Graduate School ETD Form 9
(Revised 12/07)

PURDUE UNIVERSITY
GRADUATE SCHOOL
Thesis/Dissertation Acceptance

This is to certify that the thesis/dissertation prepared

By Kelli Kristine Slack

Entitled An Evaluation of an On-Line Retinal Imaging Tutorial

For the degree of Master of Science

Is approved by the final examining committee:

Clint Rusk
Chair

Sam Cordes

B. Allen Talbert

To the best of my knowledge and as understood by the student in the *Research Integrity and Copyright Disclaimer (Graduate School Form 20)*, this thesis/dissertation adheres to the provisions of Purdue University's "Policy on Integrity in Research" and the use of copyrighted material.

Approved by Major Professor(s): Clint Rusk

Approved by: Roger Tormoehlen 1/26/09
Head of the Graduate Program Date

Graduate School Form 20
(Revised 10/07)

PURDUE UNIVERSITY
GRADUATE SCHOOL

Research Integrity and Copyright Disclaimer

Title of Thesis/Dissertation:

An Evaluation of an On-Line Retinal Imaging Tutorial

For the degree of Master of Science

I certify that in the preparation of this thesis, I have observed the provisions of *Purdue University Executive Memorandum No. C-22,* September 6, 1991, *Policy on Integrity in Research.**

Further, I certify that this work is free of plagiarism and all materials appearing in this thesis/dissertation have been properly quoted and attributed.

I certify that all copyrighted material incorporated into this thesis/dissertation is in compliance with the United States' copyright law and that I have received written permission from the copyright owners for my use of their work, which is beyond the scope of the law. I agree to indemnify and save harmless Purdue University from any and all claims that may be asserted or that may arise from any copyright violation.

Kelli Kristine Slack
Signature of Candidate

2/10/09
Date

*Located at http://www.purdue.edu/policies/pages/teach_res_outreach/c_22.html

AN EVALUATION OF AN ON-LINE RETINAL IMAGING TUTORIAL

A Thesis

Submitted to the Faculty

of

Purdue University

by

Kelli Kristine Slack

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Science

May 2009

Purdue University

West Lafayette, Indiana

Without the support of my friends and family this thesis would not have been completed. I dedicate my thesis to:

My mother for listening to my complaints time and again throughout this process,
Ashley Musselman for consenting to my crazy plans and becoming a true friend,
Ed Farris for always arguing the opposite side in our debates,
Allison Sapp for teaching me that sometimes friendship means early mornings,
Brittany Simmons and Kelli Reiff my co-"angels" and chums for helping me remember that life is a journey that is better with friends,
Tami Mosier for always listening to me,
Ashley Mueller for sharing her expertise and reminding me what fun means,
Craig Personett for his constant advice and technological help,
And to Clint Rusk for his silly jokes and sometimes helpful advice.

Thank you.

ACKNOWLEDGMENTS

Working with Dr. Clint Rusk was an enlightening period in my life. His true passion for youth, livestock, and 4-H has inspired me in ways that I know will affect me throughout my life. His guidance allowed me to grow into a person more confident of my abilities and with the knowledge that no task is too difficult if you pay attention to the details.

Without Dr. Allen Talbert, I would still be mired in adult educational theory and how to cite in APA style. His knowledge in these areas gave me the confidence to develop my materials and write my thesis.

Dr. Sam Cordes gave me a much needed lesson in time management. If I learned nothing else from him, it is that you can fit more in a day than you anticipate, but remember to relax when your work is done.

Lastly, I would like to acknowledge the assistance that I received from Alan Cark, Customer Support Representative, for Optibrand Ltd., LLC. His intimate knowledge of retinal imaging and the Optibrand Software were vital to completing my research. Without his constant good humor and understanding I would not have been able to develop my materials.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Slack, Kelli Kristine, M.S, Purdue University, May, 2009. An Evaluation of an On-line Retinal Imaging Tutorial. Major Professor: Dr. Clint Rusk.

The purpose of this research study was to determine the effectiveness of on-line distance training for Extension Educators, Extension support staff, and 4-H livestock volunteers learning retinal imaging techniques. This study focused on the use of asynchronous on-line materials to disseminate retinal imaging technology and techniques to the Extension Educators, Extension support staff, and volunteers. The on-line retinal imaging tutorial was used to examine adults' ability to gain knowledge about the OptiReader™ device, retinal imaging techniques, and the retinal imaging software.

A significant difference was found when comparing participants' pre-test and post-test scores by a paired t-test. This significance indicates that the participants were able to learn from the retinal imaging tutorial. Most of the demographic variables had no significant impact on the knowledge gained from pre- to post-test. These results indicate that the tutorial is accessible to a wide variety of people involved with 4-H. Additionally, the results showed no significant difference in participants' scores based on prior retinal imaging training. In the researcher's opinion, this indicates that the on-line tutorial is as informative as face-to-face training and can compliment, but not replace it. Prior research shows that hands-on training with the OptiReader™ device is essential to developing proficiency at collecting high quality images in a minimal amount of time.

The results of the current study imply that other on-line distance education training courses may be successful with Extension Educators and 4-H volunteers. Since the materials can be accessed repeatedly and at the learner's pace, on-line courses can deliver information in a timely manner to a broad audience. On-line courses may also be used to compliment face-to-face training to make the live interaction more effective and less time consuming.

CHAPTER 1. INTRODUCTION

Starting in March of 2005, there were two to three retinal imaging training sessions offered at the Purdue University Animal Science Research and Education Center per year. The first sessions were taught by Alan Clark, a customer service representative from Optibrand Ltd., LLC, the producer of the retinal imaging equipment. Beginning in the fall of 2007, the sessions were taught by Dr. Clint Rusk and his graduate students. During the course of these sessions, more than 170 people from at least 50 of the 92 Indiana counties were trained to use the OptiReader™ device. Typically, these trainings lasted two days with the first day focused entirely on retinal imaging and the second day focused on the software portion of image management. Starting in November of 2007, the second day was changed to reflect more work with the OptiReader™ device. One off-campus retinal imaging training was offered in Whitley County in 2006, but no additional data was available from this training.

While these trainings have reached more than half of the counties in Indiana, training has not yet been fully disseminated to the county Extension offices. A study in 2005 highlighted the concerns of Extension Educators, who felt the time required to train individuals to use the OptiReader™ device was excessive (Howell, 2006). In addition, the 4-H livestock volunteers were concerned about the time it took to capture an image and the consistency of the images (Howell, 2006). While retinal imaging training does not need to be repeated each year, Blomeke indicated that practice is required to ensure high quality images are collected in a timely manner (2004). With training opportunities currently limited by time, the distance to training facilities, and

funding; an on-line retinal imaging tutorial may be beneficial for disseminating the technology and encouraging participants to practice.

1.1. Purpose of the Study

The purpose of this study was to determine the effectiveness of a self-taught on-line retinal imaging tutorial focusing on retinal imaging technology and software for adult 4-H volunteers, Extension Educators, and Extension support staff learning retinal imaging techniques. This study focused on the use of asynchronous on-line materials to disseminate retinal imaging technology and techniques to the Extension Educators, Extension support staff, and volunteers. The materials for this study were developed specifically for the Purdue University Cooperative Extension Service with attention to certain areas indicated by Dr. Clint Rusk, Associate Professor in Youth Development and Agricultural Education and a Youth Livestock Specialist. The on-line retinal imaging tutorial was used to examine adults' ability to gain knowledge about the OptiReader™ device, retinal imaging techniques, and the retinal imaging software.

1.2. Objectives

The overall purpose of this research was to determine the effectiveness of an on-line retinal imaging tutorial. The specific objectives were to:

1. Create materials relevant to retinal imaging technology, software, and the needs of the Purdue University Cooperative Extension Service.
2. Develop a self-training course in retinal imaging software.
3. Create instruments to assess prior knowledge of the retinal imaging system and gain in knowledge.
4. Determine the participants' initial knowledge level and whether knowledge gain was achieved.

5. Collect demographic factors to determine if there is a correlation between the results and the demographic factors.
6. Compare technical difficulty to participant's knowledge gain to determine whether a correlation exists.
7. Recommend areas for future research in distance education for adults associated with 4-H.

1.3. Significance of the Study

There are few on-line training courses available for Extension Educators, Extension staff, and volunteers in Indiana. By developing an on-line medium, information can be accessed when needed. An on-line site can also be used for educational purposes and to encourage an understanding of the technology. A successful on-line course in retinal imaging may encourage the development of other on-line courses.

1.4. Limitations of the Study

One limitation of the study was the voluntary participation of the participants. There are 92 counties in Indiana. At the time of the study, there were approximately 267 educators employed by the Cooperative Extension Service. Of these 267 Extension Educators, 76 were employed as Consumer and Family Science Educators, 84 as Agriculture and Natural Resources Educators, 80 as 4-H Youth Development Educators, 28 partial or full-time Economic and Community Development Educators, 14 in other Extension Educator positions, and approximately 396 Extension support staff. Actual numbers fluctuated during the time of the study due to retirements, resignations, and new hires. There were no data available for the number of volunteers involved with 4-H livestock and retinal imaging. Allowing voluntary participation

in the study by Extension Educators, Extension support staff, and Extension volunteers may have resulted in unintended bias. A final limitation related to the participants was potential bias due to previous knowledge of the machine and software, as well as any prior training.

Other limitations included the materials created specifically for this study, which were not tested previously to determine their effectiveness. This lack of previous testing also applied to the assessment instruments, which were also created specifically for this study.

There were also technological limitations to this study. Some participants were unable to access materials for 24 hours due to a change in the server that hosted the 4-H website. Some participants were also limited in their ability to access the materials due to slow internet connections. Additionally, some participants may have decided not to participate in an on-line tutorial due to lack of competence with a digital format.

1.5. Definition of Terms

Global Positioning System (GPS)- A system of computers, satellites, and receivers used to determine the latitude and longitude of the receiver by triangulation (Blomeke, 2004).

OptiReader™ device- A machine consisting of a camera, controller, and battery pack developed by Optibrand Ltd., LLC to collect retinal images and data. Also referred to as retinal imaging machine, retinal imager, and retinal imaging device.

Optibrand Software- A data management system designed by Optibrand Ltd., LLC to manage and store retinal images and data.

Retinal Image- A retinal image is a digital picture of the retinal vascular pattern (Blomeke, 2004).

Retinal Imaging- For the purposes of this study, it is the act of collecting a retinal image for biometric identification.

CHAPTER 2. LITERATURE REVIEW

2.1. History of the Cooperative Extension Service

Seevers, Graham, Gamon, and Conklin (1997) provided a concise summary of the development of the land-grant system of universities, experiment stations, and Cooperative Extension. As the United States attempted to rebuild itself after a devastating civil war, advances in agriculture and technology created a need for a new system to disseminate these changes to the population. Early attempts at filling the need for agricultural information included societies such as The American Philosophical Society and breed associations such as the Berkshire Agriculture Society. While these societies started to fill the need for agricultural information, there were still key issues to be addressed including: the promotion of agricultural research based on sound science and the dissemination of that research. Progress on these issues was held back by the resistance of farmers to embrace “book-farming.” The concept of “book-farming” developed with the creation of land-grant colleges following the passage of the Morrill Act in 1862, which gave land to every state in the nation to be used to fund a state university. Known as land-grant universities, these institutions were instrumental in developing educational resources and research in the agricultural sciences, mechanical arts, and military sciences. Land-grant universities soon evolved into repositories of knowledge based on research completed at demonstration stations originally created by Seaman A. Knapp (Seevers et. al., 1997).

As the universities grew, the problem of how to disseminate the information to the public grew as well. There was no organized system to make available the practical knowledge derived from research at the demonstration stations. With the passing of the Smith-Lever Act in 1914, a system was

established ". . . to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage application of the same" (Seevers et al., 1997 p. 7, Smith-Lever Act, 1985 Amended). Known formally today as the Cooperative Extension Service, this collection of demonstration agents and educators is the public branch of the land-grant universities, constantly striving to connect the people with the universities and to disseminate the research developed in laboratories across the nation (Seevers et al., 1997).

2.2. Disseminating Information

A major concern of the Cooperative Extension Service has been how to effectively transfer information to the people. This issue has been addressed in many ways: home demonstrations, public discussions, lesson series, pamphlets, brochures, one-to-one contact, specialist lectures, televised series, and the internet (Seevers et al., 1997). According to Hill and Parker (2005), the most effective programming is delivered when the system is ready to receive it. The best dissemination of information occurs when the community or organization perceives a need for instruction in a specific issue, is able to identify a program that addresses the need, and has access to "adequate knowledge, skills, and resources to implement and sustain the program" (Hill et. al., 2005, ¶ 5). Without adequate resources and collaboration between government and university sources, the Cooperative Extension Service is unable to effectively disseminate information (Hill et. al., 2005).

When considering the amount of information available today, "the Extension Service must be able to provide information that makes a difference" (Astroth, 1990, ¶ 2). County offices that embrace new technology and provide relevant information will flourish as a source of accurate and up-to-date information. "Today's information-based society dictates that we add value to information if Extension is to survive" (Davis, 2006, Conclusions and Implications

¶ 8). As Extension clientele become more versed in information gathering, it will be vital for Extension staff to be trained in the latest technology (Astroth, 1990).

2.3. Internet as a Viable Medium

Originally, distance education referred to correspondence courses by mail; receiving posts and returning the instruction packets for grading (Simonson, Smaldino, Albright, & Zvacek, 2006). Early distance education gave way to newer forms of technology: first there was radio instruction, then televised instruction, and finally internet instruction (Simonson et al., 2006). Internet instruction has been embraced more widely in the last decade with almost 90% of public universities offering on-line courses and 85% identifying on-line education as "critical to their long-term strategies" (Simonson et al., 2006, p. 13).

Distance education has been increasing in popularity in the United States, and particularly courses and training completed over the internet (Simonson et al., 2006). In Heather Duncan's 2005 article "On-line Education for Practicing Professionals: a Case Study," the learners "valued the relevance of the course content to their professional experiences, and appreciated how it allowed them prior learning as a foundation for new knowledge" (p. 882). Another advantage that learners appreciate in distance education relates to asynchronous learning, which allows students to learn at their own pace and time. The issue of time is an important one in education as "time is a valuable and scarce commodity for professionals" (Duncan, 2005, p. 892). Many of the 4-H volunteers are professionals and their time is valuable both for training and volunteering purposes (Seevers et al., 1997).

2.4. Addressing the Digital Divide in Rural America

The "digital divide" must be addressed if volunteer training is to be made available through the internet (Duncan, 2005). The percent of Indiana users who have a home computer has increased from 43.5% in 1998 to 59.6% in 2003

(Duncan, 2005). During this time, the percent of the United States population with internet access increased from 26.1% to 51.0% (U.S. Census Bureau, 2007). When estimating the current numbers, there is still a portion of the population that does not have internet access (Cejda, 2007; Salpeter, 2006). There is also a disparity in internet access between rural and urban populations with 52% of rural Americans accessing the internet as compared to 60% of urban Americans (Cejda, 2007). This difference may be due in part to demographic factors such as age, income, and educational attainment (Cejda, 2007). The 2007 U. S. Census Bureau Statistical Abstract indicates that internet access is affected by education. Only 35% of Americans with less than a high school degree access the internet compared to 88% of Americans who have obtained at least a college degree (U. S. Census Bureau, 2007). Rural areas tend to have an older population with a lower income and educational attainment than urban and suburban areas (Cejda, 2007). Yet, these factors would be less detrimental to internet access with a stronger infrastructure (Cejda, 2007).

Part of the digital divide is fueled by a lack of access to broadband technology. In 2001, only 6% of rural communities had broadband connections compared to 21% of urban and 23% of suburban communities (Cejda, 2007). This disparity may be due to the higher cost of updating rural telephone lines, which in turn creates higher costs for the consumer (Cejda, 2007; Salpeter, 2006). In spite of these differences, delivery of educational opportunities and professional training via the internet has continued to grow (Simonson et al., 2006). However, consumers who do not have computers and internet access available at home or at work may be less likely to participate in training and educational opportunities accessed through the internet (Mincemoyer, 2003).

As distance technologies make travel to rural areas less necessary for educators, access to technology by rural learners becomes more vital (Cejda, 2007). While there has been an increase in internet connectivity and availability in rural areas (U. S. Census Bureau, 2007), greater access is needed to ensure adequate coverage and educational opportunities. For 4-H volunteers, access to

technology and the internet must be made available for training to be viable over the internet (Mincemoyer, 2003).

2.5. Adult Educational Theory in Extension

The Cooperative Extension Service is the "largest institution of adult education in America" (Franz, 2007, ¶ 1). An institution that affects so many people should base its educational opportunities on adult educational theory to have a greater impact in communities and with clientele (Franz, 2007). Successfully implementing adult educational theories also involves learner participation in the process (Grudens-Schuck, 2000). Participation by learners enhances their experience and understanding through sharing of prior knowledge and collaboration (Merriam, Caffarella, & Baumgartner, 2007). Encouraging participation in educational opportunities and training can lead to deeper comprehension for Extension clientele through critical reflection and changes in the learner's perceptions (Franz, 2007).

Learning preferences need to be considered for both Extension staff and clientele (Franz, 2007). For many Extension Educators and their clients, this means learning by "doing" and "seeing" (Richardson, 1994). While all learning occurs in the mind, meaningful learning occurs when a neural connection is made between information in the mind and information that is being read, heard, and seen (Taylor, 2006). Creating experiences that allow the learner to "see" and "do" enhances their meaningful learning connections, which can lead to greater learning by the client (Taylor, 2006).

When teaching adults, it is also important to consider aspects of the adult's life that affect how they learn and change. Adults have preconceived notions based on past experiences and prior knowledge. New information will build upon this base. It is important to acknowledge and use their prior experiences when possible (Caffarella, 2002). Adults are also "motivated to learn based on a combination of complex internal and external forces" (Caffarella, 2002, p. 29). In order to enhance their learning opportunities, adults must

engage in learning that is meaningful to them, in subjects that will be relevant in the near future, and in ways that they learn best. This may mean using a variety of learning techniques to capture and retain their interest throughout the program (Caffarella, 2002). These techniques should allow learners to participate actively, whether they are involved in an individual project or in a group (Caffarella, 2002; Grudens-Schuck, 2000). It may also mean that adult learners need to be "given more control over their learning environment and the activities they undertake" (McLoughlin, 2002, p. 159). Additionally, the following items must be considered when it comes to the comfort of adult learners: location, temperature, time of day, length of program, socio-cultural context, responsibilities, pressures, and other such factors. (Caffarella, 2002).

2.6. Volunteers, 4-H, and Education

Often described as the "lifeblood of Extension," volunteers have been one of the greatest assets of the Cooperative Extension Service since its inception in 1914 (Seevers et al., 1997, p.188). "This is especially true in 4-H, where the implementation of programs relies almost exclusively on the work of thousands of dedicated adult volunteers" (White & Arnold, 2003, Introduction section, ¶ 1). Four-H volunteers tend to be middle-aged, females who are married, have children in 4-H, and are former 4-H participants themselves (Rohs & Warmbrod, 1985). To ensure that volunteers continue to participate in 4-H, it is important to help these volunteers achieve the skills they need by providing training and educational opportunities (Hinton, 1994). While the traditional focus of 4-H has been on youth development, adult volunteers are the backbone of the program and deserve adequate and effective training (VanWinkle, Busler, Bowman, & Manoogian, 2002).

When considering volunteers in Extension, the benefits that volunteers receive from participating in Extension programming are often overlooked (Braker, Leno, Pratt, & Grobe, 2000). Volunteers in the Extension system receive personal, community, and economic benefits from participation. Braker

et al. (2000) found that the greatest benefits arise from an increase in knowledge and skills, personal growth, and family involvement. While community and economic benefits are important, it should also be noted that volunteers "appear to be motivated primarily by desires to contribute and to feel good about themselves rather than extrinsic benefits" (Braker et al., 2000, Implications section, ¶ 5). Volunteers should be recognized for the positive impact they have on Extension clientele, and given the support and encouragement they need to continue their service (Braker et al., 2000). Some volunteer concerns brought forth by Braker et al.'s study were "a desire for more ongoing training after the basics, updates on new information and changes, and the need for continuous support and encouragement" (Implications section, ¶ 3).

4-H volunteers perform their jobs better when they "understand the job and have been trained to do the job" (Kaslon, Lodl, & Greves, 2005, Introduction section, ¶ 1). It is not enough to simply train a volunteer, an organization must also be sure that the training is effective (Kaslon et al., 2005). Training that addresses: development of new skills, receipt of rewards, and social interaction will be the most effective (VanWinkle et al., 2002). Inadequate training could be more detrimental to the organization than no training.

Potential participants often perceive training as unavailable or unattainable due to travel, time off work, and cost (Sherfey, Hiller, Macduff, & Mack, 2000). With increasing pressures on volunteers, greater demands on budget dollars, and expanding programs, new training methods should be considered. The answer to this dilemma might be on-line training, which "offers participants the opportunity to learn during their peak learning times, to study at their own pace, to focus on specific content areas, to test themselves daily, and to have access to more information and resources" (Kaslon et al., 2005, Background section, ¶ 5).

Research by Kaslon, et al. (2005) found that volunteer leaders were amiable to "on-line training as a method of gaining new skills" (Discussion and Conclusions section, ¶ 1). This finding is supported by Cook, Kiernan, and Ott

(1986) who reported that volunteers were open to a variety of training methods. Cook, et al.'s research also dispelled the myth that volunteers do not want to be trained, finding that nearly two thirds of surveyed volunteers wanted to participate in training (1986). Kaslon et al. (2005) determined that volunteer leaders were using the internet to find resources related to 4-H. These volunteers indicated that it was "easier and more useful to pull information off the Web than to go to the Extension Office" (Kaslon et al., 2005, Discussion and Conclusions section, ¶ 3). Research on the use of the internet shows that "on-line learning [is] removing physical and time constraints for . . . learners" (Kaslon, et al., 2005, Discussion and Conclusions, ¶ 3). Kaslon, et al. (2005) found that on-line training is an acceptable method for training, is an accessible way to gain information, is the preferred method of training for volunteers, provides consistent training and better access to information when it is needed, is not time or place bound, and reduces the amount of travel previously required to attend face-to-face training.

Kaslon, et al. (2005) also identified three challenges to on-line training: technology accessibility, delayed answers to questions sent to content experts, and the lack of interpersonal communication. While these challenges are important to consider, the various commitments of volunteers must also be taken into account. Up to 85% of 4-H volunteers are actively volunteering with other organizations. Volunteers also have other time commitments with nearly two-thirds of volunteers employed full-time (Culp, McKee, & Nestor, 2005).

2.7. Livestock Shows and 4-H

Livestock shows have been an integral part of the American landscape since the first premium shows, held in the early 1800s, awarded prizes and money to the best crops and livestock to encourage improvement and greater production (Seevers et al., 1997). Continued improvement in livestock and crops was encouraged with the formation of boys' and girls' clubs in the early 1900's. These clubs grew quickly as the "idea of awarding premiums for agricultural projects at county and state fairs became very popular" (p. 33). Additional

benefits from premium shows included faster adoption of new techniques and crop varieties by farmers, as well as skills acquisition by members of these boys' and girls' clubs, which grew into a new organization called 4-H (Seevers et al., 1997).

Life skills development remains the primary purpose of 4-H and the foundation from which projects are based (Boyd, Herring, & Briers, 1992; Fox, Schroeder, & Lodl, 2003). Four-H youth acquire many skills through the 4-H program that benefit them in their adult lives. "The development of life skills allows youth to cope with their environment by making responsible decisions, having a better understanding of their values, and being better able to communicate and get along with others" (Boyd, et. al., 1992). In Fox et al.'s 2003 study, the greatest life skills that former 4-H members felt they developed were: responsibility, production skills, the ability to handle competition, and the ability to meet new people.

As 4-H has grown and changed in the last one hundred years, premium and award shows have remained an important way to develop life skills in 4-H members (Kieth & Vaughn, 1998). Where 4-H was originally intended to educate youth with the skills they would need for a life on the farm, the 4-H program of today enhances the development of 4-H youth to become "responsible and capable citizens, regardless of home life or family background" (Kieth & Vaughn, 1998, p.41). As 4-H members complete livestock projects, they not only learn how to care for their animal, groom it, exhibit it, and monitor its health, but also greater responsibility, self-confidence, people skills and decision making skills (Rusk, Summerlot-Early, Machtmes, Talbert, & Balschweid, 2003).

Kieth and Vaughn (1998) found that adults' perceptions of life skill development through livestock competitions were positive. These researchers discovered that the greatest perceived benefits were in personal skill development such as responsibility, work ethic, dependability and in enhancing self-esteem. Ward's 1996 study also supports the contribution of 4-H to life skill development. Ward found a high correlation between 4-H participation and the

development of life skills. Her respondents felt that 4-H participation helped them to learn to accept responsibility, and improved their ability to relate to others. Respondents also credited the 4-H program with improving their: spirit of inquiry, decision making, public speaking, and self esteem. Ward's respondents indicated that livestock shows and exhibitions were the most effective activities for building life skills. Additional research completed by Boleman, Cummings, and Briers in 2005 supports the work of Kieth and Vaughn (1998), and Ward (1996). Findings by Boleman et. al. (2005) suggest a low positive relationship between 4-H and two of the life skills tested, with higher positive relationships noted for eleven of the skills tested; indicating that 4-H does teach life skills to its members. The studies listed above represent a range of survey populations from parents and leaders to current and former 4-H members, indicating that life skills development is recognized by many segments of the 4-H population (Boleman et. al., 2005; Kieth & Vaughn, 1998; Ward, 1996).

2.8. Ethics and 4-H

Ethics in 4-H is not a new concern, but the clenbuterol scandal of the 1990's forced a bright light on unethical livestock feeding practices and resulted in stricter testing and regulation of 4-H animals, as well as improved education of 4-H members (Goodwin, Murphy, & Briers, 2002; Mitchell & Dunnavan, 1998). Clenbuterol is a beta agonist that redirects energy in an animal's body from fat deposition to muscle development. It is banned by the U. S. Food and Drug Administration (FDA) for use in food animals. U.S. meat and health officials first became aware of a problem with suspected clenbuterol use in 4-H animals in the late 1980's. By 1991, the Food Safety and Inspection Service (FSIS) had developed a method to detect clenbuterol in animal tissue, but the test wasn't accurate enough to detect clenbuterol use in 4-H livestock tested in 1991, 1992, and 1993. A more accurate testing method was developed in 1994 and a strategy was put in place that would result in the disqualification of animals that tested positive for clenbuterol use at state fairs across the United States (Mitchell

& Dunnavan, 1998). At this point, “the retina became the tissue of choice because clenbuterol residues had been detected for at least 20 [weeks] after withdrawal” (Mitchell & Dunnavan, 1998, p. 210). The enhanced testing methods resulted in the detection of clenbuterol in both the Grand and Reserve Grand Champion steers at the 1995 National Western Stock Show held in Denver, Colorado (Mitchell & Dunnavan, 1998).

As a result of unethical practices such as: feeding clenbuterol, filling the animal with air or vegetable oil, falsifying documentation, and falsifying animal identification; Extension Educators and Extension administration felt the need to increase ethical awareness and education in 4-H members (Goodwin, et al., 2002; Rusk & Machtmes, 2003). Goodwin, Murphy, and Briers (2002) examined the effectiveness of a video program to change student perceptions of ethical behavior. These researchers found that their experimental group had a significantly higher mean value for ethical knowledge than the control group. Yet, the youth who show livestock, along with their parents, make decisions every show season about whether to act ethically or not (Rusk & Machtmes, 2003). Rusk and Machtmes (2003) examined students’ perceptions of ethics before and after participating in a lesson on livestock ethics. After the ethics lesson, the researchers found a significant increase in participants’ knowledge of: “characteristics of a trustworthy livestock exhibitor,” “links in the food safety chain,” “percentage of U.S. food animals that come from youth livestock shows,” and “the most important reason to address the issue of livestock show ethics” (Rusk & Machtmes, 2003, Results section, ¶ 2). It is important to note that 64.1% of Goodwin, et al.’s control group achieved a perfect score on the test, indicating that the majority of livestock project participants act ethically (2002). By implementing one or both of the methods used by Rusk and Machtmes (2003), or Goodwin, et al. (2002), significant changes in the unethical actions of participants might occur.

2.9. Identifying Livestock Animals

Livestock identification has been a concern for centuries resulting in the development of several identification methods including: ear tagging, branding, ear notching, and tattooing (Solis & Maala, 1975). These methods remained the only viable methods of livestock identification until the 1970's, and remain important methods today. Authenticity of the identification poses a problem as the methods listed above can be tampered with, altered, and duplicated. A more reliable method of identification was developed by Solis and Maala in 1974: noseprinting. Noseprinting was the standard for secure livestock identification in Indiana's 4-H program until a more secure method was developed by Whittier, Shadduck, and Golden in the 2000's.

As stated by Whittier et al. (2003) the greatest drawback to noseprinting lies in the smudging of the print. It is often difficult to obtain non-smudged prints due to one of the following: too much ink, moisture on the animal's nose, and movement of the animal (Neary & Yeager, 2002). This poses a problem when noseprinting is used for permanent identification of sale and exhibition sheep and cattle (Neary & Yeager, 2002).

Several new technologies have made permanently identifying livestock easier in the last few years (Evans & Van Eenennaam, 2005). Improvements such as global positioning systems, biometrics, and DNA-based biotechnologies make the permanent identification of animals easier, more reliable, and more tamper resistant. One new technology developed by Optibrand Ltd., LLC, a Colorado based company, is retinal imaging which is a form of permanent identification. The identification of retinal images relies on the unique retinal patterns that are formed by each animal before birth (Rusk, Blomeke, Balschweid, Elliot, & Baker, 2006). Advantages to retinal imaging over DNA identification include: the cost per animal and the time required to verify images (Evans & Ven Eenennaam, 2005).

2.10. Ethics, Technology, and Retinal Imaging

In order to ensure ethical enrollment and exhibition requirements in 4-H ruminant livestock projects, new technologies must be considered (Rusk et al., 2006). The ability to alter brands, ear tags, tattoos, and ear notches was well understood in 1975 when Solis and Maala searched for a new technique of permanent identification. Their solution was noseprinting, which is unique to each animal. Noseprinting remains a viable method of permanent identification, but noseprints "are inconsistent in quality, sometimes difficult to read due to smearing, and require a 'trained eye' to verify a match" (Rusk et al., 2006, Implications, ¶ 2).

As a digital, tamper-resistant method of permanent animal identification, retinal imaging was chosen to replace traditional noseprints in Indiana to verify animal identity at the Indiana State Fair and select county fairs. Retinal imaging is a secure biometric that is unchanging and present at birth (Rusk, et al., 2006; Whittier, et al., 2000). By adding a Global Positioning System (GPS) location to the OptiReader™ device, the location of animals at the time of retinal image collection can be verified as well. A study by Rusk, et al. (2006) determined that retinal imaging and noseprinting were "equally reliable forms of permanent identification" (Conclusions, ¶ 1). Additionally, untrained individuals in the Rusk et. al. study were able to match pairs of retinal images more often than noseprints, by as much as 29.7%. Retinal imaging is the new standard in ruminant animal identification in Indiana due to its tamper resistance, easy identification, and digital format.

CHAPTER 3. MATERIALS AND METHODS

The purpose of this study was to determine the effectiveness of a self-taught on-line retinal imaging tutorial focusing on retinal imaging technology and software for adult 4-H volunteers, Extension Educators, and Extension support staff learning retinal imaging techniques. This study focused on the use of asynchronous on-line materials to disseminate retinal imaging technology and techniques to the Extension Educators, Extension support staff, and volunteers. The materials for this study were developed specifically for the Purdue University Cooperative Extension Service with attention to certain areas indicated by Dr. Clint Rusk, Associate Professor in Youth Development and Agricultural Education and a Youth Livestock Specialist. The on-line retinal imaging tutorial was used to examine adults' ability to gain knowledge about the OptiReader™ device, retinal imaging techniques, and the retinal imaging software. The objectives of this study were to:

1. Create materials relevant to retinal imaging technology, software, and the needs of the Purdue University Cooperative Extension Service.
2. Develop a self-training course in retinal imaging software.
3. Create instruments to assess prior knowledge of the retinal imaging system and gain in knowledge.
4. Determine the participants' initial knowledge level and whether knowledge gain was achieved.
5. Collect demographic factors to determine if there is a correlation between the results and the demographic factors.
6. Compare technical difficulty to participant's knowledge gain to determine whether a correlation exists.

7. Recommend areas for future research in distance education for adults associated with 4-H.

3.1. Materials Creation

Few materials addressing retinal imaging technology were available for this study. As a result, the following materials were created by the researcher to address this need: the PowerPoint tutorial “What Is Retinal Imaging?” (Appendix A), the tutorial worksheet “What Is Retinal Imaging?” (Appendix B), short instructional videos such as “Inserting Records,” and written software guides such as “Adding Plugins” (Appendix E).

Each set of materials addressed a different aspect of retinal imaging. The PowerPoint tutorial and worksheet focus on the physical demands of retinal imaging, describing how the image is captured and how to evaluate a retinal image. The additional instructional videos and written software guides focus on the technological demands of retinal imaging and explain how to: use the software, add additional information to the image, and prepare the image for digital transport. The videos and written software guides were created to allow learners to access the material that best suits their learning needs. In some instances, written materials were more conducive to learning the material and an additional video was not created.

Topics addressed in the PowerPoint tutorial entitled “What is Retinal Imaging?” (Appendix A) include: What is Retinal Imaging, Parts of the Eye, Illumination, Parts of the Imager, Technology, Matching Images, Species ID, and Clear Imaging. “What is Retinal Imaging” explains what retinal imaging is, why it is being used, and how it was developed. “Parts of the Eye” describes the various parts of the eye that are involved in the retinal imaging process and why it is important to know these parts. “Illumination” discusses the types of illumination that are needed to ensure and capture a clear image. “Parts of the Imager” breaks the OptiReader™ device into its basic components and names

the parts. “Technology” addresses the underlying technology behind the retinal imaging process and the users’ interaction to this technology. “Matching Images” is a short lesson on identifying a match and the factors affecting image quality. “Species ID” describes the general differences between sheep, goat, and beef images. “Clear Imaging” discusses the factors that make some images difficult to match, such as: poor clarity, an improper camera angle, and glare. A worksheet (Appendix B) was created to correspond to the PowerPoint based tutorial. This worksheet is also a PowerPoint document minus the self quizzes of the PowerPoint based tutorial. The worksheet has blanks to engage the learner in actively reading and absorbing the information presented.

In order to address the software portion of capturing and transmitting retinal images, an instructional guide was written. For more visual learners, additional videos were developed to provide clear instruction that follows the written guides. The written tutorials include: inserting records (Appendix C), managing the information (Appendix D), adding plug-ins (Appendix E), and setting-up the reader configuration (Appendix F). The videos address the following topics: adding plugins, programming the compact flash card, inserting records, copying files, editing images, exporting to Excel, creating JPEGs, managing the information, printing certificates, searching records, and setting-up preferences. Each written and visual tutorial addresses specific topics in a step-by-step manner that allows the learner to follow along and try the actions themselves.

A final segment addresses the need for reminders before retinal imaging. Since retinal imaging is only performed once or twice a year for each specie, it can be beneficial to have a list of “tips” to remind the person collecting retinal images of the necessary steps to capture a good image. Two “tip sheets” (Appendixes G and H) were created and included with the lesson so the learner might print them off for use at the retinal imaging location.

3.2. Developing a Self-Training Course

Materials were developed in a digital format. Both the content and presentation of the materials were based on educational instruction references, including *Learning Theories and the Design of E-learning Environments* by Gillani (2003). In order to achieve adequate cognitive transfer without overwhelming the learner, the media was presented in small sections. The content was focused in categories and broken into pieces based on common themes. In addition to the content, theme, and size, the visual perception of the materials was considered. Blue was chosen as a background color for the videos as it evokes thoughts of confidence and comfort (Gillani, 2003). Green was chosen as a background color for the website as it is associated with 4-H and with doing (Gillani, 2003). A linear layout was chosen to encourage the learner to follow the lesson as it is presented; however, all of the sections were available at the start of the tutorial so learners can choose the order of their lessons to best fit their learning needs.

In order to create a student centered tutorial, personalize the instruction, and help the materials better fit the needs of the learner; lessons were presented in both a written and a visual mode. This strategy allows learners to choose the method that best fits their needs, while attending to a wider range of student learning styles. Written materials were downloadable and presented in three formats: as a PDF file, in the original format such as Word or PowerPoint, and as an html file. Videos were not downloadable due to their size, but were available through the website. Different formats allowed learners to choose the method that best matched their learning style. For example, a learner might be most comfortable with visual interactive learning methods such as the PowerPoint tutorial. Another learner might be more engaged by the audio from the videos. Some learners might gain more from following the text-based materials while viewing the videos. By varying the materials to accommodate the learner's needs, students were able to personalize their instruction and bring prior knowledge into the tutorial.

When creating the materials for this study, particular attention was given to behavioral and cognitive learning theories in designing the materials for adult needs (Gillani, 2003; Merriam et al., 2007). Each part of the retinal imaging lesson was addressed in detail to satisfy participants' need for an in-depth understanding of the OptiReader™ device and software. These parts were then used as pieces of a whole that could be supported by prior knowledge. This concept was supported by the webpage layout which encouraged the learner to access the information linearly, but allowed for variation in learning style by allowing access to all of the materials at the start of the tutorial.

In order to implement the web-based program, all materials needed to be created in a user-accessible digital format. The materials needed to meet the time constraints of adult learners by providing instruction in small sections. These digitally based materials then needed to be made available to users through an internet webpage with technical support available for questions and technical difficulty.

3.3. Creating Assessment Instruments

Careful consideration of the participants' time and motivation resulted in the creation of assessment instruments that were accessible on-line. It was determined that a pre-test (Appendix I) and post-test (Appendix J) would best reflect the participant's knowledge gain. Both the pre-test and post-test contained 38 questions, 17 of which were multiple choice questions with the remaining 21 being true or false questions. Sixteen of the questions focused on the retinal imaging equipment. Twenty-two questions addressed the use of the retinal imaging software. To prevent answer bias due to the use of different wording or changing the question order, the same 38 questions were used in the same order on both the pre- and post-test.

Demographic information was collected on the pre-test. This information included the participant's: age, gender, county, whether they had attended a Purdue retinal imaging training, if they had attended a training held elsewhere, if

they had used the Optibrand software, if they had attended a training about the Optibrand software, their involvement with 4-H, and their familiarity with retinal imaging. These demographic factors were collected to determine if a correlation could be made between the results and the demographic factors.

An exit survey was included with the post-test. This exit survey asked questions related to ease of access to the tutorial. Participants were also asked to select their preferred method of instruction and to make suggestions for improvements to the course. This information was collected with the intent of comparing technical difficulty to participant's knowledge gain to determine whether a correlation exists between the two.

3.4. Determining Participants' Initial and Final Knowledge

To determine their initial knowledge of retinal imaging, participants were asked 38 questions that ranged from: Which is the best definition for retinal imaging? to, Is there more than one way to open the insert tab in the retinal imaging software? There were eight multiple choice questions related to the OptiReader™ device and image collection technique followed by eight true or false questions. The next section of the pre-test focused on participant's knowledge of the retinal imaging software with nine multiple choice questions and 13 true or false questions. These two question formats were chosen for ease of coding and statistical analysis.

After completing the on-line tutorial, participant's ending knowledge was assessed using the same questions, presented in the same order. This format was chosen to allow direct comparison between participant answers and to allow for accurate analysis of knowledge gained. Separating the questions into two sections allowed a more thorough review of participant's knowledge of the OptiReader™ device and the retinal imaging software.

3.5. Institutional Review Board

The Purdue University Institutional Review Board (IRB) was contacted on May 22, 2008. Final approval for the project was received on July 22, 2008. The IRB exemption number for this project is #0805006936.

3.6. Identifying Participants and Data Collection

Participants in this study were recruited from Purdue University Cooperative Extension Service Educators, Extension support staff, and Extension volunteers. On August 20, 2008, an email was sent to Extension Educators and Extension support staff inviting their participation in a retinal imaging tutorial (Appendix K). The population available for the study was not randomly selected. All of the participants in this study self-selected participation. Participants that elected to join the study were directed to follow a Universal Resourse Locator (URL) link to a short demographic survey and pre-test hosted on Zoomerang (WWW.ZOOMERANG.COM). The demographic survey asked for participants to select the term or terms that best described their involvement in the 4-H program. Participants could identify themselves as Extension Educators, other Purdue employees (not an Extension Educator), a parent of a 4-H member, a volunteer, a former 4-H member, a current 4-H member, and other (with description required). After completing the demographic survey and pre-test, participants were instructed to view and study the Retinal Imaging Tutorial available on the Indiana 4-H website. Seventeen participants completed the pre-test and demographic survey following this e-mail.

Reminder e-mails were sent on August 28, 2008 and September 19, 2008 (Appendixes L and M). These e-mails were addressed to Extension Educators, Extension support staff, and Extension volunteers. They included a “thank you” to those who had already completed the post-test, answers to questions that had been received by the researcher, and links to the pre-test, tutorial website, and post-test. Eighteen participants completed the demographic survey and pre-test following the first reminder. Twenty-one participants completed the demographic

survey and pre-test following the second reminder. Fifty-six participants completed the demographic survey and pre-test.

The demographic survey and pre-test were closed to participants on November 3, 2008. The post-test and reflections survey were closed to participants on November 13, 2008. Fifty-two participants completed the post-test and reflections survey.

Data collection was done through the Zoomerang (WWW.ZOOMERANG.COM) website. Answers were recorded by Zoomerang and available to the researcher throughout the study. Individual replies from participants and group data were collected to compare pre-test to post-test answers.

3.7. Analysis of Data Collected

After the raw data were downloaded from the Zoomerang website, the Purdue University Statistical Consulting Services (PUSCS) staff was contacted. With the assistance of one of the PUSCS staff, the data were analyzed using the Statistical Package for Social Sciences (SPSS) software version 16. Through the use of this software, means, standard deviations, frequencies, variances, percentages, paired t-tests, one-way ANOVAs, and other statistical factors were calculated. The results of these calculations were used to interpret the data.

Statistical significance for the paired t-tests was established a priori as a p-value of less than .05. Statistical significance for the ANOVAs was established a priori as a significance of less than .05.

CHAPTER 4. RESULTS

This study was designed to determine the effectiveness of an on-line retinal imaging technology and software tutorial for adults involved with the 4-H program. Effectiveness was measured by the knowledge gain of participants from pre-test to post-test after viewing the retinal imaging curriculum. In addition to the pre-test and post-test, participants completed a demographic survey indicating: age, gender, whether they had attended a retinal imaging training at Purdue University or elsewhere, if they had used the Optibrand software, if they had been trained on the Optibrand software, their involvement in 4-H, and their familiarity with retinal imaging. At the end of the post-test, participants were given the option of completing a reflections section that included questions about: course accessibility, technical difficulty, preferred instruction method, and suggestions for improvement. This chapter presents participants' responses to survey questions, pre-test and post-test scores, reflection questions, and the statistical analysis of the listed factors. Participants were not given access to their scores or the answers to the questions.

4.1. Participant Demographic Results

Participants were presented with demographic questions before completing the pre-test. They were not required to answer the questions, however, before continuing to the pre-test. They were able to leave the survey and pre-test at any time without submitting their answers. Fifty-six participants chose to complete the demographic survey. Of the 56 participants who completed the survey and pre-test, 52 completed the post-test and reflections.

Only those participants that completed both the pre-test and post-test were included in the data analysis. Therefore the sample size was 52.

4.1.1. Prior Retinal Imaging System Experience

The first question on the demographic survey asked whether the participant had attended a retinal imaging training at Purdue University. Thirty-two participants indicated they had not attended a retinal imaging training at Purdue University. Twenty participants indicated that they had attended a retinal imaging training at Purdue University.

Next, participants were asked to indicate whether they had attended a retinal imaging training elsewhere. Forty-two participants indicated they had not attended a retinal imaging training elsewhere. Ten participants indicated they had attended a retinal imaging training that was not held at Purdue University.

Participants were then asked to choose whether they had used the Optibrand retinal imaging software before viewing the retinal imaging tutorial. Twenty participants indicated they had not used the Optibrand software before. Thirty-two participants indicated they had used the Optibrand software before.

The last question about training asked participants whether they had attended a training that included instructions on how to use the Optibrand retinal imaging software. Twenty-nine participants indicated they had not attended a retinal imaging training that included instructions on how to use the Optibrand software. Twenty-three participants indicated they had attended a retinal imaging training that included instructions on how to use the Optibrand software.

Table 4.1 *Frequencies of Retinal Imaging System Experience*

	Yes (% Yes)	No (%No)
Trained at Purdue University	20 (38.5)	32 (61.5)
Trained Elsewhere	10 (19.2)	42 (80.8)
Used Software	32 (61.5)	20 (38.5)
Trained to Use Software	23 (44.2)	29 (55.8)

4.1.2. Age

Participants were asked to indicate their age by checking one of six categories: under 20 years, 20-29 years, 30-39 years, 40-49 years, 50-59 years, and 60 years or older. One participant (1.9%) indicated he or she was under 20 years-of-age. Nine participants (17.3%) indicated they were between 20 and 29 years old. Eleven participants (21.1%) indicated they were between 30 and 39 years-of-age. Fourteen participants (26.9%) indicated they were between 40 and 49 years-of-age. Thirteen participants (25%) indicated they were between the ages of 50 and 59. Four participants (7.7%) indicated they were over 60 years-of-age. The mode for age was 40-49 years. For the purposes of this study, the under 20 year old group and the 20-29 year old group were combined for a total of ten participants. Additionally, the 50 to 59 year old group and the 60 years or older group were combined for a total of seventeen participants. Figure 4.1 shows the frequency of these adjusted age groups.

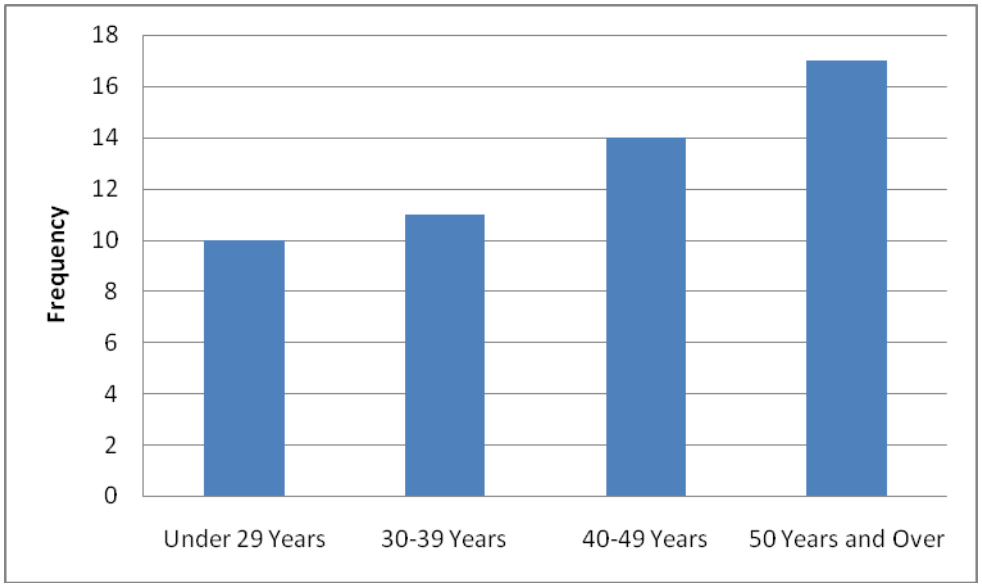


Figure 4.1 *Adjusted Age Groups*

4.1.3. Gender

Participants were asked to indicate their gender. Twenty-nine (55.8%) participants were female and twenty-three (44.2%) participants were male.

4.1.4. Involvement With 4-H

Participants were then asked to select the term or terms that best described their involvement with 4-H from seven categories: Extension Educator; Purdue employee, but not an Extension Educator; parent of a 4-H member; volunteer; former 4-H member; current 4-H member; or other. If participants selected "other," they were asked to provide a description. Thirty-one participants indicated they were Extension Educators. Three indicated they were Purdue employees, but not Extension Educators. Nine indicated they were the parent of a 4-H member. Twelve participants indicated they were volunteers in the 4-H program. Fourteen participants indicated they were former 4-H members. No participants were current 4-H members. Ten participants chose other as their response. Seven of those 10 participants were support staff for

their County Extension Offices. Two of the remaining participants were project leaders and one was a fair board member. There were 15 participants who selected two or more of the terms. Figure 4.2 shows the participants 4-H involvement in each category.

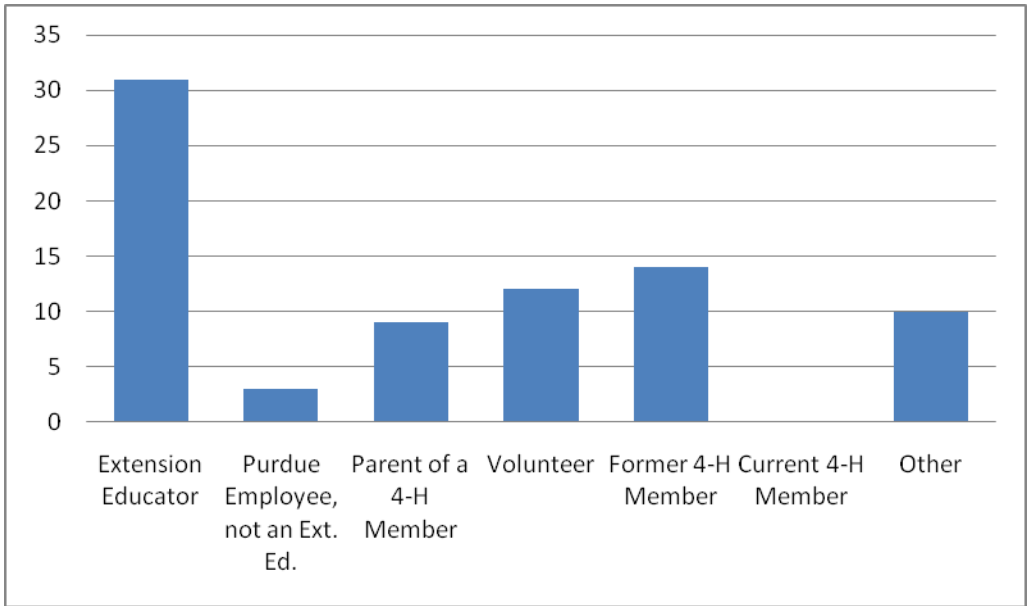


Figure 4.2 *4-H Involvement*

4.1.5. Familiarity With Retinal Imaging

Participants were asked to select their level of familiarity with the retinal imaging system on a scale of one to five, with one being “not familiar” and five being “very familiar.” Three participants indicated they were “not familiar” with retinal imaging, while 9 participants indicated they were “very familiar” with retinal imaging. Figure 4.3 shows the participants’ self reported level of familiarity with retinal imaging.

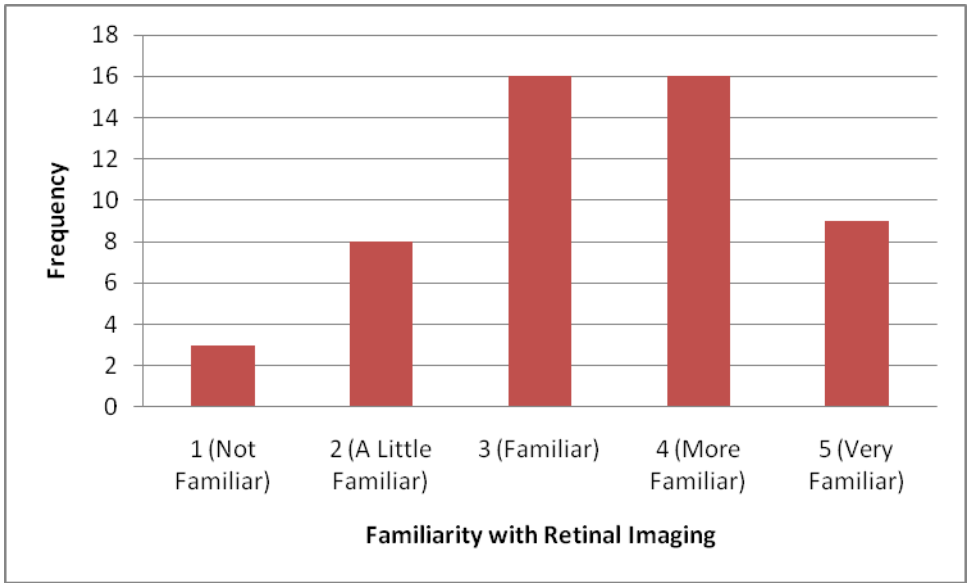


Figure 4.3 *Participants Self Reported Familiarity with Retinal Imaging*

4.2. Knowledge Gain Data

Participants were instructed to complete a pre-test in conjunction with the demographic survey before viewing the retinal imaging technology and software tutorial. After completing the on-line tutorial, participants were asked to complete the post-test and provide reflections. Participants were not required to answer the demographic survey questions before continuing to the pre-test. They were able to leave the survey, pre-test, post-test, and reflections at any time without submitting their answers. The pre-test was written specifically to cover the materials developed for this study. The pre-test consisted of 38 multiple choice and true/false questions over the subject matter presented in the on-line tutorial. The post-test consisted of the same 38 questions listed in the same order as they were on the pre-test. Fifty-six participants completed the pre-test. Of the fifty-six participants who completed the survey and pre-test, 52 of them completed the post-test and provided reflections. Only those participants who completed both the pre-test and the post-test were included in the data analysis.

The pre-test and post-test were arranged in two sections: one that focused on the technology and one that focused on the software. This allowed further

breakdown and analysis of the data. These two sections were termed “machine” and “software” for the purposes of analysis. Participants were not given a score for the pre-test and were not shown their answers.

4.2.1. Participant Pre-Test Results

For the fifty-two respondents who completed the retinal imaging tutorial, the mean number of correct responses on the pre-test was 28 out of a possible 38, with a standard deviation of 3.93. The median was 28 correct answers and the mode was 31. The minimum number of correct answers on the pre-test was 19 and the maximum was 36. Figure 4.4 shows the participants’ pre-test score distribution.

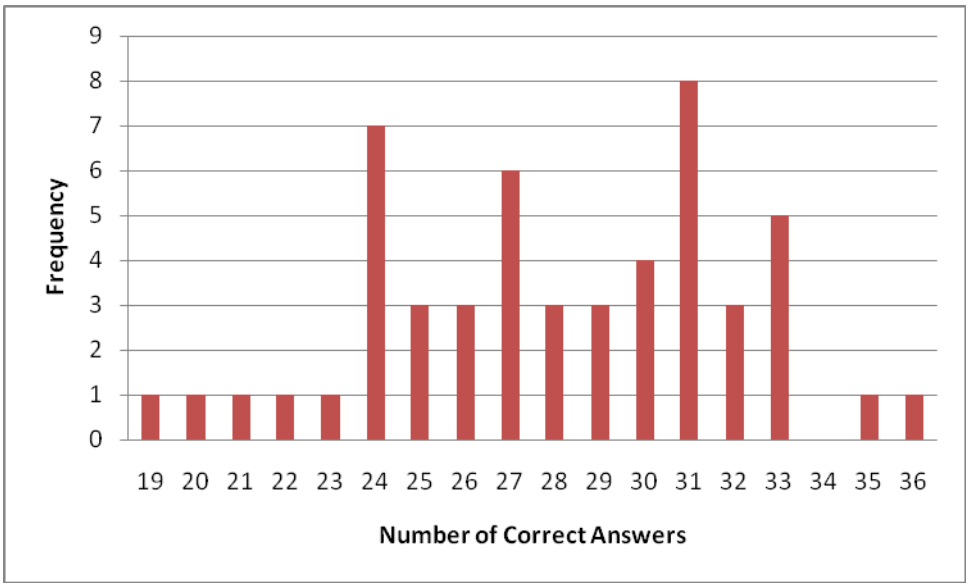


Figure 4.4 *Pre-Test Distribution of Correct Answers*

The mean number of correct responses on the machine portion of the pre-test was 13.1 out of a possible 16, with a standard deviation of 2.05. The median and mode were both 14 correct answers. The minimum number of correct

answers on the machine portion of the pre-test was 8 and the maximum was 16 correct answers. Figure 4.5 shows the distribution of participants' pre-test machine scores.

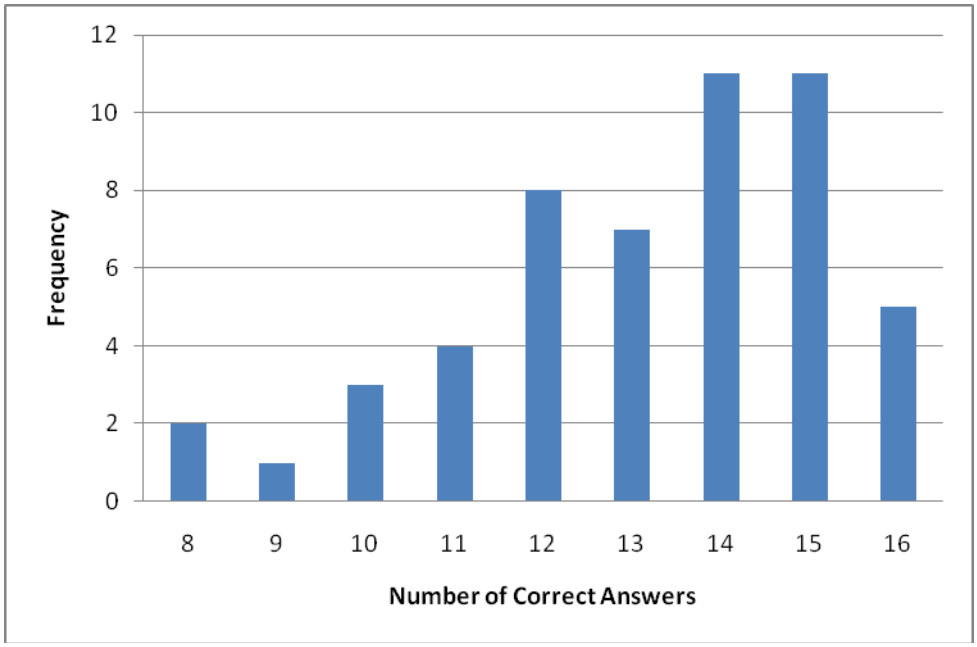


Figure 4.5 *Correct Answer Distribution on the Machine Portion of the Pre-Test*

The mean number of correct responses on the software portion of the pre-test was 14.8 out of a possible 22, with a standard deviation of 2.82. The median was 15 correct answers and the mode was 18. The minimum number of correct answers on the software portion of the pre-test was 9 and the maximum was 20 correct answers. Figure 4.6 shows the distribution of the participants' pre-test software scores.

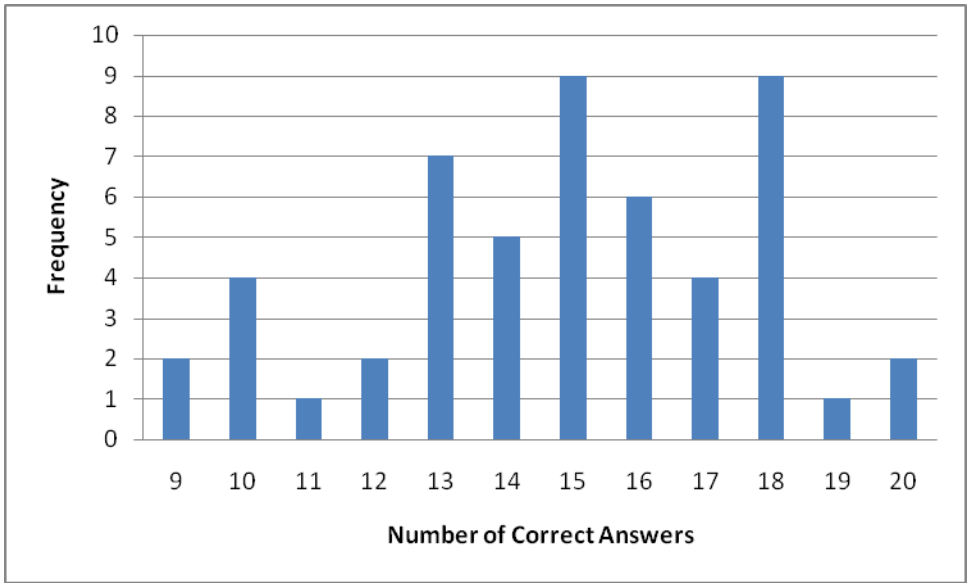


Figure 4.6 *Correct Answer Distribution on the Software Portion of the Pre-Test*

4.2.2. Participant Post-Test Results

After completing the on-line retinal imaging technology and software tutorial, participants were asked to complete the post-test and provide reflections through the Zoomerang website. Fifty-two participants completed the post-test.

The mean post-test score was 30.7 correct answers out of a possible 38, with a standard deviation of 3.94. Both the median and the mode were 30 correct answers. The minimum number of correct answers on the post-test was 23 and the maximum was 38 correct answers. Figure 4.7 shows the participants' post-test score distribution.

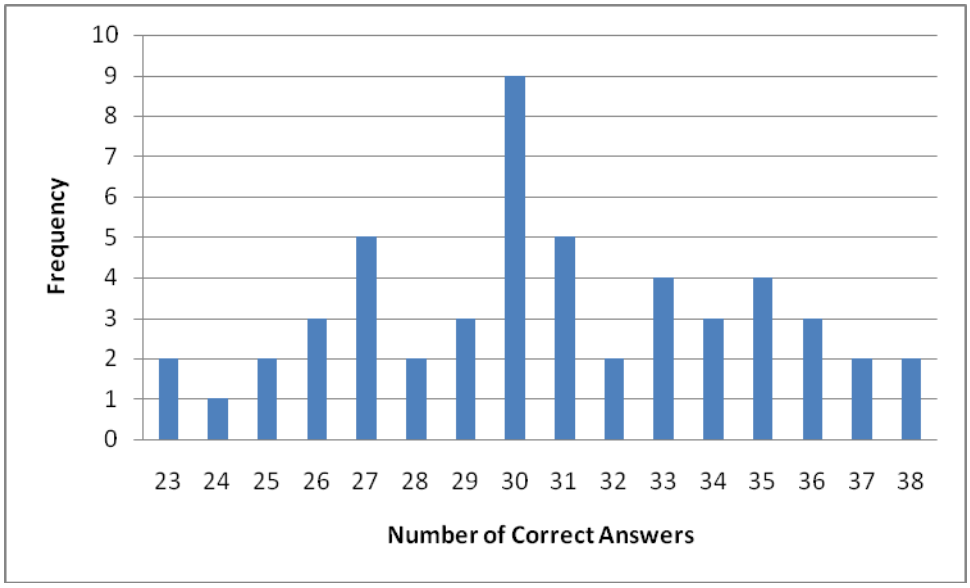


Figure 4.7 *Post-Test Distribution of Correct Answers*

The mean number of correct responses on the machine portion of the post-test was 14.2 out of a possible 16, with a standard deviation of 1.38. The median and mode were both 15 correct answers. The minimum number of correct answers on the machine portion of the pre-test was 11 and the maximum was 16. Figure 4.8 shows the distribution of participants' post-test machine scores.

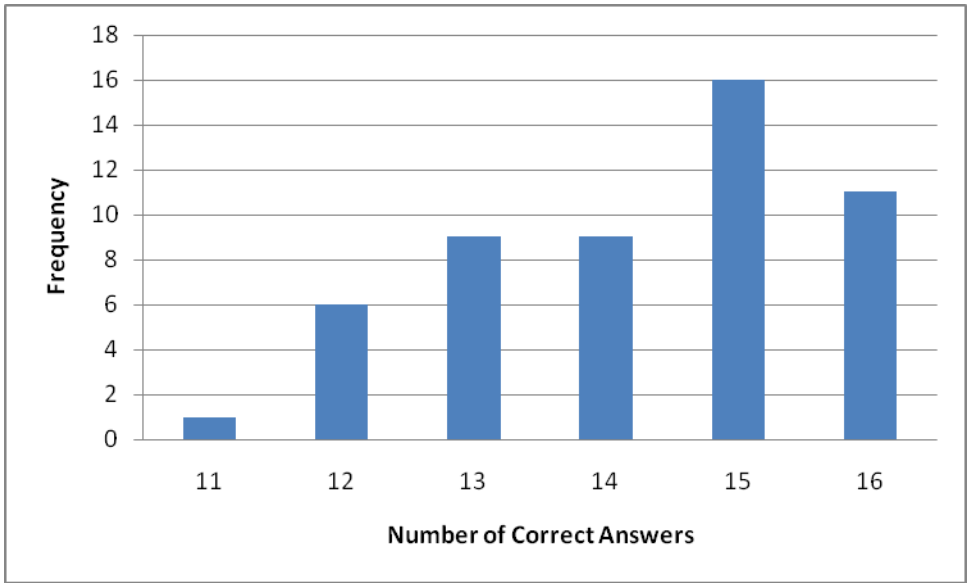


Figure 4.8 *Correct Answer Distribution on the Machine Portion of the Post-Test*

The mean number of correct responses on the software portion of the post-test was 16.4 out of a possible 22, with a standard deviation of 3.02. The median was 16 correct answers and the mode was 15 correct answers. The minimum number of correct answers on the software portion of the post-test was 10 and the maximum was 22. Figure 4.9 shows the distribution of participants' post-test software scores.

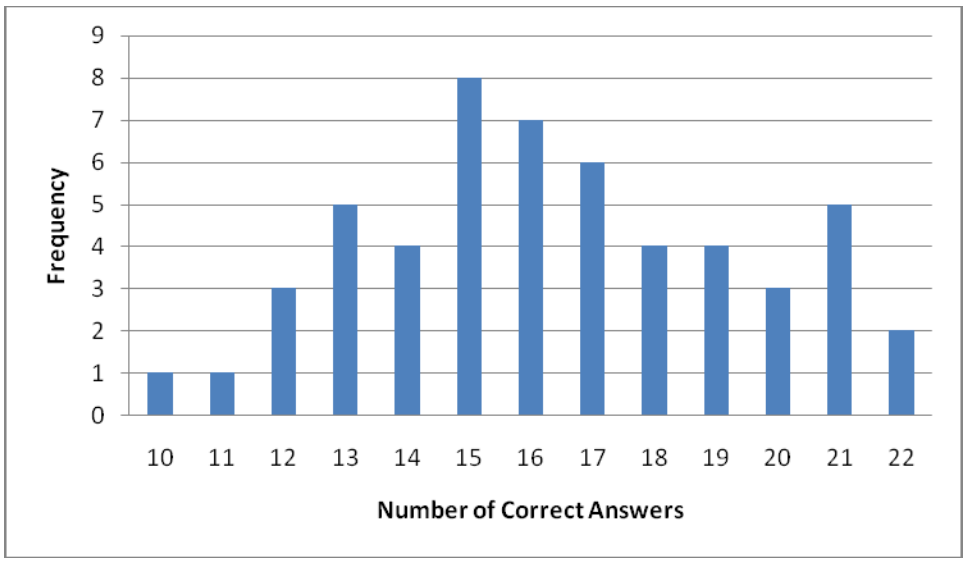


Figure 4.9 *Correct Answer Distribution on the Software Portion of the Post-Test*

4.3. Knowledge Gain Comparison

To determine the participants' knowledge gain, the participants' pre-test scores were subtracted from their post-test scores. The mean knowledge gain for participants was 2.6 correct answers (6.98% knowledge gain) with a standard deviation of 3.19. A paired t-test performed on the average number of correct answers on the pre-test and post-test yielded a statistically significant increase in the average number of correct answers with a t-statistic of 5.995 and a p-value less than .001. Figure 4.10 shows the participants' knowledge gain distribution.

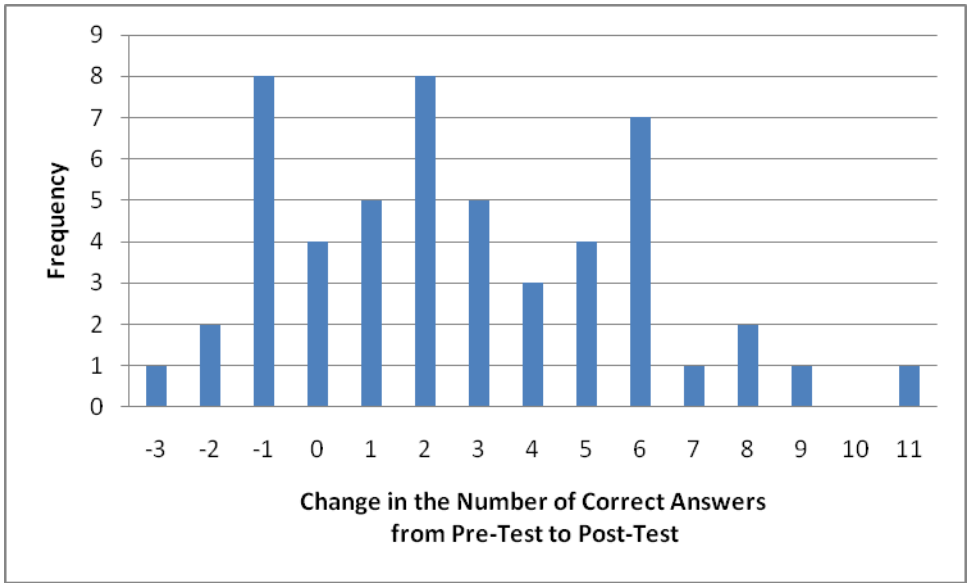


Figure 4.10 *Sum Knowledge Gain(Loss) Distribution*

For the purposes of this study, the participants' scores on the pre-test and post-test were separated into two additional categories: the machine portion and the software portion. This allowed for further statistical analysis and breakdown of the data.

Participants' knowledge gain on the machine portion of the tests was compared by subtracting the average number of correct answers on the machine portion of participants' pre-tests from the average number of correct answers on the machine portion of their post-tests. The mean knowledge gain for the machine portion of the test was 1.1 (2.88% knowledge gain) correct answers with a standard deviation of 1.74. A paired t-test performed on the average number of correct answers on the machine portion of the pre-tests and post-tests yielded a statistically significant increase in the average number of correct answers with a t-statistic of 4.541 and a p-value less than .001. Figure 4.11 shows the participants' machine knowledge gain distribution.

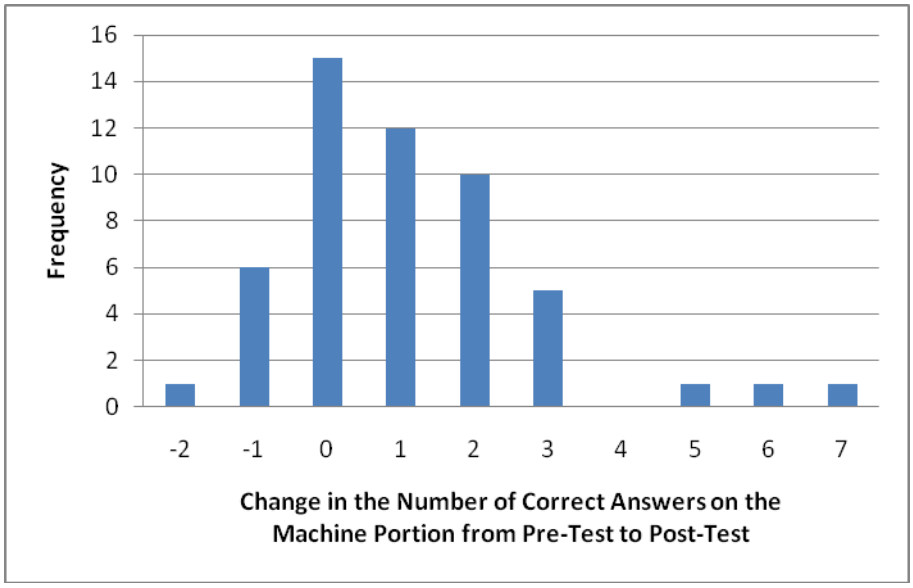


Figure 4.11 *Machine Knowledge Gain(Loss) Distribution*

Participants' knowledge gain on the software portion of the tests was compared by subtracting the average number of correct answers on the participants' pre-tests from the average number of correct answers on the software portion of their post-tests. The mean knowledge gain on the software portion of the test was 1.5 (4.09% knowledge gain) correct answers with a standard deviation of 2.82. A paired t-test performed on the average number of correct answers for the pre-tests and post-tests yielded a statistically significant increase in the average number of correct answers with a t-statistic of 3.977 and a p-value less than .001. Figure 4.12 shows the participants' software knowledge gain distribution.

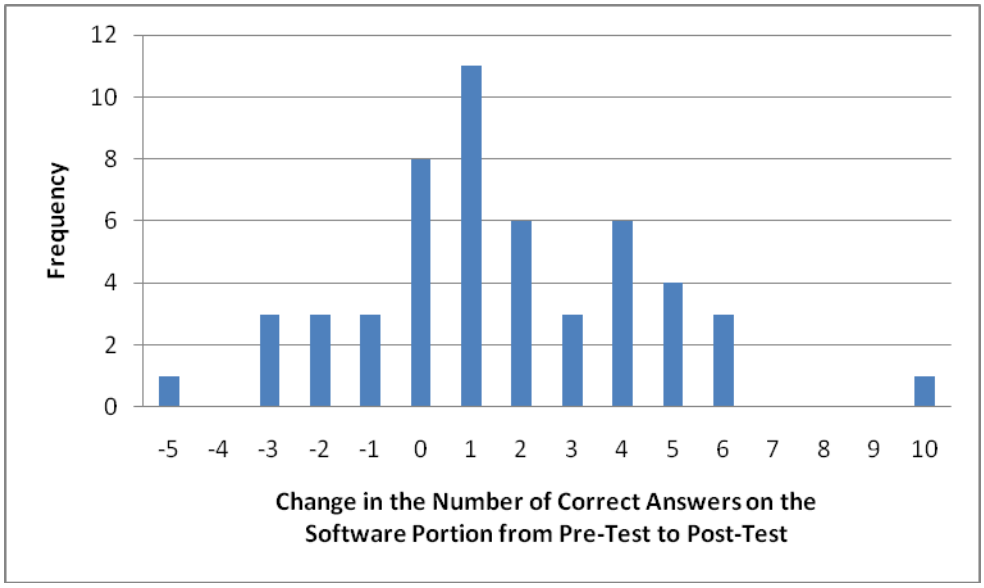


Figure 4.12 *Software Knowledge Gain(Loss) Distribution*

4.4. Sum Knowledge Gain ANOVAs

A one-way ANOVA was used to analyze knowledge gain by the variables collected on the demographic survey. There were no significant differences in knowledge gain among: age, gender, participants' familiarity with retinal imaging, whether the participant had attended a retinal imaging training at Purdue University, whether the participant had attended a retinal imaging training elsewhere, whether the participant had used the Optibrand software, or whether the participant had been trained to use the Optibrand software. There was also no significant difference in whether the participant selected Extension Educator, volunteer, former 4-H member, current 4-H member, 4-H member parent, or other. There was also no significance for participants experience with technical difficulty or in preferred instruction method. Table 4.2 displays the variables and their significance factors.

Table 4.2 *Demographic Effects on Sum Knowledge Gain Using ANOVAs*

Variable	DF	Mean Squared	F-Value	Significance
Age	3	8.436	.819	.490
Gender	1	13.098	1.293	.261
Familiarity with Retinal Imaging	4	9.434	.920	.460
Retinal Imaging Training at Purdue	1	9.969	.978	.328
Retinal Imaging Training Elsewhere	1	5.293	.514	.477
Used Software	1	2.850	.276	.602
Trained to Use Software	1	6.369	.620	.435
Extension Educator	1	7.563	.738	.394
Volunteer	1	8.478	.829	.367
Former 4-H Member	1	1.687	.163	.688
Purdue Employee, not an Extension Educator	1	.001	.000	.994
Other	1	1.550	.150	.701
Technical Difficulty	1	.144	.014	.907
Preferred Instruction	2	17.723	1.793	.177
4-H Member Parent	1	38.307	3.978	.052

4.5. Machine Knowledge Gain ANOVAs

A one-way ANOVA was used to analyze the knowledge gained on the machine portion of the pre-test and post-tests by the variables collected on the demographic survey. There were no significant differences in knowledge gain among: age, gender, or whether the participant had attended a retinal imaging training at Purdue University or elsewhere, or in preferred instruction. There was also no significant difference if the participant selected Extension Educator, parent of a 4-H member, volunteer, former 4-H member, or a current 4-H member. Table 4.3 displays the variables and their significance factors.

Table 4.3 *Demographic Effects on Machine Knowledge Gain Using ANOVAs*

Variable	**DF**	**Mean Squared**	**F-Value**	**Significance**
Age	3	1.684	.541	.657
Gender	1	.249	.081	.777
Retinal Imaging Training at Purdue	1	3.894	1.293	.261
4-H Member Parent	1	.612	.199	.658
Volunteer	1	3.703	1.228	.273
Former 4-H Member	1	9.109	3.132	.083
Purdue Employee, not an Extension Educator	1	.587	.191	.664
Preferred Instruction	2	5.565	1.902	.160
Familiarity with Retinal Imaging	4	6.569	2.407	.063
Retinal Imaging Training Elsewhere	1	9.943	3.439	.070
Extension Educator	1	9.631	3.324	.074

With a significance of .012, participants who had not used the software had a greater knowledge gain from pre-test to post-test than other survey participants on the machine portion of the test. Additionally, with a significance of .013, participants who had not been trained to use the software had a greater knowledge gain from pre-test to post-test than other survey participants on the machine portion of the test. Participants who selected "other" for their involvement with 4-H had greater knowledge gain from pre-test to post-test than other survey participants on the machine portion of the test with a significance of .024. Participants who selected "other" provided a description. Seven participants were support staff for their counties, two were project leaders, and one was a fair board member. Participants who experienced technical difficulty also had greater knowledge gain from pre-test to post-test than other survey participants on the machine portion of the test with a significance of .008. Table 4.4 displays the variables and their significance factors.

Table 4.4 *Significant Machine Knowledge Gain ANOVAs*

Variable	**DF**	**Mean Squared**	**F-Value**	**Significance**
Used Software	1	18.469	6.788*	.012
Trained to Use Software	1	18.039	6.609*	.013
Other	1	15.086	5.410*	.024
Technical Difficulty	1	20.769	7.764*	.008

4.6. Software Knowledge Gain ANOVAs

A one-way ANOVA was used to analyze the knowledge gained on the software portion of the pre-test and post-test by the variables collected on the demographic survey. There were no significant differences in knowledge gain among: age, gender, their selected familiarity with retinal imaging, whether the participant had attended a retinal imaging training at Purdue University, whether the participant had attended a retinal imaging training elsewhere, whether the participant had used the Optibrand software, or whether the participant had been trained to use the Optibrand software. There was also no significant difference if the participant selected volunteer, former 4-H member, current 4-H member, or other. There was also no significant difference if participants experienced technical difficulty or in preferred instruction.

Table 4.5 displays the variables and their significance factors.

Table 4.5 *Demographic Effects on Software Knowledge Gain Using ANOVAs*

Variable	DF	Mean Squared	F-Value	Significance
Age	3	3.332	.403	.751
Gender	1	9.732	1.225	.274
Familiarity with Retinal Imaging	4	8.978	1.138	.350
Retinal Imaging Training at Purdue	1	1.402	.173	.679
Retinal Imaging Training Elsewhere	1	.727	.090	.766
Used Software	1	6.808	.851	.361
Trained to Use Software	1	2.971	.368	.547
Volunteer	1	23.385	3.049	.087
Former 4-H Member	1	18.635	2.400	.128
Purdue Employee, not an Extension Educator	1	.623	.077	.783
Technical Difficulty	1	17.452	2.241	.141
Preferred Instruction	2	3.428	.420	.659
Other	1	26.308	3.457	.069

With a significance of .037, Extension Educators had a greater gain in knowledge than other survey participants on the software portion of the test. Additionally, with a significance of .012, participants who were not parents of a 4-H member had a greater gain in knowledge than other survey participants on the software portion of the test. Table 4.6 displays the variables and their significance factors.

Table 4.6 *Significant Software Knowledge Gain ANOVAs*

Variable	DF	Mean Squared	F-Value	Significance
Extension Educator	1	34.265	4.599*	.037
4-H Member Parent	1	48.605	6.784*	.012

4.7. Participant Reflection Results

At the end of the post-test, participants were given the option of completing a reflections section that included questions about: course accessibility, technical difficulty, preferred instruction method, and suggestions for improvement. They were not required to answer the questions after completing the post-test.

4.7.1. Course Accessibility

Of the 52 participants who completed the post-test, 49 (94.2%) indicated the course was easily accessible. Three indicated the course was not easily accessible.

4.7.2. Technical Difficulty

Twelve of the 52 participants (23%) indicated they had some form of technical difficulty accessing the on-line course. The comments ranged from connection speed issues to server problems and software incompatibility (Appendix N).

4.7.3. Preferred Instruction Method

Participants were asked to select their preferred method of instruction: face-to-face, on-line, mixed on-line/face-to-face, or other. If participants selected "other," they were asked to provide a description. Fourteen participants (26.9%) preferred face-to-face instruction. Eight participants (15.4%) preferred on-line instruction. Thirty participants (57.7%) preferred mixed, on-line/face-to-face, instruction.

4.7.4. Suggestions for Improvement

At the end of the reflections portion of the survey, participants were asked to provide suggestions to improve the on-line tutorial (Appendix O). Twelve participants left a comment or suggestion. One suggestion was to add a glossary. Another was to add more information about using the OptiReader™ device. A third suggestion was to enlarge the videos.

Comments ranged from appreciation for the materials to a desire to keep them available, as well as indicating that the tutorial was a way to save time. Additional comments indicated that the tutorial was too long, the participant could not find the tutorial, and the participant could not find the software portion of the tutorial.

CHAPTER 5. CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The purpose of this study was to determine the effectiveness of a self-taught on-line retinal imaging tutorial focusing on retinal imaging technology and software for adult 4-H volunteers, Extension Educators, and Extension support staff learning retinal imaging techniques. This study focused on the use of asynchronous on-line materials to disseminate retinal imaging technology and techniques to the Extension Educators, Extension support staff, and volunteers. The materials for this study were developed specifically for the Purdue University Cooperative Extension Service with attention to certain areas indicated by Dr. Clint Rusk, Associate Professor in Youth Development and Agricultural Education and a Youth Livestock Specialist. The on-line retinal imaging tutorial was used to examine adults' ability to gain knowledge about the OptiReader™ device, retinal imaging techniques, and the retinal imaging software. The objectives of this study were to:

1. Create materials relevant to retinal imaging technology, software, and the needs of the Purdue University Cooperative Extension Service.
2. Develop a self-training course in retinal imaging software.
3. Create instruments to assess prior knowledge of the retinal imaging system and gain in knowledge.
4. Determine the participants' initial knowledge level and whether knowledge gain was achieved.
5. Collect demographic factors to determine if there is a correlation between the results and the demographic factors.
6. Compare technical difficulty to participant's knowledge gain to determine whether a correlation exists.

7. Recommend areas for future research in distance education for adults associated with 4-H.

5.1. Conclusions

A significant difference was found when comparing participants' pre-test and post-test scores by a paired t-test. This significance indicates that the participants were able to learn from the retinal imaging tutorial. Participants improved their total scores from the pre-test to post-test by an average of 6.88%, on the machine portion of the test by 2.88%, and on the software portion of the test by 4.09%. These results indicate that the materials and assessment instruments were successful in teaching retinal imaging technology and software to adults involved with 4-H. As 30 participants had used the software before and 23 had been trained on the software, the greater gain on the software portion of the test indicates that the software self-training course was successful.

Participants' initial knowledge ranged from 19 to 36 correct answers out of a potential 38 questions. After exploring the retinal imaging tutorial, participants' post-test knowledge scores ranged from 23 to 38 correct answers. Knowledge gain(loss) ranged from -3 to 11 correct answers. Eleven participants showed a knowledge loss, four showed no gain, and 37 showed a knowledge gain. The assessment instruments were able to establish a base for participants' prior knowledge. Statistically, the participants' knowledge gain was significant. There was also an increase from the pre-test to the post-test in the number of participants that had at least 30 correct answers. Twenty-two participants had at least 30 correct answers on the pre-test while 34 participants had at least 30 correct answers on the post-test. Similar increases were seen in the machine and software portions of the test.

Most of the demographic variables collected in this study had no significant impact on the knowledge gained from pre- to post-test. These results indicate that the tutorial is accessible to a wide variety of people involved with 4-H. Additionally, the results showed no significant difference in participants'

scores based on prior retinal imaging training. In the researcher's opinion, this indicates that the on-line tutorial is as informative as the face-to-face training and can compliment, but not replace it. Prior research shows that hands-on training with the OptiReader™ device is essential to developing proficiency at collecting high quality images in a minimal amount of time.

Some interesting statistical results were also found. Knowledge loss occurred for eleven participants. Personal communication with one of the participants indicates that their knowledge loss was due to the server being unavailable. The participant chose to complete the post-test without viewing the full tutorial and as a result had knowledge loss. An additional participant admitted via personal communication that the post-test was taken immediately following the pre-test without participating in the tutorial. The researcher believes that many of the knowledge loss results may be explained by these two instances.

Participants who had not used the software prior to the retinal imaging tutorial had a higher knowledge gain from pre- to post-test on the machine portion of the test. Additionally, participants who had not been trained to use the software had a higher knowledge gain from pre- to post-test on the machine portion of the test. This may be because those participants were more familiar with the machine than with the software, or because they had been trained on the software, but not on the machine. Participants who selected "other" for their involvement with 4-H scored statistically higher on the machine portion of the test. This may be because participants who selected "other" were trained to use the OptiReader™ device, but not the software.

Extension Educators had a statistically higher knowledge gain from pre- to post-test on the software portion of the test. This may be because Extension Educators were trained on the software more often than other participants. Additionally, participants who were not parents of a 4-H member had a statistically higher knowledge gain from pre- to post-test on the software portion

of the test. This may be because participants who were trained on the software were not likely to be parents of a 4-H member.

Participants that experienced technical difficulty had greater knowledge gain than other participants on the machine portion of the pre- and post-test. This may be because participants viewed the first portion of the tutorial, which focused on the machine, several times due to their technical difficulty. Marginal significance was also found for several variables indicating potential significance with a larger sample size.

Developing the tutorial was time consuming and involved the assistance of several content specialists. If the researcher were to conduct the study again, some changes would be made. The PowerPoint tutorial would be streamlined and include fewer slides. Additional information would be supplied for retinal imaging the animals. Hardcopies of the materials would be supplied for those participants that wanted them. For more accurate results, the researcher would have pilot tested the pre-test and post-test instrument, and increased the number of questions to better gauge the participants prior knowledge and knowledge gain. The researcher would have also tested the level of difficulty for each question and adjusted as necessary. If possible, the researcher would also attempt to further randomize the study.

Offering the materials in two formats allowed the participants to learn from the media that best suited their learning styles. Creating the videos and their print counterparts was difficult and time consuming, but once completed they are available for reference and can be updated with a much smaller time investment. These materials offer flexibility to the learner and to the program instructor.

5.2. Implications

The results of the current study imply that other on-line distance education training courses may be successful with Extension Educators and 4-H volunteers. Since the materials can be accessed repeatedly and at the learner's pace, on-line courses can deliver information in a timely manner to a broad

audience. The use of on-line courses can also be used to compliment face-to-face training to make the live interaction more effective and less time consuming.

Trained volunteers are more effective in their jobs. More capable and competent volunteers are better able to guide 4-H members. By developing relevant and timely materials for adults involved with the 4-H program, making them accessible, and encouraging their use, the 4-H program and its participants will be enriched.

5.3. Recommendations

This study lends itself to several recommendations for further research; the first of which is further study with adult educational theory in 4-H. While the goal of 4-H is to help young people develop life skills, it is adults that guide the young people. To ensure that the young people are receiving qualified assistance, it is important that the adults involved with 4-H receive adequate training. Further investigation into adult educational theory applied to adults involved with 4-H could increase their competence and the experiences of 4-H members.

A second recommendation pertains to the use of on-line training courses with Extension Educators and 4-H volunteers; more training courses should be developed and implemented. Further research into on-line training courses with Extension Educators and 4-H volunteers should be conducted to explore efficacy, increases in knowledge gain, and potential savings in time and money. This research should also explore the relationship between face-to-face instruction and complimentary on-line instruction.

Thirdly, the on-line tutorial developed for this study should be retained, remain available for use, and be expanded. Additional information regarding cataloguing images and image transfer to Purdue University would be beneficial for Extension Educators. Additional retinal imaging technique videos, for those who use the machine, would also be beneficial.

5.4. Summary Statement

In conclusion, this research found that the on-line retinal imaging training increased participants' knowledge from pre-test to post-test. It also indicated that there is significant potential for this type of distance education within the 4-H program and as a compliment to traditional face-to-face trainings. It was an accessible program that was able to satisfy a broad range of needs for retinal imaging including: dissemination of information, increasing understanding of retinal imaging, and greater access to training for the adults involved with retinal imaging.

REFERENCES

REFERENCES

Astroth, K. (1990). Information technology: Extension's future. *Journal of Extension*, *28(1)*. Retrieved November 25, 2008, from http://www.joe.org/joe/1990spring/fl.html

Blomeke, C. (2004). *An evaluation of retinal imaging technology for 4-H beef and sheep identification*. Unpublished Master's thesis, West Lafayette, IN: Purdue University.

Boleman, C., Cummins,S., & Briers, G. (2005). An assessment of life skills gained from youth exhibiting beef, swine, sheep or goat 4-H projects. *Proceedings of the 2005 National AAAE Research Conference, San Antonio, TX, 32, 388-401.*

Boyd, B., Herring, D., & Briers, G. (1992). Developing life skills in youth. *Journal of Extension*, *30(4)*. Retrieved January 10, 2008, from http://www.joe.org/joe/1992winter/a4.html

Braker, M., Leno, J., Pratt, C., & Grobe, D. (2000). Oregon extension volunteers: Partners in action. *Journal of Extension*, *38(2)*. Retrieved December 4, 2007, from http://www.joe.org/joe/2000april/rb3.html

Caffarella, R. (2002). *Planning programs for adult learners* (2nd ed.). San Francisco, CA: Josey-Bass.

Cejda, B. (2007). Connecting to the larger world: Distance education in rural community colleges [Electronic version]. *New Directions for Community Colleges*, *137*, 87-98.

Cook, M., Kiernan, N., & Ott, H. (1986). 4-H volunteer training—who needs it! *Journal of Extension*, *24(3)*. Retrieved October 30, 2007, from http://www.joe.org/joe/1986fall/a4.html

Culp, K., McKee, R., & Nestor, P. (2005). Demographic differences of 4-H volunteers, agents, and state volunteerism specialists: Implications for volunteer administration. *Journal of Extension, 43(4),* Article 4FEA2. Retrieved October 30, 2007, from http://www.joe.org/joe/2005august/a2p.shtml

Davis, G. (2006). Avoiding the "rut" in program development and delivery: improving our understanding of learning style preferences. *Journal of Extension 44(4).* Article 4RIB1. Retrieved January 9, 2009, from http://www.joe.org/joe/2006august/rb1p.shtml

Duncan, H. (2005). On-line education for practicing professionals: A case study [Electronic version]. *Canadian Journal of Education*, *28(4)*, 874-896.

Evans, J., & Van Eenennaam, A. (November 2005). *Emerging management systems in animal identification*. Davis, California: University of California, Cooperative Extension Service.

Fox, J., Schroeder, D., & Lodl, K. (2003). Life skill development through 4-H clubs: The perspective of 4-H alumni. *Journal of Extension*, *41(6).* Retrieved January 10, 2008 from http://www.joe.org/joe/2003december/rb2.shtml

Franz, N. (2007). Adult education theories: Informing cooperative extension's transformation. *Journal of Extension, 45(1),* Article 1FEA1. Retrieved October 30, 2007, from http://www.joe.org/joe/2007February/a1p.shtml

Gillani, B. (2003). *Learning theories and the design of e-learning environments.* Lanham, MD: University Press of America.

Goodwin, J., Murphy, T., & Briers, G. (2002). Measuring the ethical cognition effects of a videotape livestock show ethics education program. *Journal of Extension, 40(6).* Retrieved December 2, 2007, from http://www.joe.org/joe/2002december/rb2.shtml

Grudens-Schuck, N. (2000). Extension and grassroots educators' approach to participatory education: Interrelationships among training, worldview, and institutional support. Paper presented at the 2000 AERC Conference. Retrieved December 4, 2007, from http://www.edst.educ.ubc.ca/aerc/2000/grudensschuckn1-web.htm

Hill, L., & Parker, L. (2005). Extension as a delivery system for prevention programming: capacity, barriers, and opportunities. *Journal of Extension, 43(1).* Article 1FEA1. Retrieved January 9, 2009, from http://www.joe.org/joe/2005february/a1p.shtml

Hinton, K. (1994). Extension's role in developing community volunteers. *Journal of Extension*, *32(2)*. Retrieved December 11, 2007, from http://www.joe.org/joe/1994august/a4.html

Howell, B. (2006). *Perceptions of extension educators, 4-H volunteers, and 4-H members regarding the use of retinal imaging to identify 4-H ruminant projects.* Unpublished Master's thesis, West Lafayette, IN: Purdue University.

Kaslon, L., Lodl, K., & Greve, V. (2005). On-line leader training for 4-H volunteers: A case study of action research. *Journal of Extension*, *43(2),* Article 2FEA4. Retrieved October 30, 2007 from http://www.joe.org/joe/2005april/a4p.shtml

Kieth, L., & Vaughn, P. (1998). The value of 4-H competitive activities as perceived by the parents of 4-H members [Electronic version]. *Journal of Agricultural Education*, *39(3),* 41-50.

McLoughlin, C. (2002). Learner support in distance and networked learning environments: Ten dimensions for successful design [Electronic version]. *Distance Education*, 23(2), 149-162.

Merriam, S., Caffarella, R., & Baumgartner, L. (2007). Learning in adulthood: A comprehensive guide. San Francisco, CA: John Wiley and Sons.

Mincemoyer, C. (2003). 4-H volunteers and the internet: A partnership for the future [Electronic version]. *The Journal of Volunteer Administration, 21(1),* 31-36.

Mitchell, G., & Dunnavan, G. (1998). Illegal use of β-andrenergic agonists in the United States [Electronic version]. *American Society of Animal Science, 76,* 208-211.

Neary, M., & Yager, A. (2002, December). *Methods of livestock identification* (As-556-W). West Lafayette, Indiana: Purdue University, Cooperative Extension Service.

Richardson, J. (1994). Learning best through experience. *Journal of Extension*, *32(5).* Retrieved January 1, 2008, from http://www.joe.org/joe/1994august/a6.html

Rohs, F., & Warmbrod, J. (1985). *Social background, personality and attitudinal factors influencing the decision to volunteer and level of involvement among adult 4-H leaders* (Summary of Research 39). Columbus, OH: Ohio State University, Department of Agricultural Education.

Rusk, C., Blomeke, C., Balschweid, M., Elliot, S., & Baker, D. (2006). An evaluation of retinal imaging technology for 4-H beef and sheep identification. *Journal of Extension*, *44(5),* Article 5FEA7. Retrieved December 5, 2007, from http://www.joe.org/joe/2006october/a7.shtml

Rusk, C., & Machtmes, K. (2003). Livestock ethics—a lesson for high school students. *Journal of Extension, 41(3)*. Retrieved December 5, 2007, from http://www.joe.org/joe/2003june/iw4.shtml

Rusk, C., Summerlot-Early, J., Machtmes, K., Talbert, B., & Balschweid, M. (2003). The impact of raising and exhibiting selected 4-H livestock projects on the development of life and project skills [Electronic version]. *Journal of Agricultural Education*, *44(3)*, 1-11.

Salpeter, J. (2006). Inside the divide [Electronic version]. *Technology & Learning*, *8*, 22-4.

Seevers, B., Graham, D., Gamon, J., & Conklin, N. (1997). *Education through cooperative extension.* Albany, NY: Delmar Publishers.

Sherfey, L., Hiller, J., Macduff, N., & Mack, N. (2000). Washington state university on-line volunteer management certification program. *Journal of Extension*, *38(4).* Retrieved December 4, 2007, from http://www.joe.org/joe/2000august/tt1.html

Simonson, M., Smaldino, S., Albright, M., & Zvacek, S. (2006). *Teaching and learning at a distance: Foundations of distance education* (3rd ed.). Upper Saddle River, NJ: Pearson Merrill Prentice Hall.

Solis, J., & Maala, C. (1975). Muzzle printing as a method for identification of cattle and carabaos. *The Philippine Journal of Veterinary Medicine*, *14(1),* 1-14.

Taylor, K. (2006, Summer). Brain function and adult learning: Implications for practice [Electronic version]. *New Directions for Adult and Continuing Education*, *110*, 71-85.

U. S. Census Bureau. (2007). *Statistical Abstract of the United States [Electronic version].* Section 24. Washington, D. C.: U. S. Government Printing Office.

VanWinkle, R., Busler, S., Bowman, S., & Manoogian, M. (2002). Adult volunteer development: Addressing the effectiveness of training new 4-H leaders. *Journal of Extension*, *40(6).* Retrieved December 4, 2007, from http://www.joe.org/joe/2002december/a4.shtml

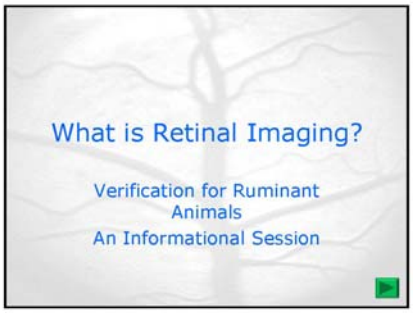
Ward, C. (April 1996). Life skill development related to participation in 4-H animal science projects. *Journal of Extension*, 34(2). Retrieved January 10, 2008, from http://www.joe.org/joe/1996april/rb2.html

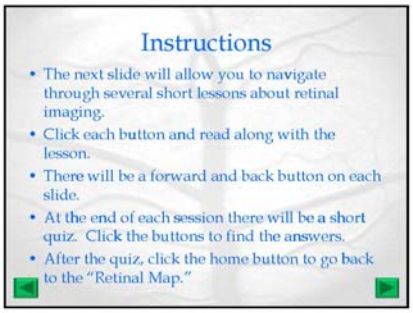
White, D. & Arnold, M. (2003). Why they come, why they go, and why they stay: Factors affecting volunteerism in 4-H programs. *Journal of Extension*, *41(4).* Retrieved January 10, 2008, from http://www.joe.org/joe/2003august/rb5.shtml

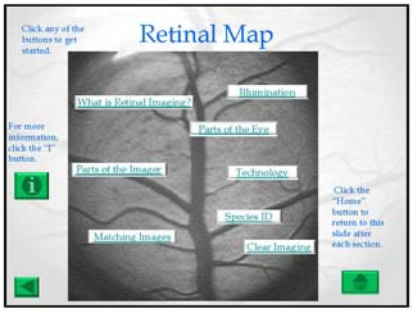
Whittier, J., Shadduck, K., & Golden, B. (2003). *Secure identification, source verification of livestock—The value of retinal images and GPS* (167-172) [Electronic version]. Paper presented at the European Conference on Precision Livestock Farming, Berlin, Germany.

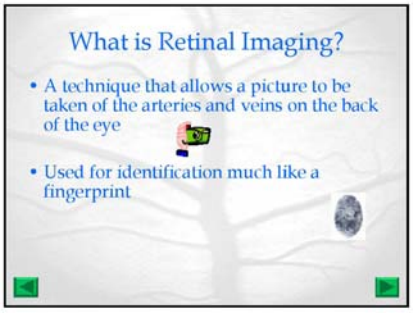
APPENDICES

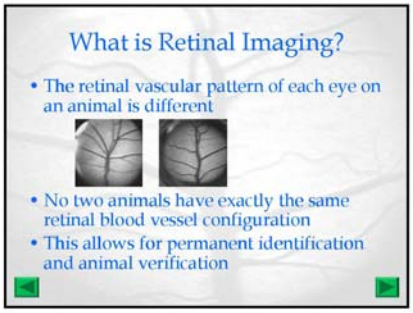
Appendix A. Retinal Imaging Lesson: What Is Retinal Imaging?

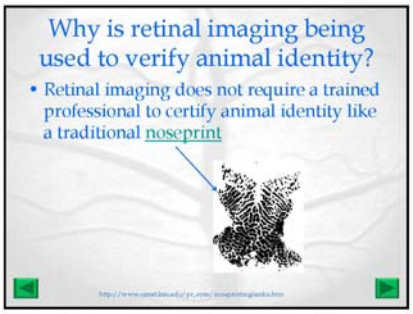












Why is retinal imaging being used to verify animal identity?

- Pictures that are somewhat blurry or off-center can still be matched
- Images can be stored and sent electronically
- Images cannot be altered

How Is Retinal Imaging Possible?

- Through equipment designed and supported by Optibrand
- With technology used to view human retinas
- Using the unique arterial/venal pattern created in utero in each animal's eye

Quiz 1

- When is the retinal vascular pattern created?

In Utero | At Birth | Six Months of Age

- Does retinal imaging require a trained professional to identify a match?

Yes | No

Oops!

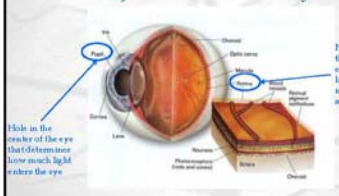
Time to take another look!

You're Right!

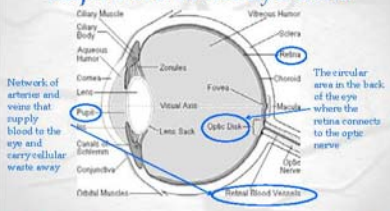
Major Parts of the Eye

- Optic Disk
- Pupil
- Retina
- Retinal Blood Vessels

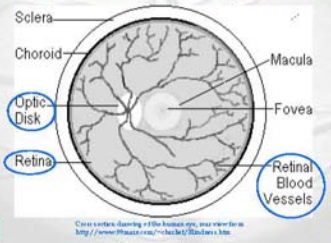
Major Parts of the Eye



Major Parts of the Eye Cont.



Major Parts of the Eye Cont.

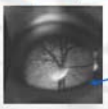


Why These Are Important

- Optic Disk- helps orient the picture but, it should be just below the picture of the vascular pattern
  - The optic disk is closer to the bottom of the eye
  - Good images are taken just above the optic disk

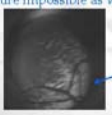
Why These Are Important

- Pupil- too much sunlight while trying to capture the image causes the pupil to constrict
  - Use adequate lighting, but be sure there isn't too much direct sunlight
  - Light that is affecting one eye will cause the other to react as well



Why These Are Important

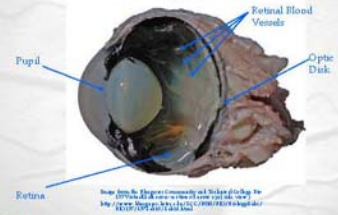
- Retina- senses the light from the camera and can cause the animal to move its eye
  - The retina also supports the blood vessels
  - A damaged retina may make taking a picture impossible
  - Pinkeye can cloud the vitreous humor making a picture impossible as well



Why These Are Important

- **Retinal Blood Vessels (RBV)- create the pattern in the retinal image**
  - The vessels are created during embryonic development
  - Each set of blood vessels forms a pattern that is unique to each eye in the animal

Identify the Parts



Quiz 2

- Which part of the eye are we not concerned with during retinal imaging?

Retina
Pupil
Optic Disk
Retinal Blood Vessels
Vitreous Humor

Oops!

Time to take another look!

You're Right!

Illuminating the Retinal Blood Vessels

- Vessels must be illuminated to obtain a picture
- Steady light allows a clearer image

Illuminating the Retinal Blood Vessels

- Must prevent excess sunlight from entering the eye
  - Pupil closes making image capture difficult
- Lights must not be too dim either
  - The pupil is enlarged until it is approached by the camera light, then the pupil closes

Retinal Imaging Camera

The camera has a low light that shines in the animal's eye to illuminate the blood vessels

How the Eye is Illuminated

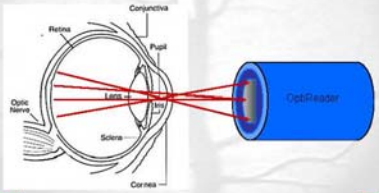


Image Capture

- The camera must be pointed in the correct direction
- The angle must be appropriate for the animal

Image Capture

- Animal needs to be restrained
- Controller's targeting software will lock onto and capture the image
- The person collecting the images must decide if the image is acceptable

Quiz 3

- Which part of the eye closes down in the presence of direct sunlight?

  Retina | Fovea | Pupil

- There is no light in the camera. True or False?

  True | False

Oops!

Time to take another look!

You're Right!

Optireader Device

- Three components:
  - Camera
  - Controller
  - Battery Pack

Battery Pack

- Uses a rechargeable lithium battery
- Lasts 4 to 6 hours
- The GPS antenna is imbedded in the top of the battery case (logo side)

Camera

- Provides a light source
- Has a special lens
- Encased in thick plastic to prevent breakage

Camera Lens and Light located here

Controller

Quiz 4

- Which of the following is not part of the Optireader device?

Camera | Controller | Battery Pack | Audio Recorder

- Which part houses the GPS antenna?

Camera | Controller | Battery Pack

Oops!

Time to take another look!

You're Right!

Technology to Capture Images

- Targeting software created by Optibrand
  - Two modes, one for cattle and one for sheep/goats (accessed through the function button)
  - Automatically captures an image as soon as it qualifies

Technology to Capture Images

- User must evaluate the retinal image and decide whether to accept or reject it
- Not all images are valid, some may be of the gate, chute, etc.

Other Technology Aspects

- Each retinal image is saved to a compact flash card in the controller
- Other information such as ear tag number, weight, breed, etc. may be entered
  - The information required by the controller depends on how the compact flash card has been programmed

Software

- Images and information are then uploaded to the Optibrand software on a computer
  - Additional information like breed, gender, etc. may be added at this time

Quiz 5

- Does the imager automatically save the image?

Yes No

- Can every image be used to identify the animal?

Yes No

Oops!

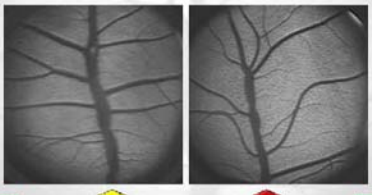
Time to take another look!

You're Right!

Matching Images

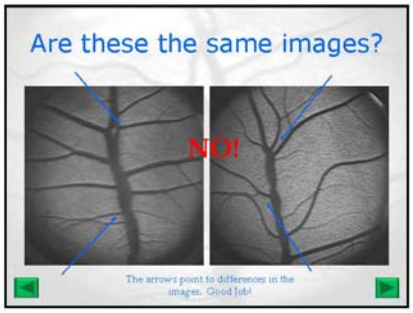
- Can be done visually with a little practice
- Can also be done by computer software
- Images can be matched visually, even if they are off-center or slightly blurred
- Clear images that are centered are easier to match

Are these the same images?



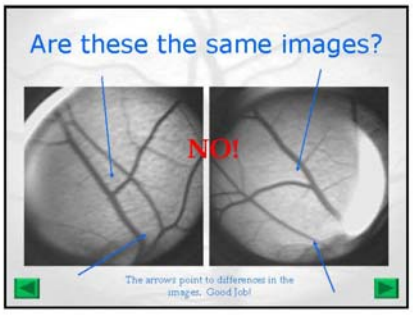
Yes! No!


Oops!
Time to take another look!


Are these the same images?
NO!
The arrows point to differences in the images. Good Job!


Are these the same images?
Yes!
No!


Oops!
Time to take another look!

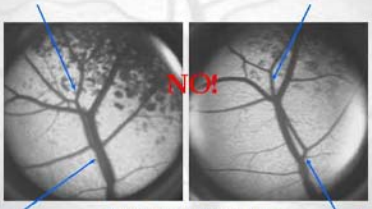

Are these the same images?
NO!
The arrows point to differences in the images. Good Job!


Are these the same images?
Yes!
No!

Oops!

Time to take another look!

Are these the same images?



The arrows point to differences in the images. Good Job!

Factors Effecting Image Quality:

- Easier Matching-
  - Clear images
  - Centered on the screen
  - Above the optic disk
  - Some "branches" (the arteries and veins that extend horizontally)
  - The middle of the "trunk" captured in the image
- Harder Matching-
  - Blurry images
  - To the far left or right of center
  - Centered on the optic disk
  - Only "branches" and no trunk
  - All "trunk" (the artery and vein that extend vertically) and no branches

Quiz 6

- What are the ways that images can be matched?

Virually | By Computer | Professional Image Specialist

- What makes matching images easier?

Clear Images | Centered | Above the Optic Disk | Some Branches | Middle of the Trunk

Oops!

Time to take another look!

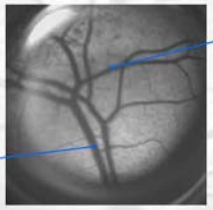
You're Right!

Species Identification

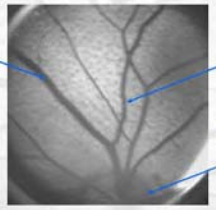
- Currently, only ruminants can be identified using this technique
  - Cattle, sheep, goats, alpacas, llamas, elk, deer, bison, etc.
- Optibrand is working on a pet camera for dogs and cats
- We'll focus on cattle, goats, and sheep

Cattle

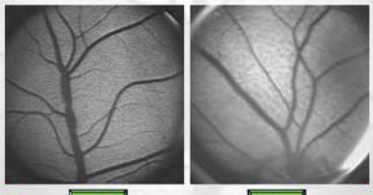
Sheep



Goat



Which Is Which #1?



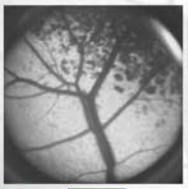
Cattle!

- If you guessed beef, steer, cattle, or calf, you're right!
- This image has a long "trunk" and some "branches" but no optic disk can be seen

Goat!

- If you said goat, you're right!
- This image shows the optic disk at the bottom of the image and looks like a "bush"

Which is Which #2?



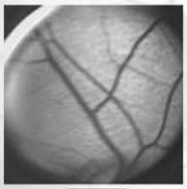
Sheep!

- If you said sheep, you're right!
- This image has a short "trunk" with a lot of "branches"

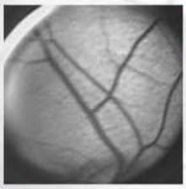
Cattle!

- If you guessed beef, steer, cattle, or calf, you're right!
- This image has a long "trunk" and some "branches" but no optic disk can be seen

Which Is Which#3?



Goat!



- If you said goat, you're right!
- This image shows the optic disk at the bottom of the image and looks like a "bush"

Sheep!

- If you said sheep, you're right!
- This image has a short "trunk" with a lot of "branches"

Quiz 7

- Which 4-H animals are currently being imaged?

Cattle
Sheep
Goats
Swine
Dogs

Oops!

Time to take another look!

You're Right!

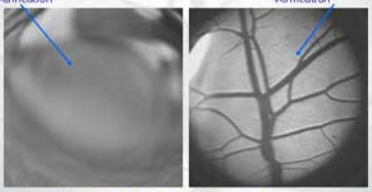
Clear Imaging

What makes an image easy to identify?

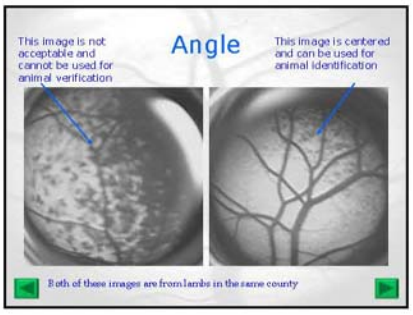
Clarity

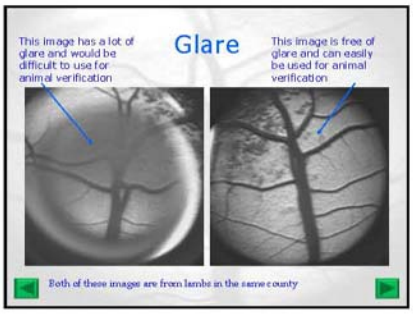
This image is not acceptable and cannot be used for animal verification

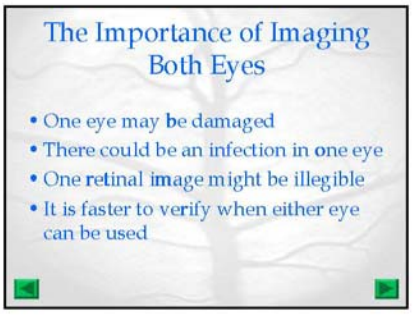
This image is clear and can be used for animal verification



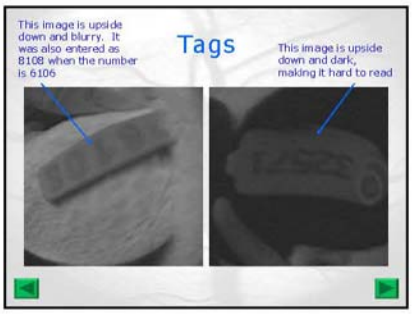
Both of these images are from calves in the same county

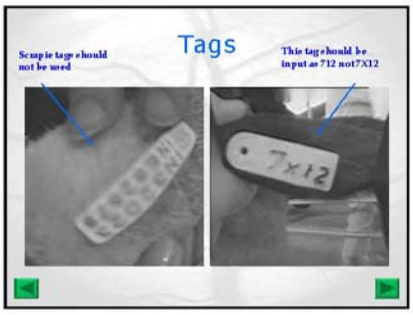

Angle
This image is not acceptable and cannot be used for animal verification
This image is centered and can be used for animal identification
Both of these images are from lambs in the same county


Glare
This image has a lot of glare and would be difficult to use for animal verification
This image is free of glare and can easily be used for animal verification
Both of these images are from lambs in the same county


The Importance of Imaging Both Eyes
• One eye may be damaged
• There could be an infection in one eye
• One retinal image might be illegible
• It is faster to verify when either eye can be used


Tags
This image is too dark to be of any value
This image is clear, easy to read, obviously in the animal's ear, and oriented correctly.
05810
Both of these images were taken in the same county


Tags
This image is upside down and blurry. It was also entered as 8108 when the number is 6106
This image is upside down and dark, making it hard to read


Tags
Scrapie tags should not be used
This tag should be input as 712 not 7X12
7x12

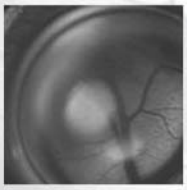
Important Considerations

- Separating images for each county and specie
- Standard input- use the same format for all tags
- No alphanumeric tags- use the numbers only
- Check and double-check the animal's number

Now It's Your Turn

- This year, you are in charge of retinal imaging in your county. There are twenty families in-line waiting to have their animals scanned. It is your job to accept or decline the retinal images. Quickly decide whether the image is Great, Acceptable, or Very Bad and click on the corresponding word.
- Remember, the 4-H members are counting on you to make sure the images can be read at State Fair.

Sarah's Calf



- It is Sarah's first year, and her calf is skittish. This was the best image you have taken so far. It's your decision. Is it Great? Acceptable? Or Very Bad?

It's Great!

Oops! Better go back and review the image again.

It's Acceptable.

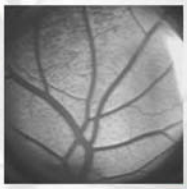
Oops! Better go back and review the image again.

It's Very Bad!

- You made the right decision. This image can't be used to identify Sarah's calf at the State Fair. Give the calf a moment to calm down and try again.
- What made the image bad?
- What can you do to capture a better image?

Melanie's Goat

- This is the fifth goat you have imaged for Melanie. The goat keeps fidgeting and Melanie is getting upset. It's your decision. Is the image Great? Acceptable? Or Very Bad?



It's Great!

- You made the right decision. This image can be used to identify Melanie's goat at the State Fair.
- What made the image great?

It's Acceptable.

Oops! Better go back and review the image again.

It's Very Bad!

Oops! Better go back and review the image again.

John's Sheep

- John is a seven-year 4-H member and has been to the State Fair each year. He is planning to go this year, but wants to get this over with. He has a birthday party to go to. The image of the other eye was great. It's your decision. Is this image Great? Acceptable? Or Very Bad?

It's Great!

Oops! Better go back and review the image again.

It's Acceptable.

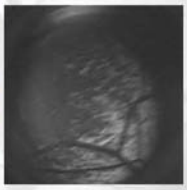
Oops! Better go back and review the image again.

It's Very Bad!

- You made the right decision. This image can't be used to identify John's sheep at the State Fair. Remind John that he needs a good image of both eyes to identify his sheep and try again.
- Why is it important to image both eyes?
- What made the image bad?
- What can you do to capture a better image?

Lola's Sheep

- Lola is a ten-year 4-H member and she's impatient. She's meeting a friend for lunch and just wants to get her only sheep imaged quickly. It's your decision. Is the image Great? Acceptable? Or Very Bad?



It's Great!

Oops! Better go back and review the image again.

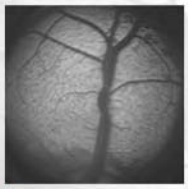
It's Acceptable.

Oops! Better go back and review the image again.

It's Very Bad!

- You made the right decision. This image can't be used to identify Lola's sheep at the State Fair. Remind Lola that she needs a good image to identify her sheep and try again.
- What made the image bad?
- What can you do to capture a better image?

Zachary's Steer



- Zachary is a third year 4-H member. He is excited to show his steer at the State Fair. You took several images and this is the best one so far. It's your decision. Is the image Great? Acceptable? Or Very Bad?

It's Great!

Oops! Better go back and review the image again.

It's Acceptable.

- You made the right decision. This image can be used to identify Zachary's steer at the State Fair.
- What made the image acceptable?
- What can you do to capture a better image?

It's Very Bad!

Oops! Better go back and review the image again.

Quiz 8

- What are three important considerations when accepting an image?

Clarity | Angle | Glare | Shape | Type

- Why is it important to image both eyes?

Damage | Illegible Image | Stress for Animal | Infection | Speed

Oops!

Time to take another look!

You're Right!

Need More Information?

- If you need help with the equipment or software program contact:
- Jenny Brown- Sales Manager
  - Sales questions and orders
  - jbrown@optibrand.com or Ext. 121
- Alan Clark- Customer Service
  - 970-490-6022
  - aclark@optibrand.com or Ext. 110

Appendix B. Retinal Imaging Worksheet: What is Retinal Imaging?

What is Retinal Imaging?

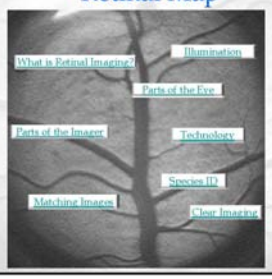
Verification for Ruminant Animals

An Informational Session

Instructions

- The next slide will allow you to navigate through several short lessons about retinal imaging.
- Click each button and read along with the lesson.
- There will be a forward and back button on each slide.
- At the end of each session there will be a short quiz. Click the buttons to find the answers.
- After the quiz, click the home button to go back to the "Retinal Map."

Retinal Map



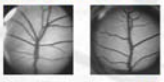
What is Retinal Imaging?

- A technique that allows a picture to be taken of the _____on the back of the eye

- Used for identification much like a _____

What is Retinal Imaging?

- The retinal vascular pattern of each eye on an animal is different



- _____exactly the same retinal blood vessel configuration
- This allows for _____ identification and animal _____

Why is retinal imaging being used to verify animal identity?

- Retinal imaging does not require a trained professional to certify animal identity like a traditional noseprint

Why is retinal imaging being used to verify animal identity?

- Pictures that are somewhat _____ _____ can still be matched
- Images can be stored and sent _____
- Images cannot be _____

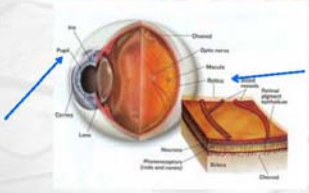
How Is Retinal Imaging Possible?

- Through equipment designed and supported by Optibrand
- With technology used to view human retinas
- Using the unique arterial/venal pattern created _____ in each animal's eye

Major Parts of the Eye

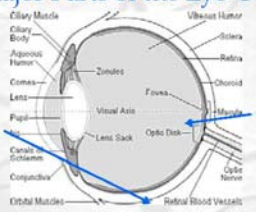
- Optic Disk
- Pupil
- Retina
- Retinal Blood Vessels

Major Parts of the Eye

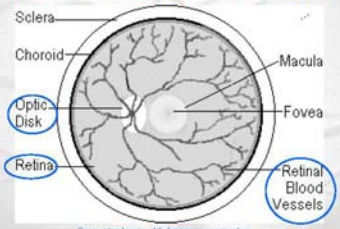


Pollack, J. (2006). Displays of a Different Stripe. IEEE Spectrum. August 2006. 43(8) Pp: 40-44

Major Parts of the Eye Cont.



Major Parts of the Eye Cont.

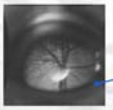


Why These Are Important

- _____- helps orient the picture but, it should be just below the picture of the vascular pattern
  - The optic disk is closer to the bottom of the eye
  - Good images are taken just above the optic disk

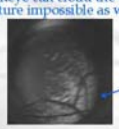
Why These Are Important

- _____- too much sunlight while trying to capture the image causes the pupil to constrict
  - Use adequate lighting, but be sure there isn't too much direct sunlight
  - Light that is affecting one eye will cause the other to react as well



Why These Are Important

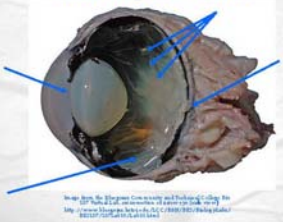
- _____- senses the light from the camera and can cause the animal to move its eye
  - The retina also supports the blood vessels
  - A damaged retina may make taking a picture impossible
  - Pinkeye can cloud the vitreous humor making a picture impossible as well



Why These Are Important

- _____(RBV)- create the pattern in the retinal image
  - The vessels are created during embryonic development
  - Each set of blood vessels forms a pattern that is unique to each eye in the animal

Identify the Parts



Illuminating the Retinal Blood Vessels

- Vessels must be _____ to obtain a picture
- Steady light allows a clearer image

Illuminating the Retinal Blood Vessels

- Must prevent excess sunlight from entering the eye
  - Pupil closes making image capture difficult
- Lights must not be too dim either
  - The pupil is enlarged until it is approached by the camera light, then the pupil closes

Retinal Imaging Camera

The camera has a low light that shines in the animal's eye to illuminate the blood vessels

How the Eye is Illuminated

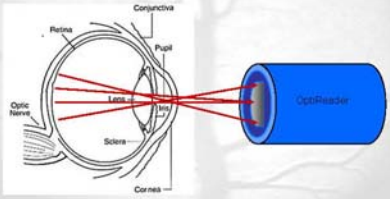


Image Capture

- The camera must be pointed in the correct direction
- The _____ must be appropriate for the animal

Image Capture

- Animal needs to be restrained
- Controller's targeting _____ will lock onto and capture the image
- The _____collecting the images must decide if the image is acceptable

Optireader Device

- Three components:
  - Camera
  - Controller
  - Battery Pack

Battery Pack

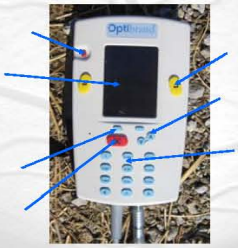
- Uses a rechargeable lithium battery
- Lasts _____
- The _____is imbedded in the top of the battery case (logo side)

Camera

- Provides a _____ source
- Has a special lens
- Encased in thick plastic to prevent breakage

Camera Lens and Light located here

Controller



Technology to Capture Images

- Targeting software created by Optibrand
  - Two modes, one for _____ and one for _____ (accessed through the _____ button)
  - _____captures an image as soon as it qualifies

Technology to Capture Images

- _____ must evaluate the retinal image and decide whether to accept or reject it
- Not all images are _____, some may be of the gate, chute, etc.

Other Technology Aspects

- Each retinal image is saved to a _____in the controller
- Other information such as ear tag number, weight, breed, etc. may be entered
  - The information required by the controller depends on how the compact flash card has been programmed

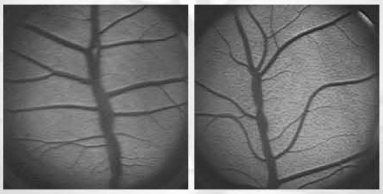
Software

- Images and information are then uploaded to the Optibrand software on a computer
  - Additional information like breed, gender, etc. may be added at this time

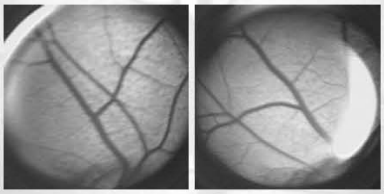
Matching Images

- Can be done _____ with a little practice
- Can also be done by _____
- Images can be matched visually, even if they are off-center or slightly blurred
- Clear images that are _____ are easier to match

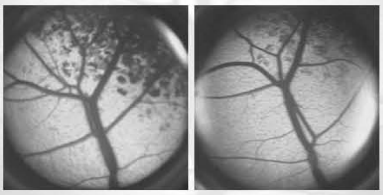
Are these the same images?



Are these the same images?



Are these the same images?



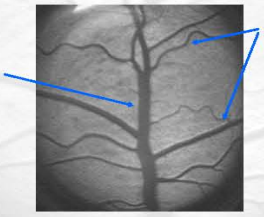
Factors Effecting Image Quality:

- Easier Matching-
- Harder Matching-

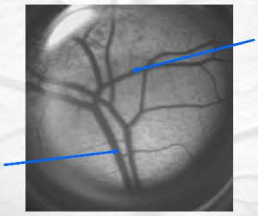
Species Identification

- Currently, only _____ can be identified using this technique
  - Cattle, sheep, goats, alpacas, llamas, elk, deer, bison, etc.
- Optibrand is working on a pet camera for dogs and cats
- We'll focus on _____

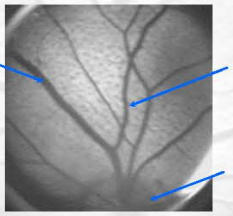
Cattle



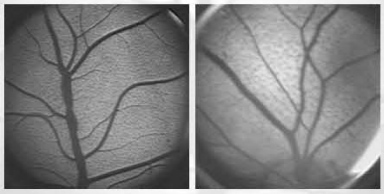
Sheep



Goat

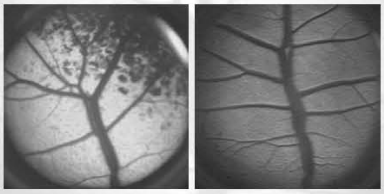


Which Is Which #1?



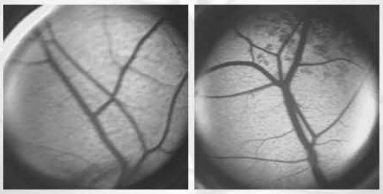
Each image is from a different specie, which species do they come from?

Which is Which #2?



Each image is from a different specie, which species do they come from?

Which Is Which#3?



Each image is from a different specie, which species do they come from?

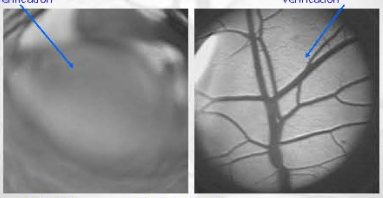
Clear Imaging

What makes an image easy to identify?

Clarity

This image is not acceptable and cannot be used for animal verification

This image is clear and can be used for animal verification

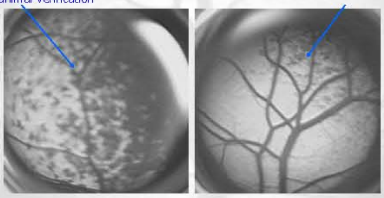


Both of these images are from calves in the same county

Angle

This image is not acceptable and cannot be used for animal verification

This image is centered and can be used for animal identification

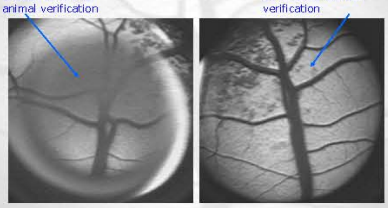


Both of these images are from lambs in the same county

Glare

This image has a lot of glare and would be difficult to use for animal verification

This image is free of glare and can easily be used for animal verification



Both of these images are from lambs in the same county

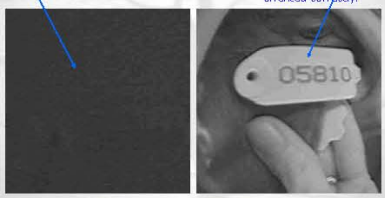
The Importance of Imaging Both Eyes

- One eye may be _____
- There could be an _____ in one eye
- One retinal image might be _____
- It is faster to verify when _____ can be used

Tags

This image is too dark to be of any value

This image is clear, easy to read, obviously in the animal's ear, and oriented correctly.

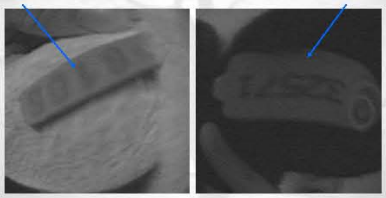


Both of these images were taken in the same county

Tags

This image is upside down and blurry. It was also entered as 8108 when the number is 6106

This image is upside down and dark, making it hard to read



Tags

Scrapie tags should not be used

This tag should be input as 712 not 7X12

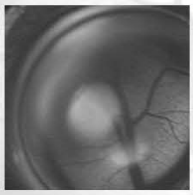
Important Considerations

- Separating images for each _____
- Standard input- use the _____for all tags
- No _____ tags- use the numbers only
- Check and double-check the animal's number

Now It's Your Turn

- This year, you are in charge of retinal imaging in your county. There are twenty families in-line waiting to have their animals scanned. It is your job to accept or decline the retinal images. Quickly decide whether the image is Great, Acceptable, or Very Bad and click on the corresponding word.
- Remember, the 4-H members are counting on you to make sure the images can be read at State Fair.

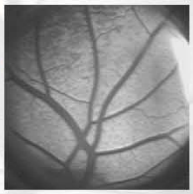
Sarah's Calf



- It is Sarah's first year, and her calf is skittish. This was the best image you have taken so far. It's your decision. Is it Great? Acceptable? Or Very Bad?

Melanie's Goat

- This is the fifth goat you have imaged for Melanie. The goat keeps fidgeting and Melanie is getting upset. It's your decision. Is the image Great? Acceptable? Or Very Bad?

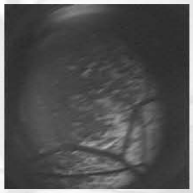


John's Sheep

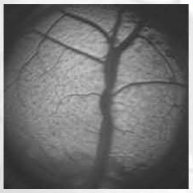
- John is a seven-year 4-H member and has been to the State Fair each year. He is planning to go this year, but wants to get this over with. He has a birthday party to go to. The image of the other eye was great. It's your decision. Is this image Great? Acceptable? Or Very Bad?

Lola's Sheep

- Lola is a ten-year 4-H member and she's impatient. She's meeting a friend for lunch and just wants to get her only sheep imaged quickly. It's your decision. Is the image Great? Acceptable? Or Very Bad?



Zachary's Steer



- Zachary is a third year 4-H member. He is excited to show his steer at the State Fair. You took several images and this is the best one so far. It's your decision. Is the image Great? Acceptable? Or Very Bad?

Need More Information?

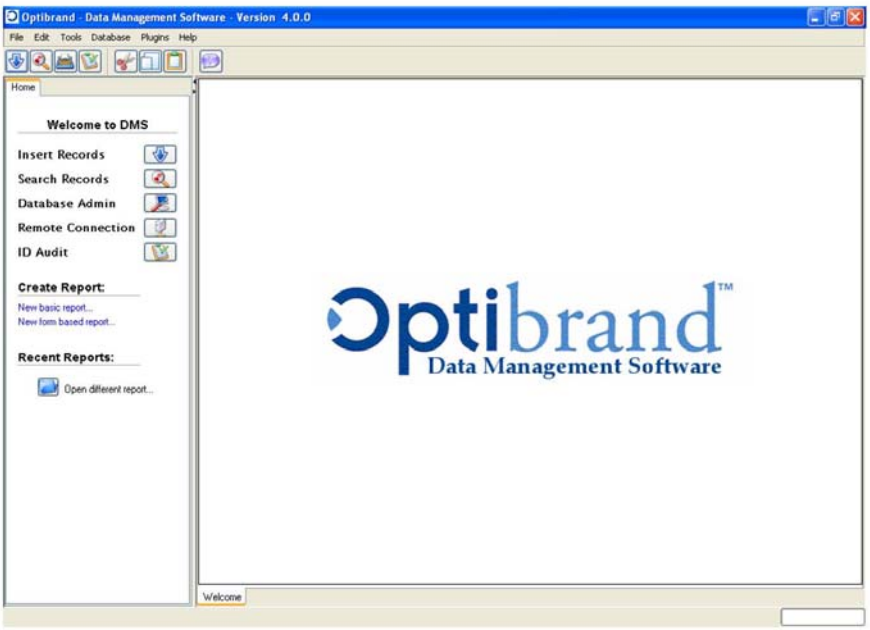
- If you need help with the equipment or software program contact:
- Jenny Brown- Sales Manager
  - Sales questions and orders
  - jbrown@optibrand.com or Ext. 121
- Alan Clark- Customer Service
  - 970-490-6022
  - aclark@optibrand.com or Ext. 110

Appendix C. Inserting Records

Inserting Records

1. Open your Data Management Software (DMS) by double clicking on the **Optibrand DMS** icon on your desktop.

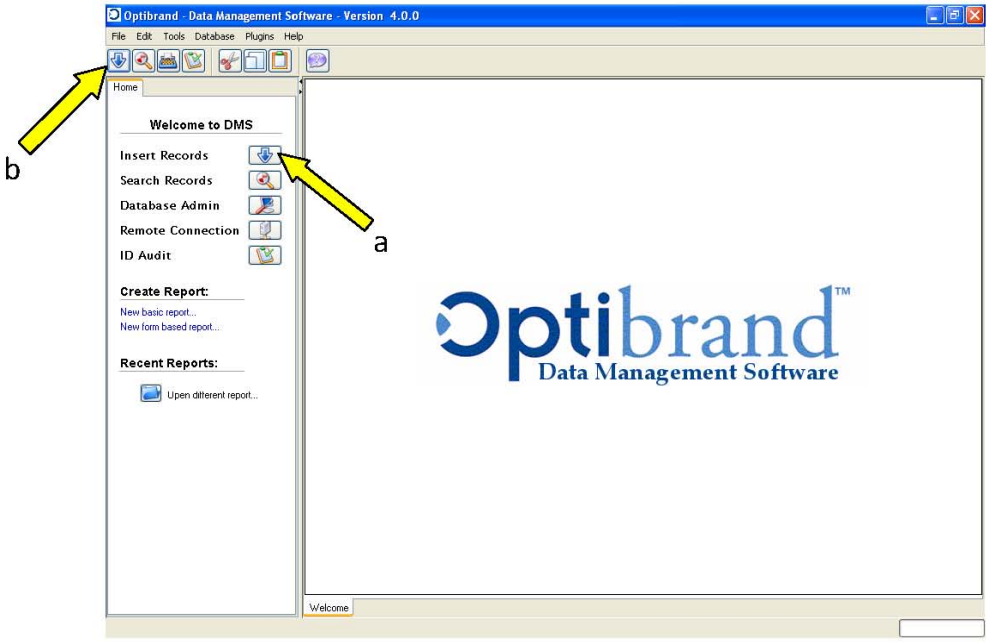
2. After your DMS has opened, you should see the following screen.



3. To insert records into the DMS software, you must have insertions available.

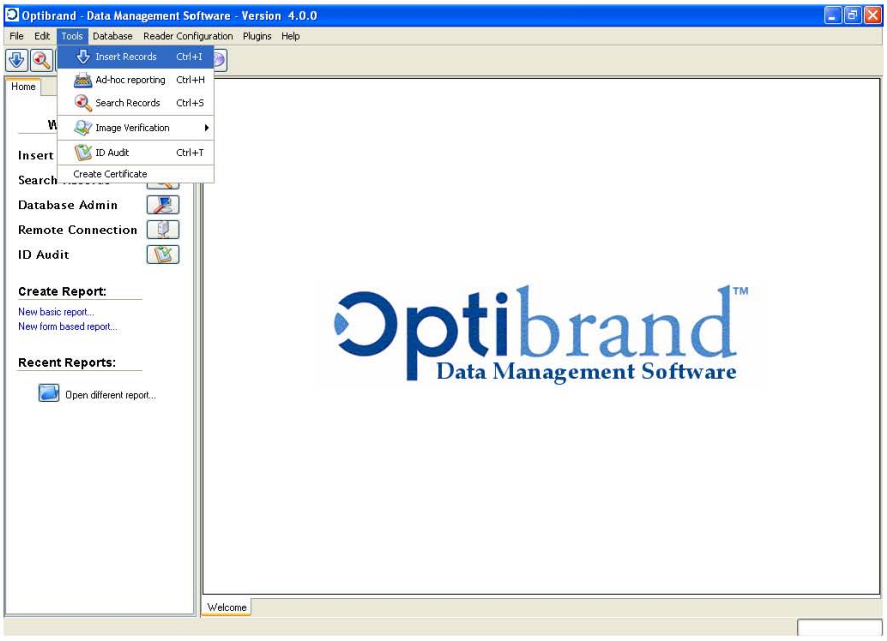
4. There are three ways to open the **Insert Records** box:

    a. Click on the **Insert Records** icon on the opening screen in the DMS software.



b. Click on the **Insert Records** icon on the toolbar in the DMS software.

c. Click on "Tools" and select **Insert Records** from the menu bar in the DMS software.



5. Once you have opened the insert records box, it will look like this.

6. Select the appropriate location for your records. If your images are stored on a compact flash card you should copy these records to another file before inserting them into your DMS software.

a. To copy your records to another folder, first open the compact flash disk folder by clicking on "start".

b. Then click "my computer."

c. Next double click the appropriate drive.

d. Choose a location, such as your desktop, and create a new folder by right clicking and selecting "New," then "Folder."

e. Name the new folder for the Year and Specie such as "Beef 2008" by right clicking on the folder, choosing rename, and typing the new name.

f. Now it is time to copy the images. Click the window on the menu bar at the bottom of the screen that is titled with your compact flash drive such as "Removable Disk (E:)." This will open the window.

g. Highlight all of the images in the window by clicking on the first image and holding the shift key down while scrolling to the bottom of the window. Continue to hold the shift key and click the last image in the folder. You may also highlight the images by clicking on the first image and then simultaneously pressing the "Ctrl" and "A" button on your keyboard.

h. Right click on the highlighted images and select copy.

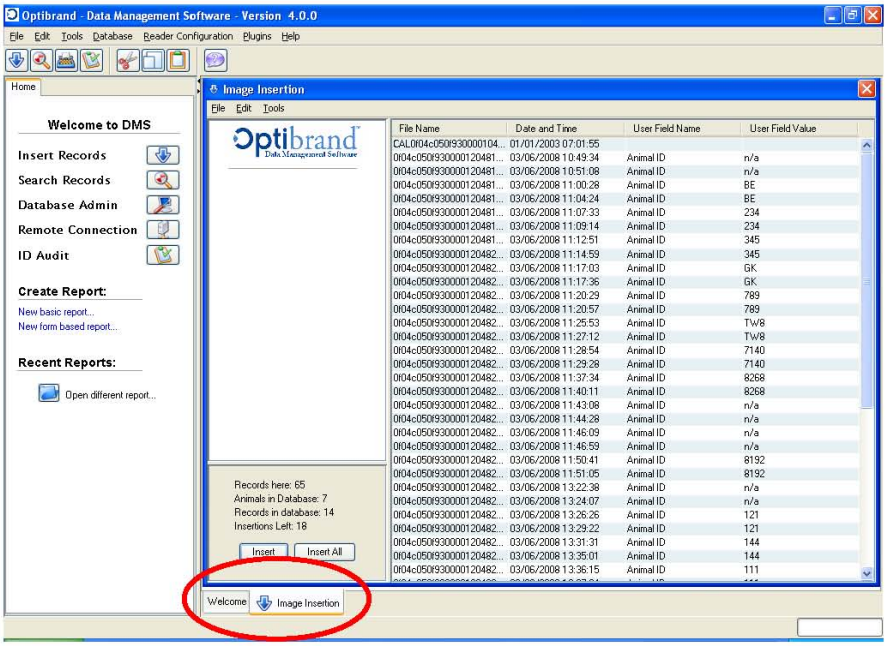
i. Now open the new folder and right click.

j. Select paste. Your images should copy from the original folder to the new folder.

7. The images in my example are stored on a compact flash card accessed through the "E:\" drive so I chose the "E:\" drive from the drop down menu. Please note that this drive may NOT be available in the dropdown menu unless there is a card inserted into the card reader.

8. After you select the appropriate drive, click OK.

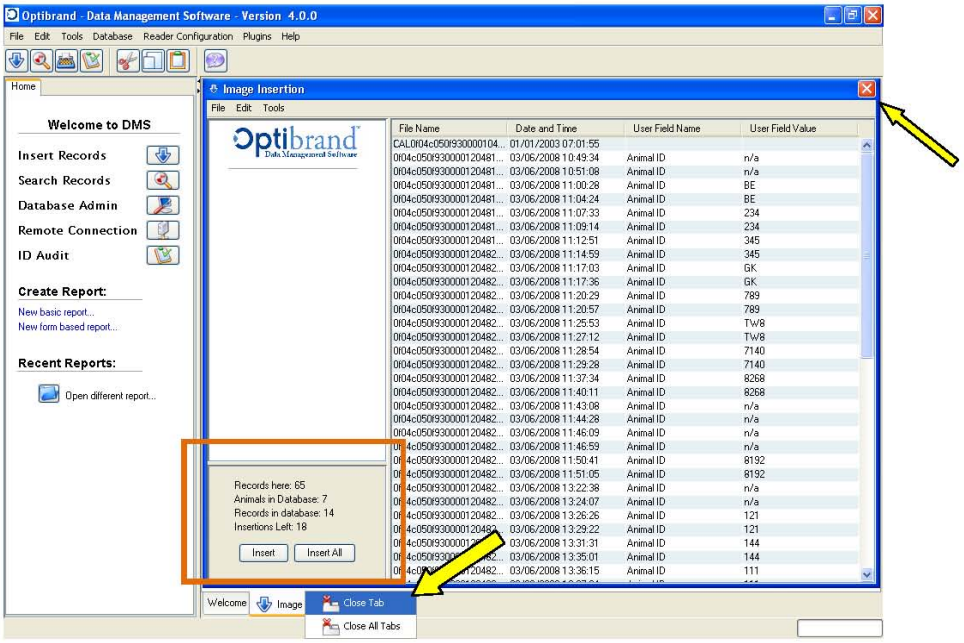
9. A new tab will open that looks similar to the one below.



10. There are several important items to note on this screen:

    a. This is a tabbed screen indicated by the circle. You may click on the tabs to go back and forth between screens.

    b. You may close the tab by clicking on the red "X" at the top right hand corner of the screen or by right clicking on the Image Insertion tab at the bottom of the screen.



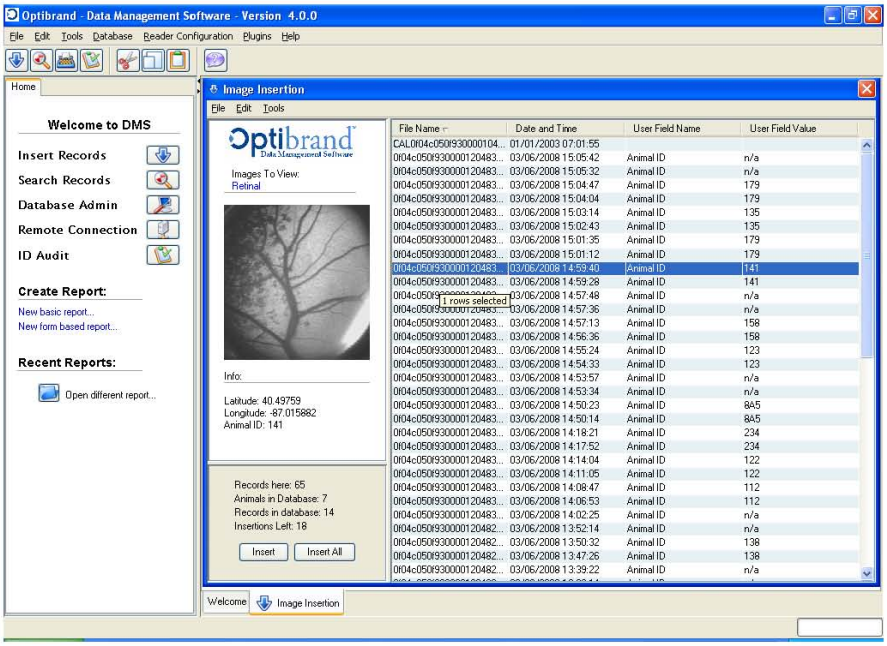
c. You will be able to tell the total number of records on the card, the number of animals in the database, the records in the database, and the number of insertions remaining by looking at the bottom left hand corner of the screen (indicated by the box).

i. "Records here" indicates how many records are on the compact flash card.

ii."Animals in the database" will indicate how many total animals are included in your database.

iii. "Records in database" will be the total number of records available. Please note that if you have taken multiple retinal images of an animal, this number will be more than twice the number of animals.

iv. "Insertions Left" is an indication of the number of insertions (animals) you have available.

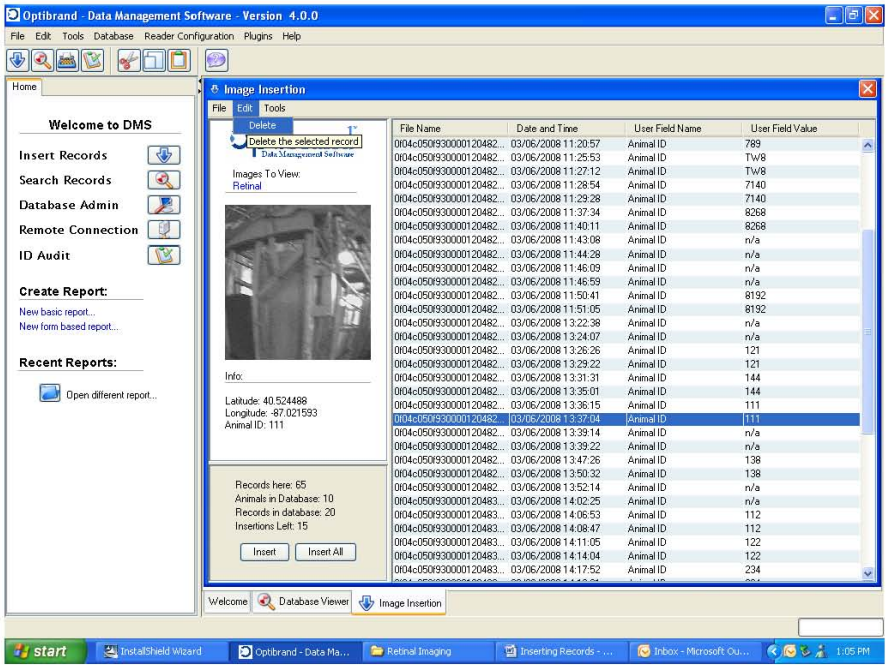


d. Click on a file to see a small summary of that file in the left hand column of the screen.

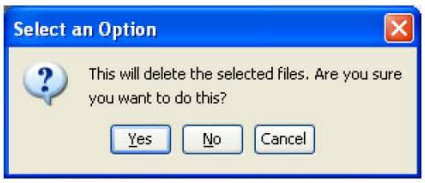
11. There are two ways to insert records: inserting selected files or inserting all of the files. If you want to insert all of the files on the compact flash card, skip to step number 16. Before inserting your records we recommend checking each file and deleting non-retinal images (the ceiling, the gate, etc.) to ensure that you are only uploading files that are needed. Remember to **make a copy** of the files on your disk before deleting any files.

a. To delete an image click **Edit** on the screen's toolbar.

b. Click **Delete**.



c. A new box will open asking if you are sure that you want to delete this file.

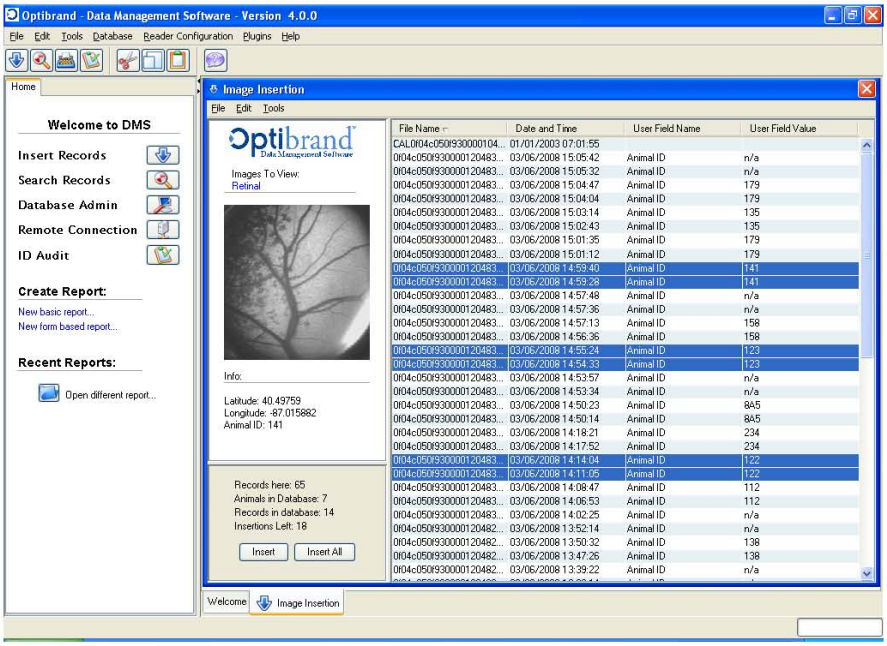


d. Click **Yes** to delete the file. This will delete the file from the compact flash disk.

12. To insert a certain selection of files, hold the "Ctrl" key down and use the mouse to click on the files you want to insert.

a. You may rearrange the files by Field Name, Date and Time, User Field Name, and User Field Value by clicking on the appropriate heading at the top of the screen.

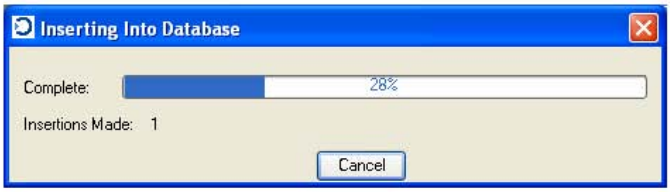
b. You may also add, rename, and remove columns. For more information see the file titled "Managing Your Information."



13. After you have selected the files you want to insert, click **Insert**.

14. A new screen will appear asking if you are sure you want to insert the selected records into the database. Click **yes.**

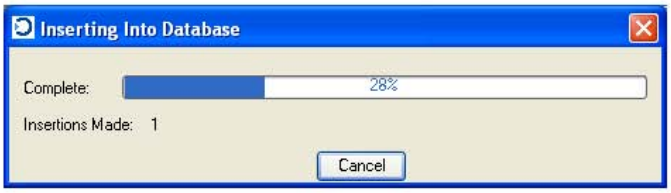
15. A progress bar will appear on the screen letting you know how far the insertion process has progressed.



16. To insert all of the available records on the compact flash drive, click **Insert All.** Please note: if you have more records available than insertions you will not be able to insert all of the records on the compact flash disk.

17. A new screen will appear asking if you are sure you want to insert all of the available records, click **yes.**

18. A progress bar will appear on the screen letting you know how far the insertion process has progressed.



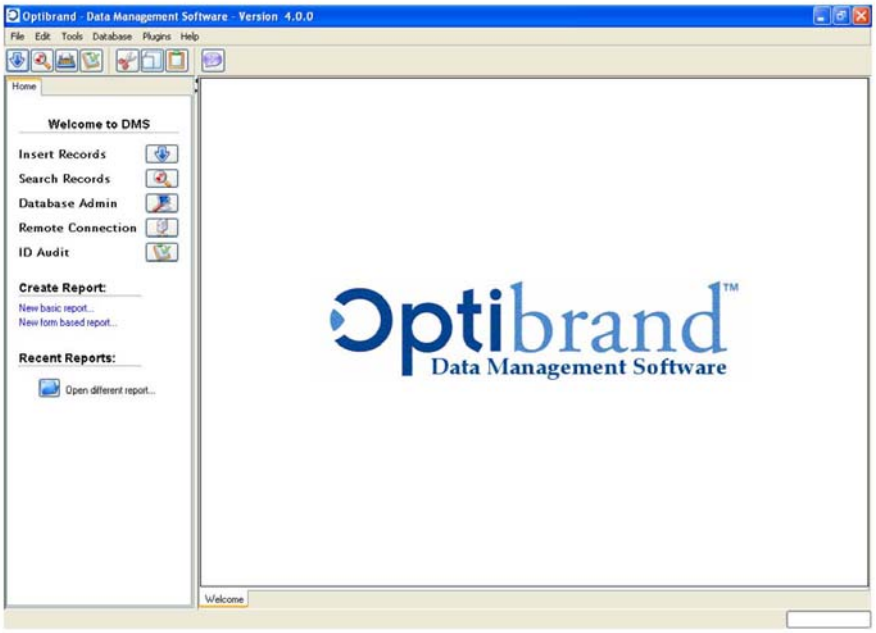
19. Once your images have been inserted into the DMS software, you may search, sort, add information, print a certificate, and compare images.

Appendix D. Managing Your Information

Managing Your Information

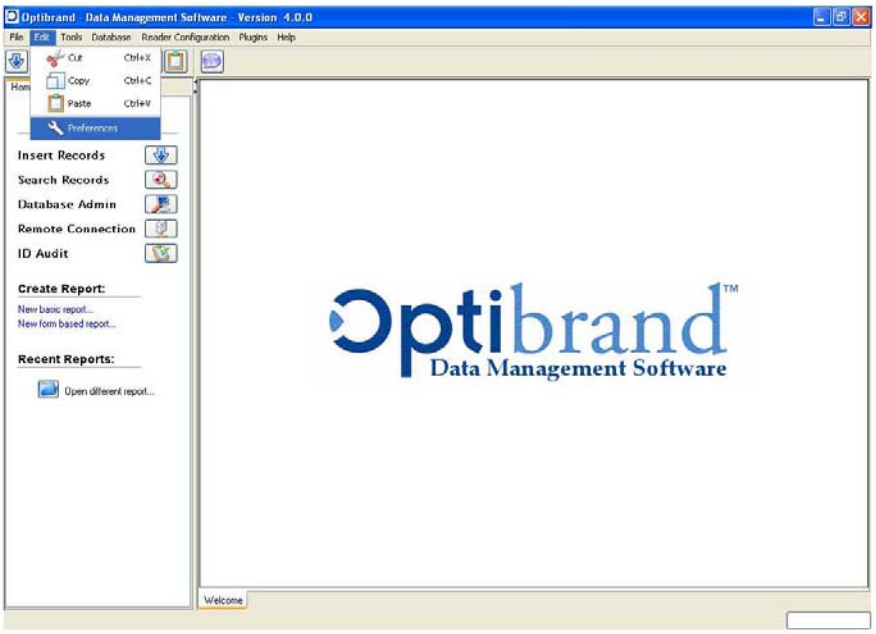
1. Open your Data Management Software (DMS) by double clicking on the **Optibrand DMS** icon on your desktop.

2. After your DMS has opened, you should see the following screen.

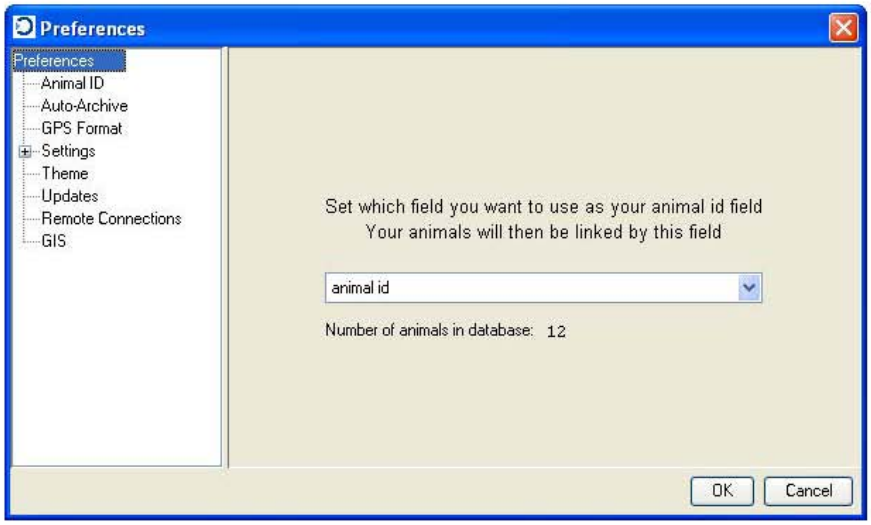


Checking the number of animals in the database:

1. Click on **Edit** and select **preferences** at the bottom of the menu.

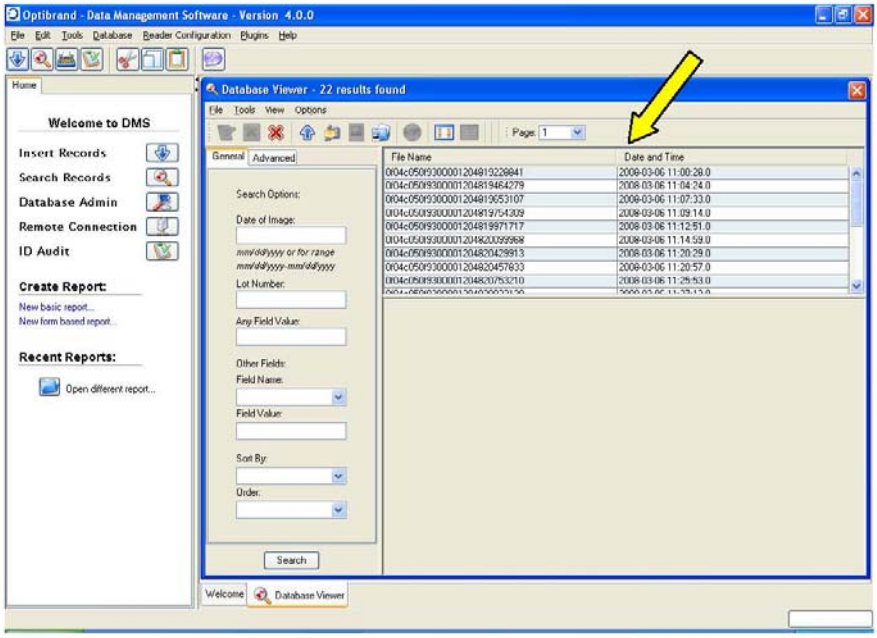


2. A new box should open that looks like this.

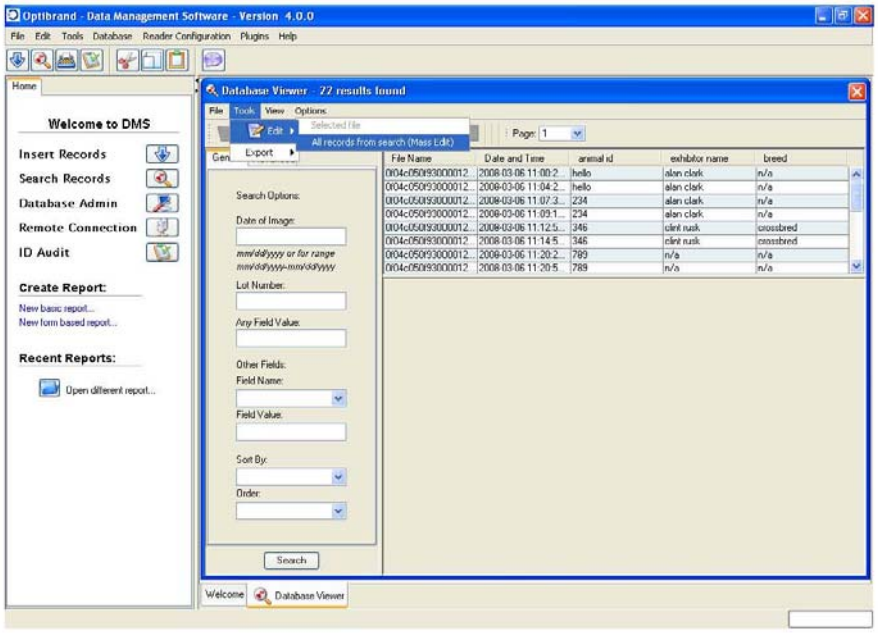


3. The total number of animals in the database will be displayed in the box. Click **ok** or **cancel** to exit the box.

Adding Columns to the Table in the Search Field:

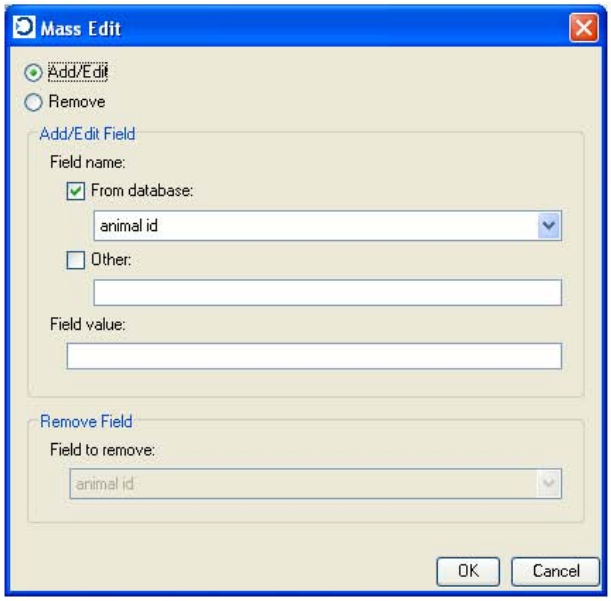


1. To add "columns" you must first add "fields." To add a "field," click **Tools,** then **Edit,** then **"all records from search (mass edit).**"



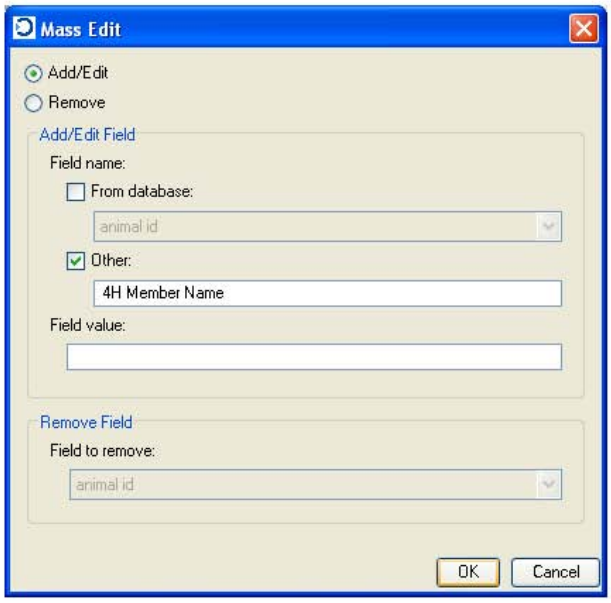
2. This will open up a new box asking if you are sure that you want to edit all of the entries. Click **Yes.**

3. This will open up a new box that will allow you to add a field.



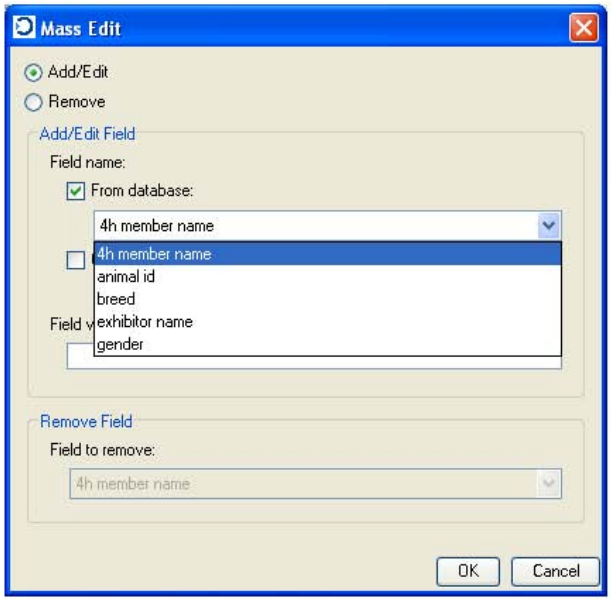
a. For example, if 4-H Member's name was not programmed in the compact flash card as a hidden field, it could be added as a field now.

4. Click the box by "Other:" then type "4-H Member Name" into the field. Under field value, type "n/a" until you can fill-in the field in for each entry. There must be an entry in the field value box. Then click **ok**.



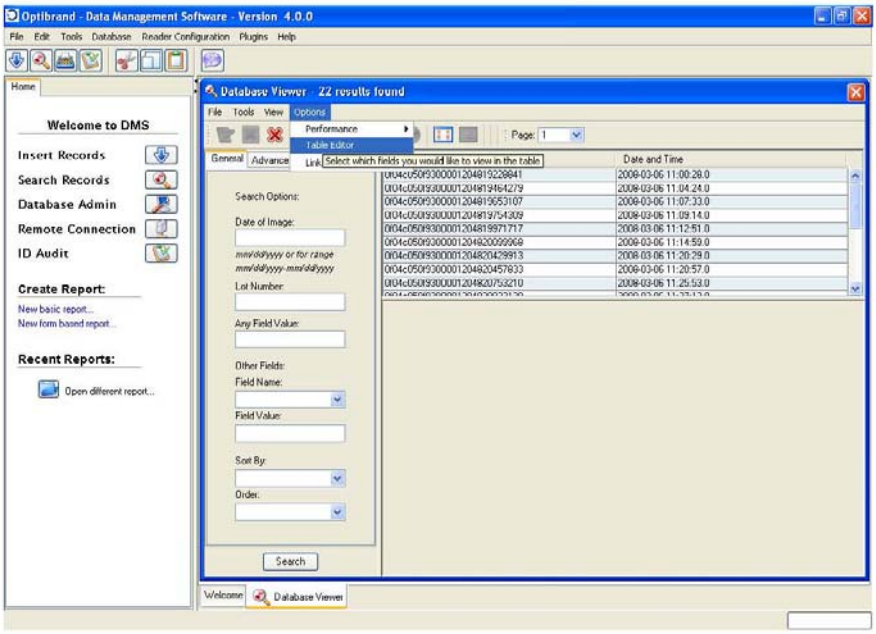
a. You can also add fields for breed and gender this way. These fields may be edited later, either individually or as a group.

5. After the field has been added to the database it will appear in the drop down menu.



6. Once you have entered your fields, you must edit the table to make your fields visible. There are three additional fields that may be visible in the screen with file name and date and time. File name and date and time are automatically populated and may not be removed from the search screen.

7. To add one of the categories to the table in the search screen, click **Options** and then **Table Editor**.



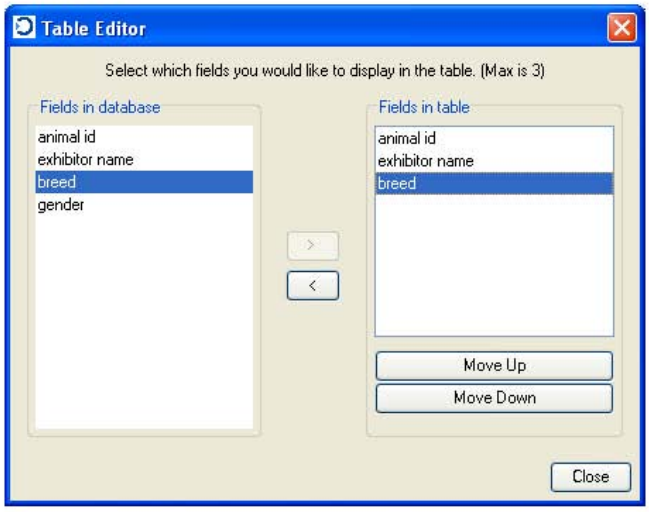
8. This will open a new box.

9. Choose a category from the left hand column by clicking on it.

10. Then click the arrow button in the middle of the screen to add it to the right hand column.

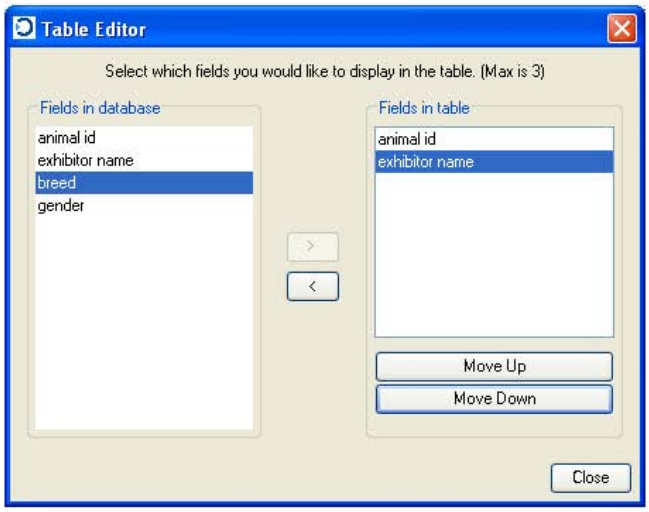
11. You may add up to three categories to the right hand column. When there are three categories in the right hand column the button in the middles of the screen will no longer be available.

12. To remove a column, click on the category in the right hand box.

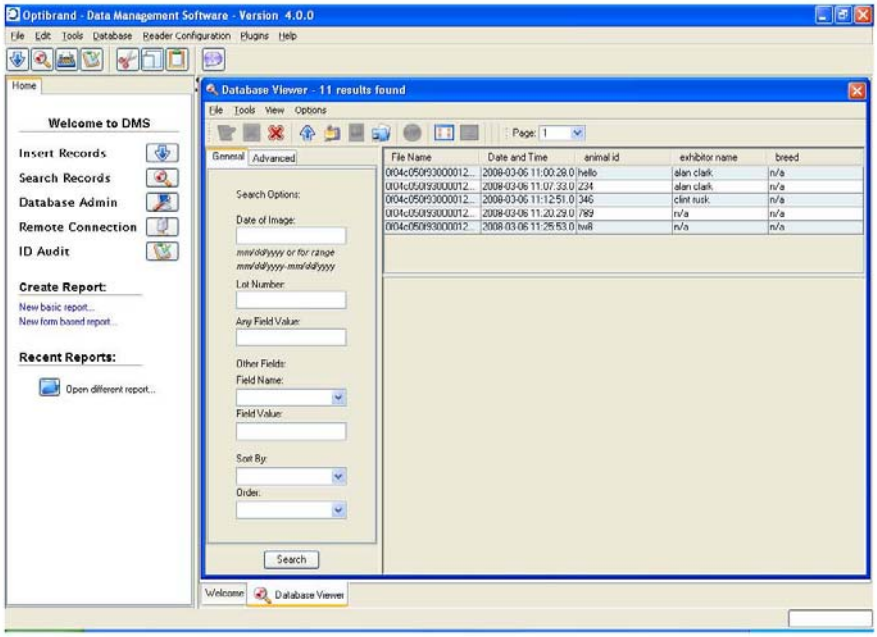


13. Now click the "back" arrow and the category will be removed.

14. You can also change the order of the fields by clicking on the field in the right hand column and clicking "Move Up" or "Move Down" as needed. This will change the order of the fields on the search page.

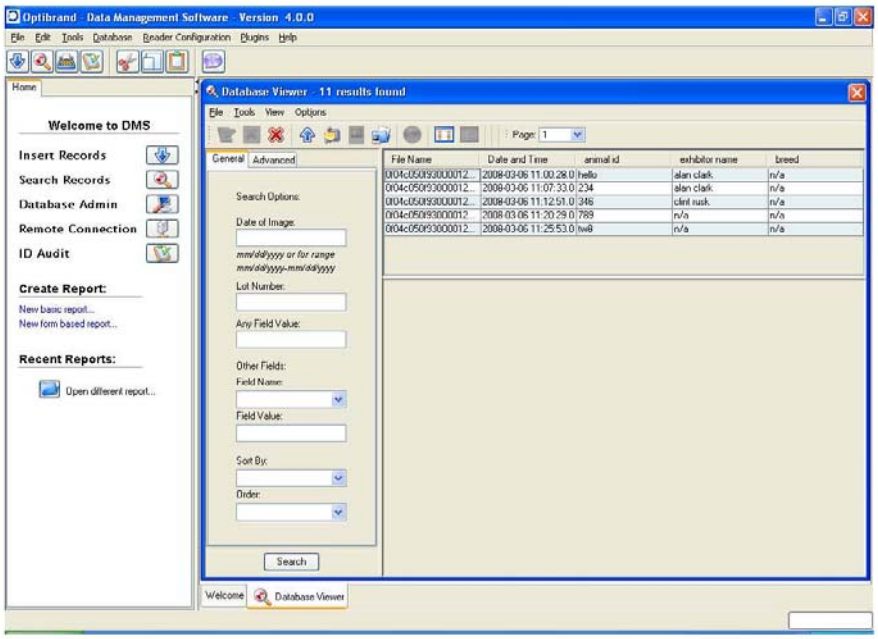


15. Click **close** when you are finished. The changes will appear on your search screen.

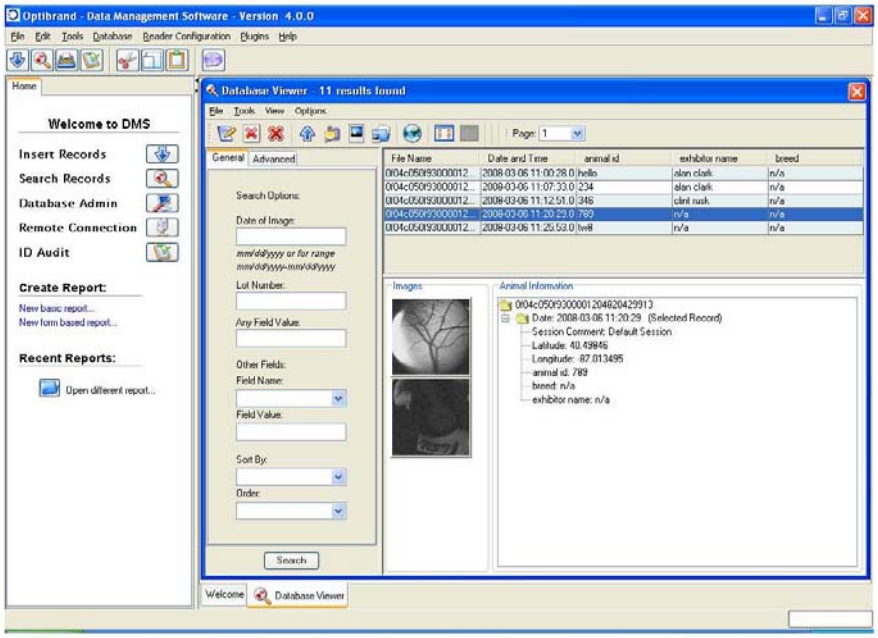


Setting Your Output preferences:

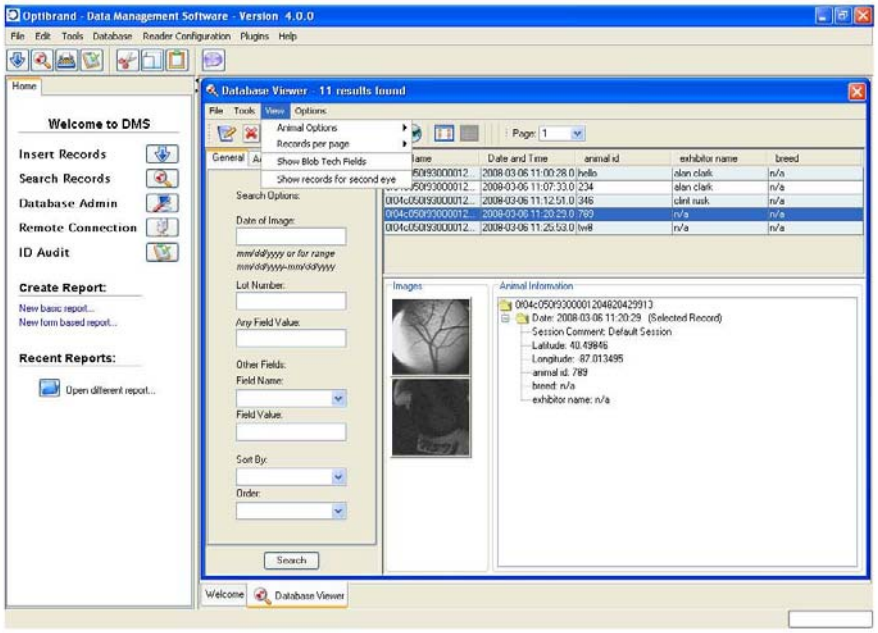
1. Click on "search records" then the "search" button.



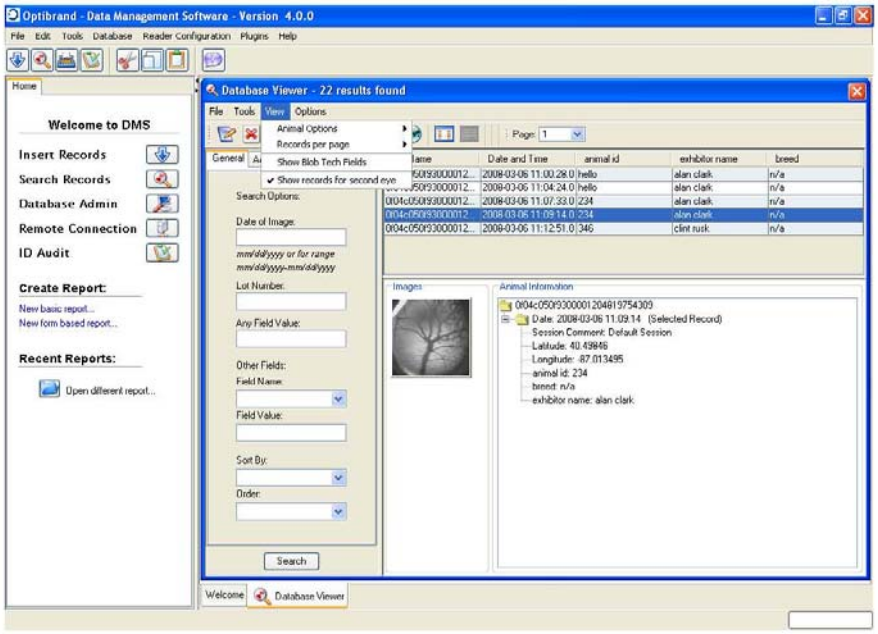
2. Click on one of the entries. The screen that opens will show five records per page and only one eye per animal.



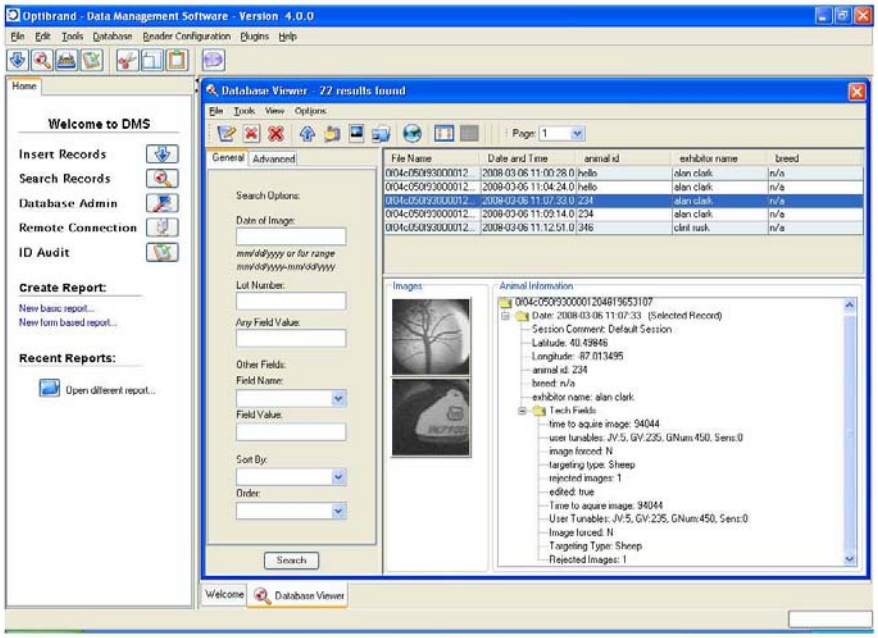
3. To change your preferences, click **View** on the screen menu. From there, you can change several display settings.



4. Click "**Show records for second eye**" and then the **search** button. This will cause the second eye to be visible in the table. There should be a check mark next to "**show records for second eye**" in the view menu.

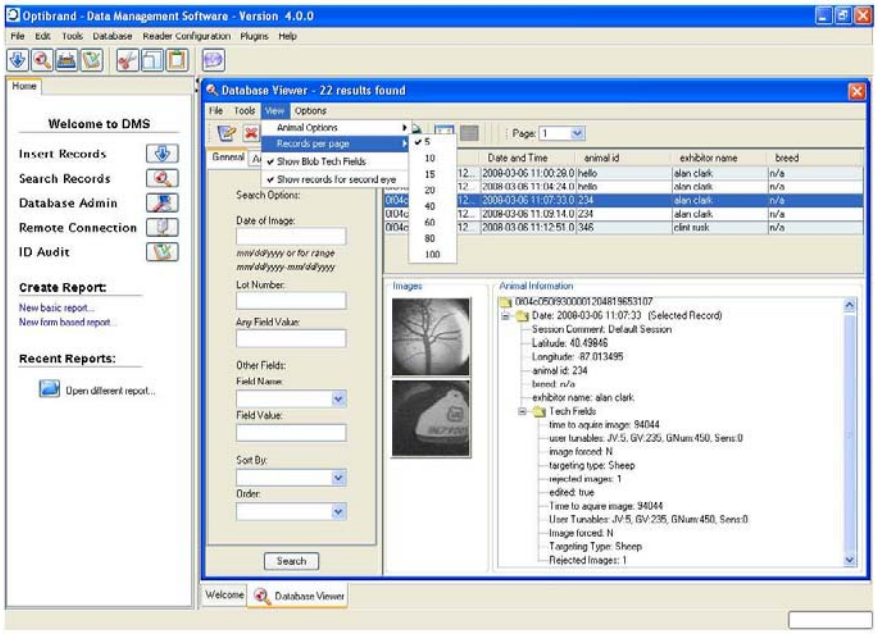


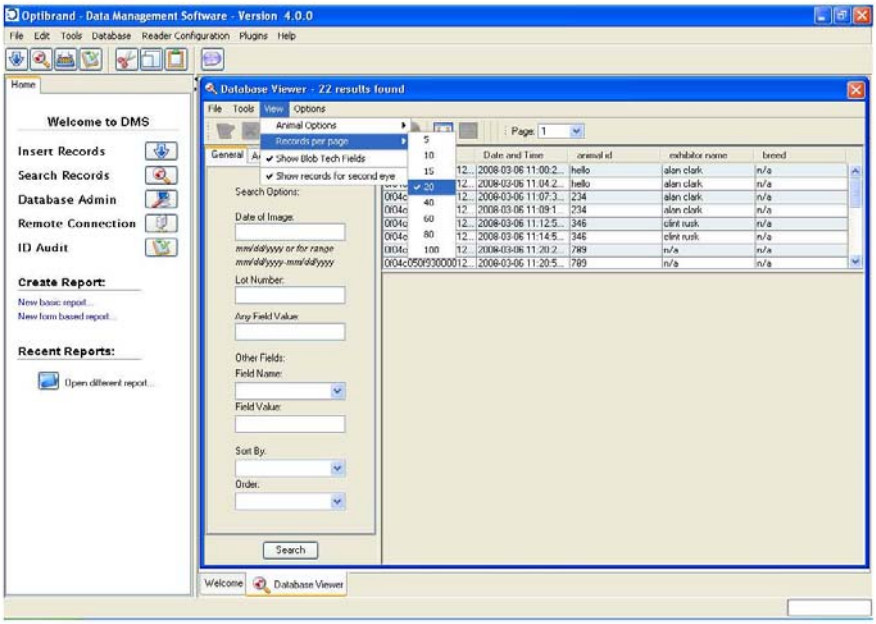
5. Next click **View** then "**Show Blob Tech Fields.**" This will add a folder to the animal information field. Remember to click the **Search** button to repopulate the table.



6. Click the folder to open it. This folder will give you information about the method of capture, targeting type, how long it took to acquire the image, etc.

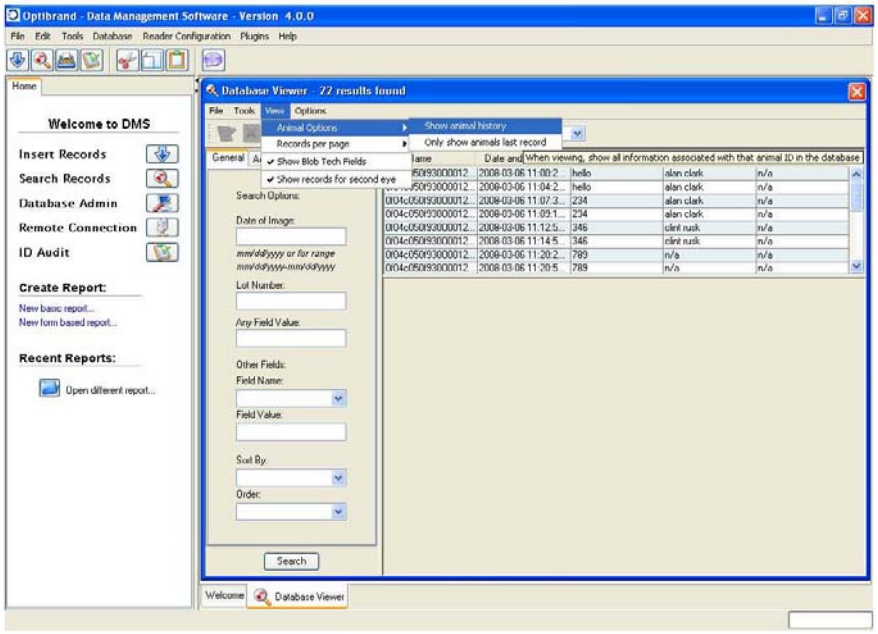
7. You can change the number of animals visible on the first page of the table by clicking on **View**, **Records per page**, and then selecting the number of records per page. Click the **Search** button to repopulate the table.

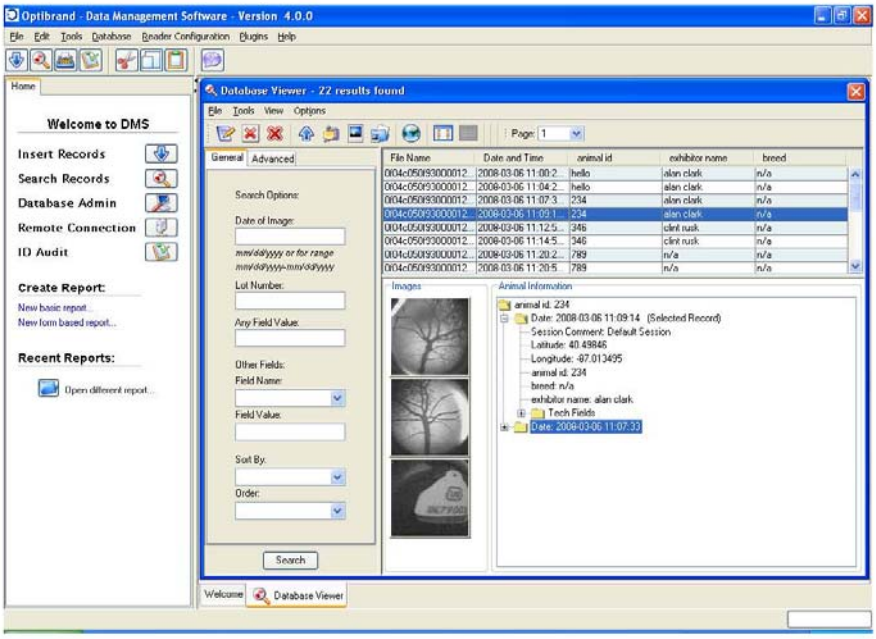




8. To tie an animal's records together, click **View** then **Animal Options**, then **Show animal history**. This will cause all of the animal's images to be shown in the left hand column next to the animal summary.

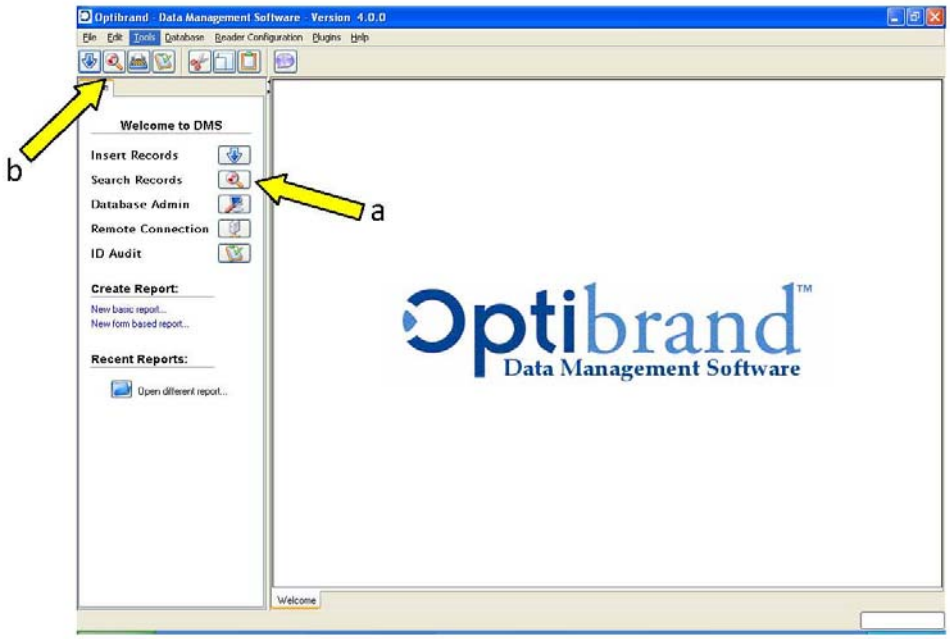
Clicking on any of the animal's records will yield all of the information in the database that is available for that animal. Remember to click search to populate the table with the changes.




Optibrand - Data Management Software - Version 4.0.0
File Edit Tools Database Reader Configuration Plugins Help
Home
Welcome to DMS
Insert Records
Search Records
Database Admin
Remote Connection
ID Audit
Create Report:
New basic report...
New form based report...
Recent Reports:
Open different report...
Database Viewer - 22 results found
File Tools View Options
Page: 1
General Advanced
Search Options:
Date of Image:
mm/dd/yyyy or for range
mm/dd/yyyy-mm/dd/yyyy
Lot Number:
Any Field Value:
Other Fields:
Field Name:
Field Value:
Sort By:
Order:
Search
File Name
Date and Time
animal id
exhibitor name
breed
Images
Animal Information
animal id: 234
Date: 2008-03-06 11:09:14 (Selected Record)
Session Comment: Default Session
Latitude: 40.49846
Longitude: -87.013495
animal id: 234
breed: n/a
exhibitor name: alan clark
Tech Fields
Date: 2008-03-06 11:07:33
Welcome
Database Viewer

Performing a Search:

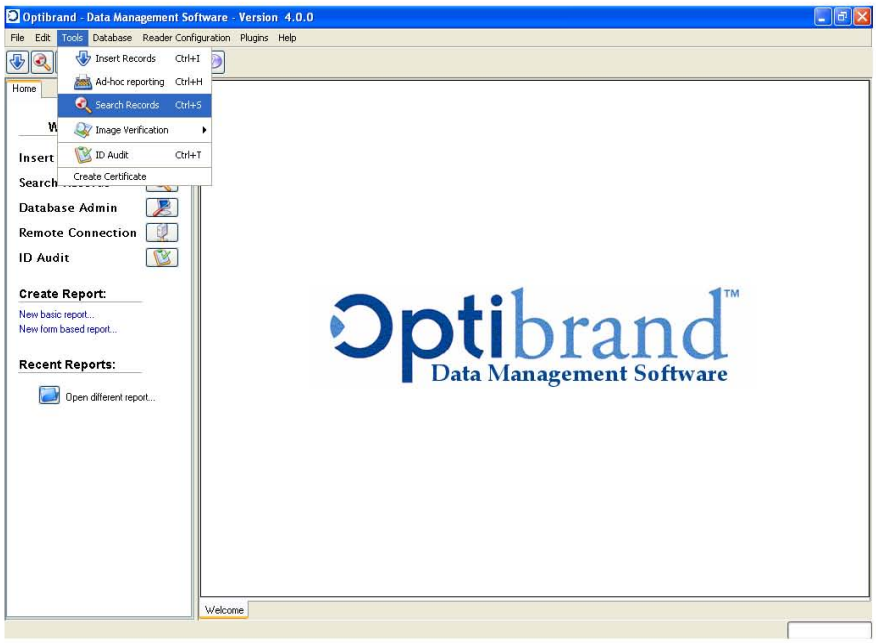
1. Click one of the two **search icons** to open the search tab.



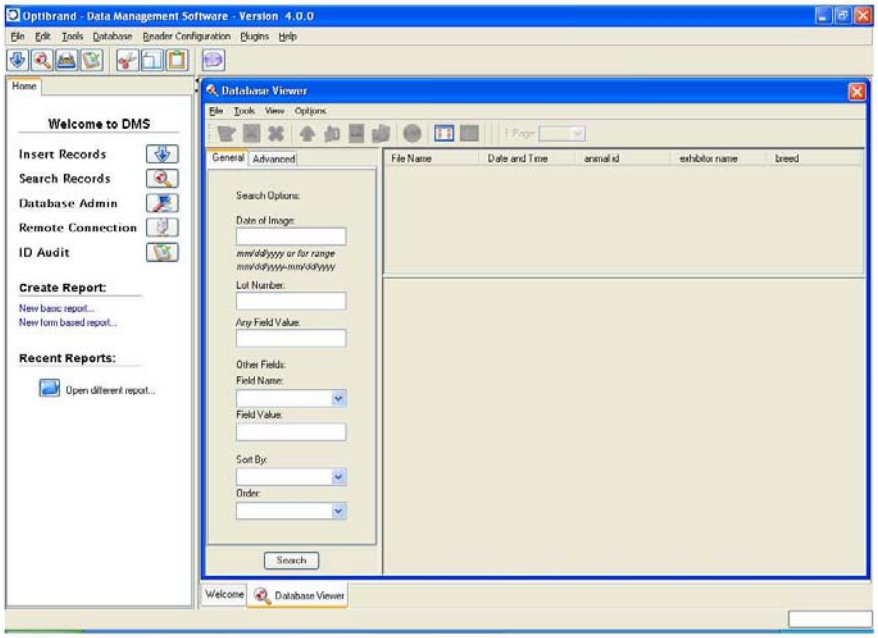
a. Click on the **search icon** next to Search Records.

b. Or click on the **search icon** on the menu bar.

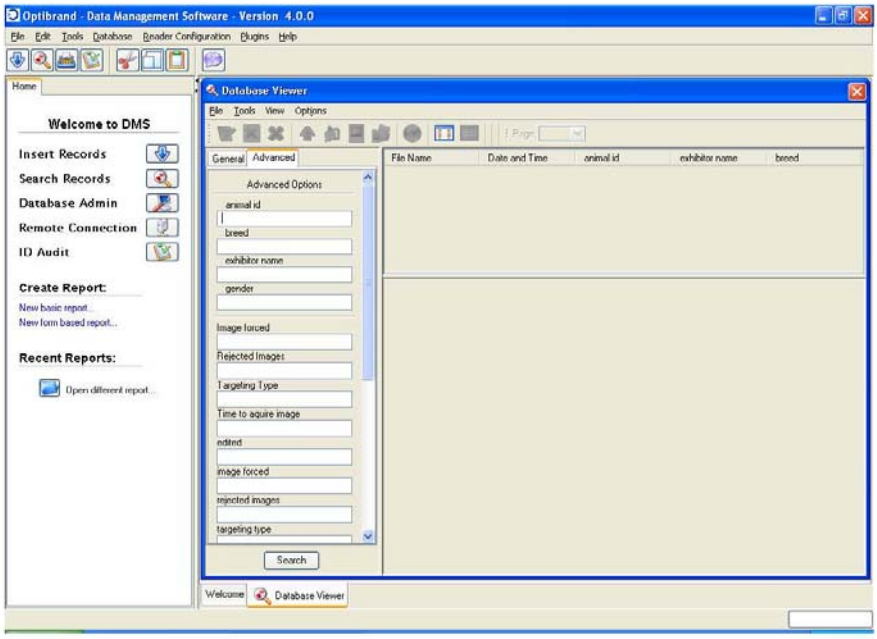
c. Or click on **Tools** and select "**Search Records**."



2. There will be a new tabbed screen available that has several search functions. Examples of some of the search functions are given later in this section.



a. Search by **date** for images that were collected on a certain date.
b. Searching by **Field Name** will yield all of the images that have information for the field name.
c. Searching by a specific **Field name and Field value** (such as a name or breed) will yield all images with the specified information
d. There are drop down menus to adjust the order of the images under **Sort By** (animal id, name, breed, etc.). These will only be available if you have added fields.

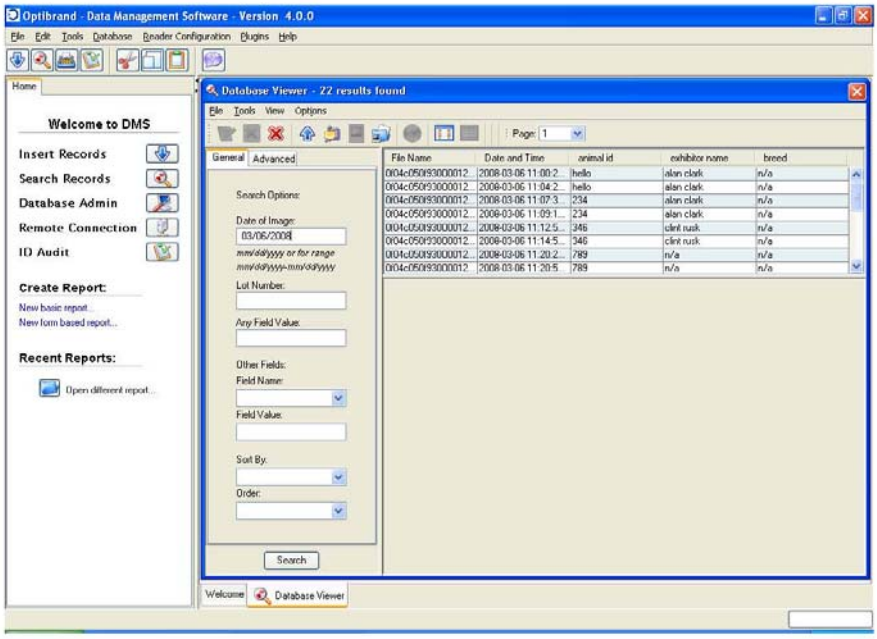


e. Click the **Advanced tab** in the Database Viewer window to search by various categories: animal id, breed, exhibitor name, gender, etc.

f. If a **"Session Comment"** was programmed into the reader configuration, there is a box at the bottom of the Advanced tab that will allow you to search by Session Comment.

g. Clicking the **Search** button without any parameters (search criteria) will bring up all of the entries in the database.

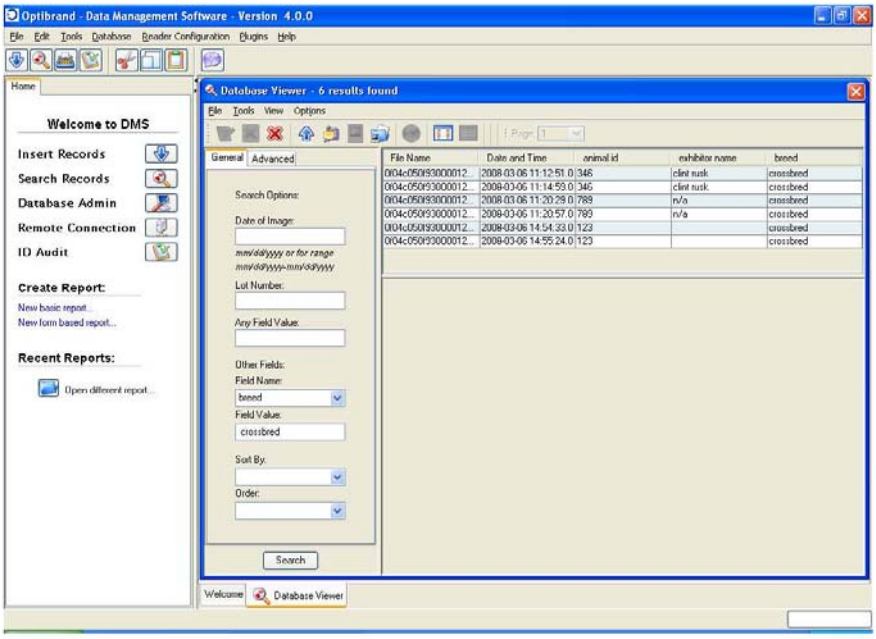
3. To search by date, type in the **date** in the "Date of Image:" blank on the General Tab in Database Viewer. Then click the **Search** button. You must click the Search button after each change to show the search results.



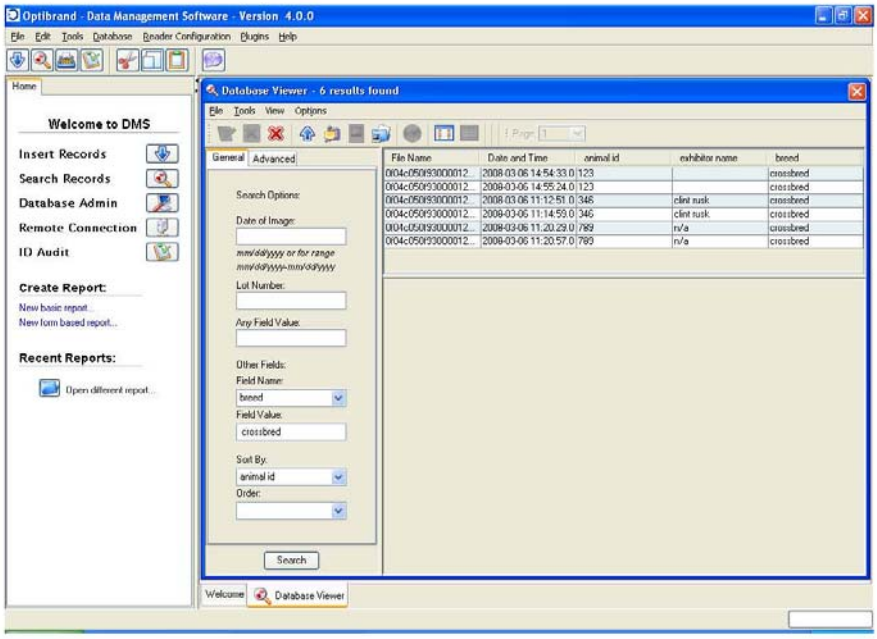
4. To search by Field Name, select the **Field Name** from the drop down list then click search. This will bring up all of the records with an entry in that category, including images with "n/a" under that category.

Please Note: Searching by any other designation before clearing previous search parameters (like the date from the previous example) will cause the program to search under all of the parameters entered. For example all of the records that meet the date AND field value criteria.

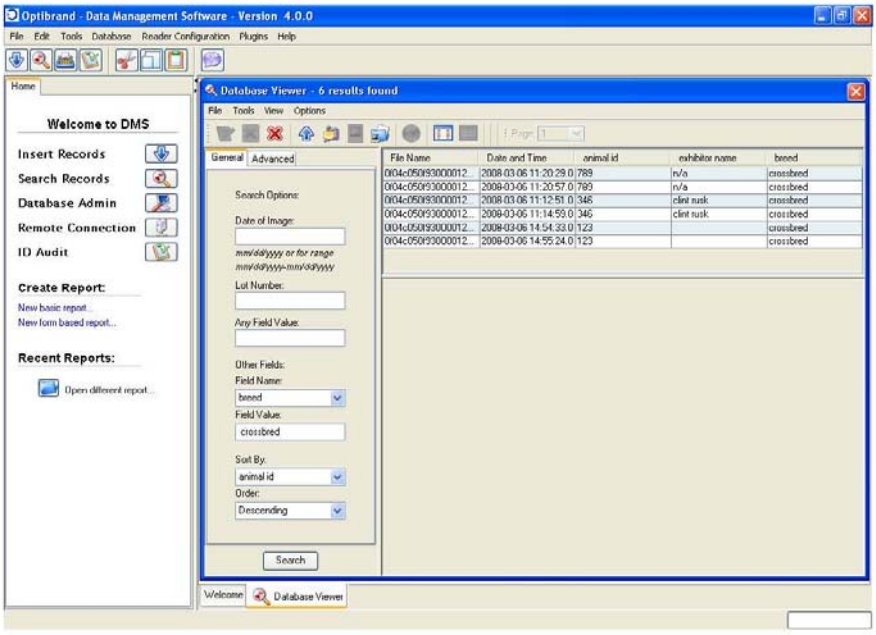
5. To search by Field Value, you must have a **Field Name** selected in the drop down menu and a valid value in the **Field Value** box. For example, select "**breed**" in the drop down menu and then type "**crossbred**" in the Field Value box. Then click the **Search** button. This will bring up all of the animals that have been marked as crossbred. See the next section for information on editing image information.



6. The images may be displayed in a different order using the **Sort By** drop down menu. Choose the category that you would like the images to sort by and then click the **Search** button.

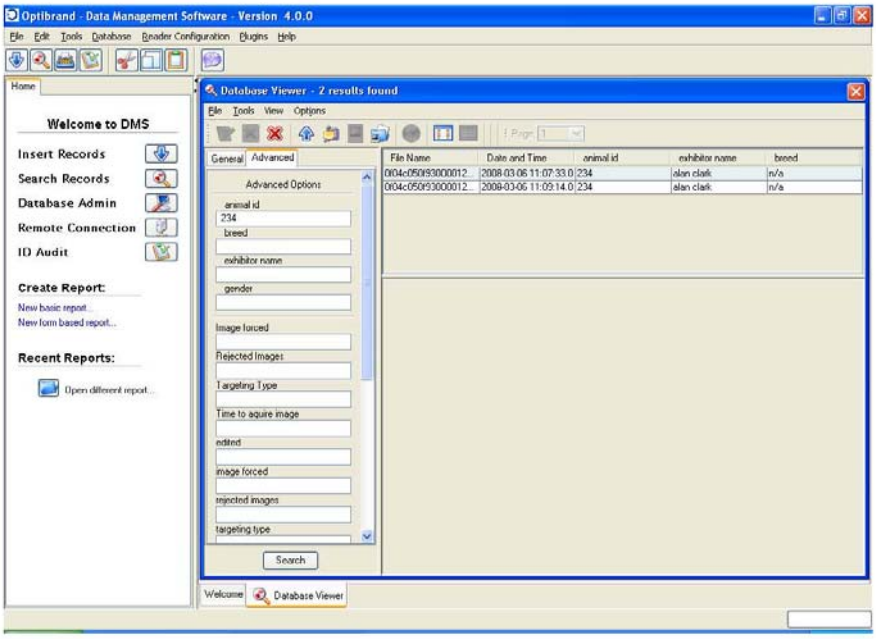


7. The order of the images may be changed from ascending to descending, if needed, by choosing the correct option from the **Order** drop down menu. For example, choose "**descending**" on the Order drop down menu then click **Search**.



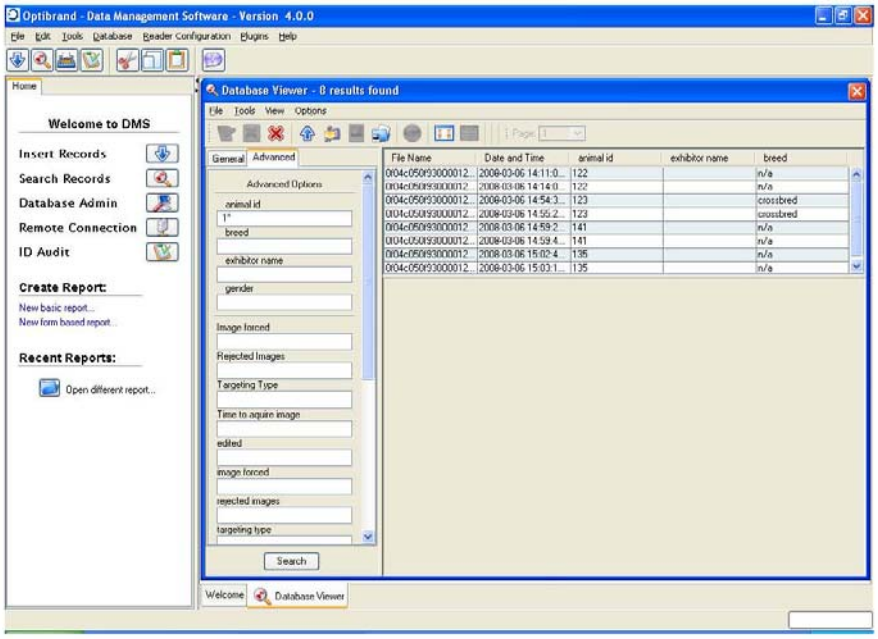
8. Click the **Advanced** tab for more sorting categories. Remember to *clear the fields* on the General tab if you want a broad search.

9. To search for a specific animal, type that animal's ear tag number in the **animal id** box and then click **Search**.

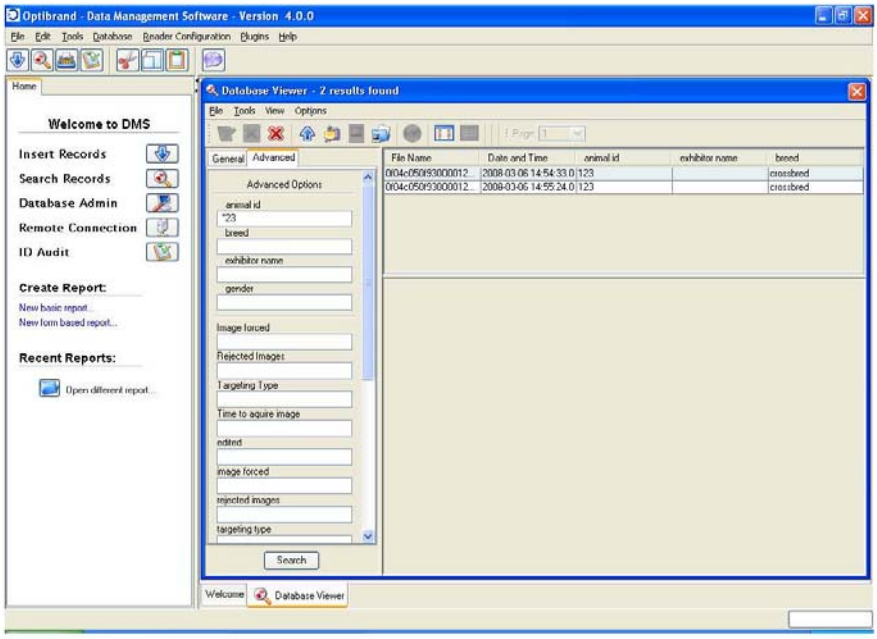


10. "Wild cards" can be used to find animals that are in a series, such as all animals starting with the number "1."

a. Type the number "1" and then an asterisk (*) in the **animal id** box and click the **Search** button. This will display all of the entries that start with the number "1." Wild cards can be used in most of the search boxes.



b. The asterisk may also be used at the start of a number. For example, to find all entries that end with "23", type "*23" in the **animal id** box and then click the **Search** button.

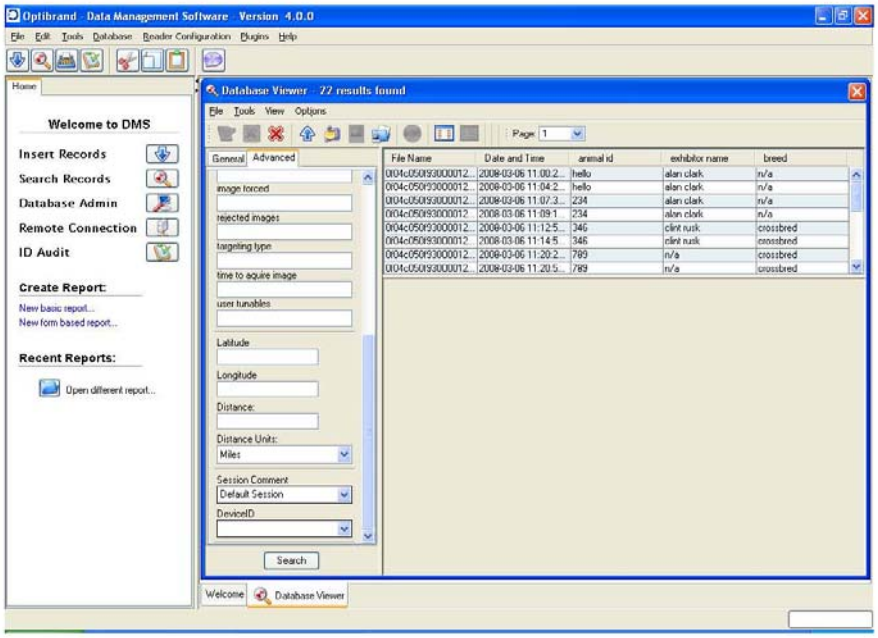


11. The actions used in steps nine and ten may also be used for **breed**, **exhibitor name**, and **gender**. Type in the appropriate search word, such as "crossbred" in the breed box, and then click **Search**.

12. If separate **Session Comments** were programmed for each **specie**, **county**, and **year**; they will be available in the drop down menu under Session Comment. For example "**Purdue Beef 2008**," "**Purdue Beef 2007**," and "**Purdue Sheep 2008**" could be categories in the drop down menu.

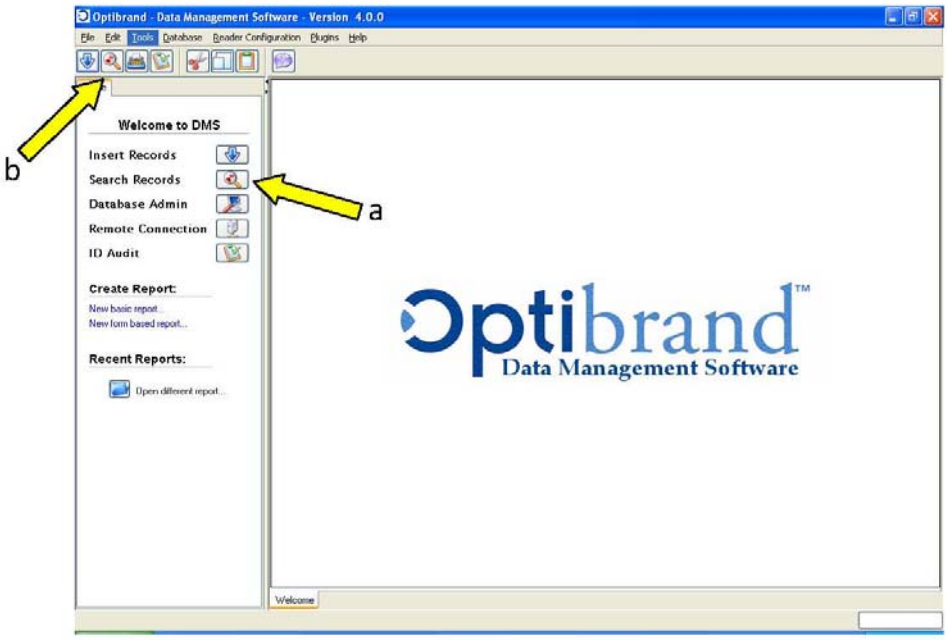
a. To search by the **session comment**, scroll to the bottom of the **Advanced** tab, select the appropriate **session comment** from the list and then click the **Search** button. This will bring up all of the images that are tagged with that specific session comment.

b. The session comment must be set during **reader configuration**.



Editing Image Information:

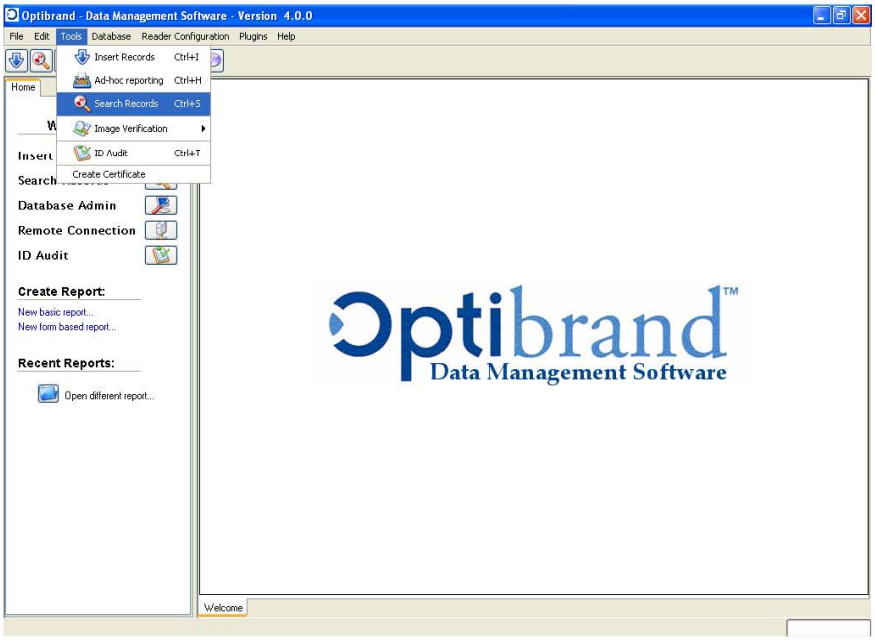
1. Click one of the two **search icons** to open the search tab.



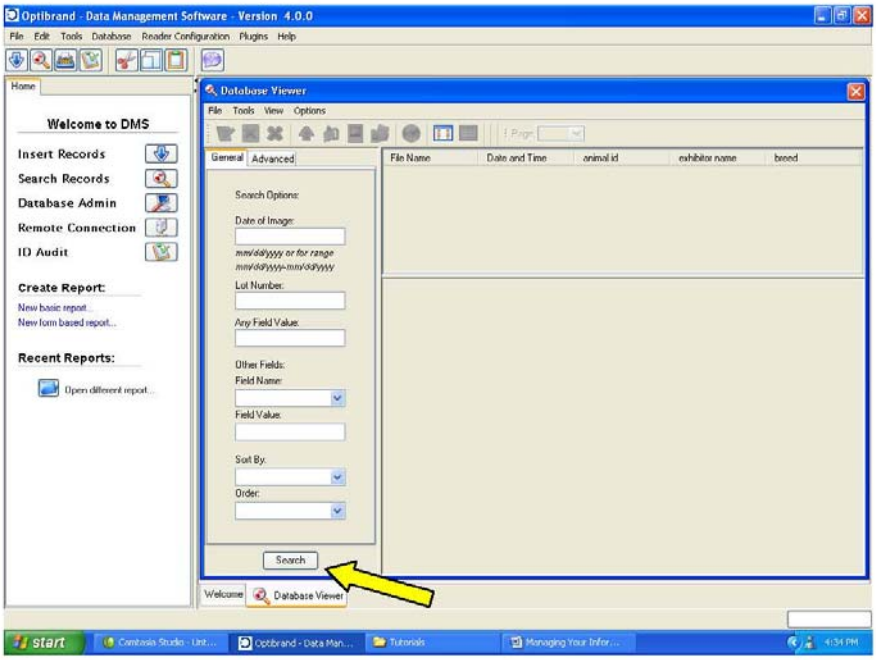
a. Click on the magnifying glass button next to Search Records.

b. Or click on the search icon on the menu bar.

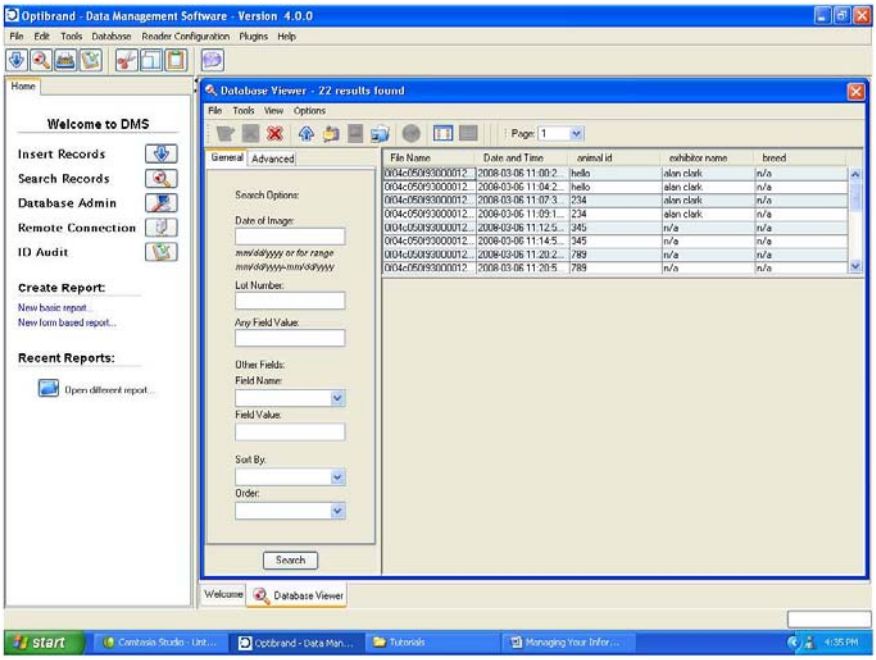
c. Or click on **tools** and select "**search records**."



2. A new tab will open on the tab bar in the Optibrand software.



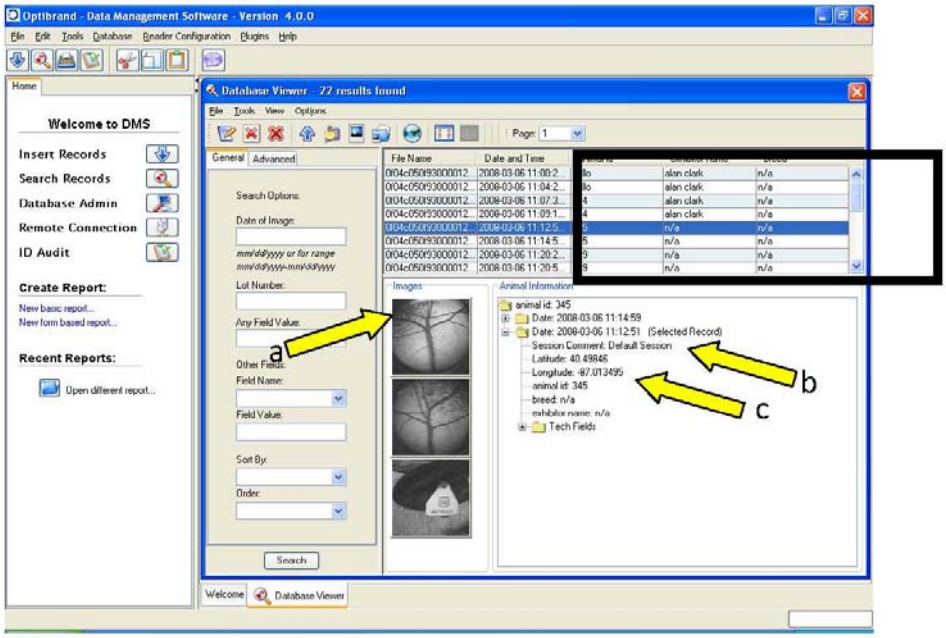
3. To see the files that are available you must click the **Search** button.



4. Each time you change something in this window you must click the **Search** button to see the results.

5. To edit images individually, select the entry you wish to edit. Please note that you are able to edit text information only. You may not edit the retinal images.

6. The file will open and display information. There are several important things to note about this summary.



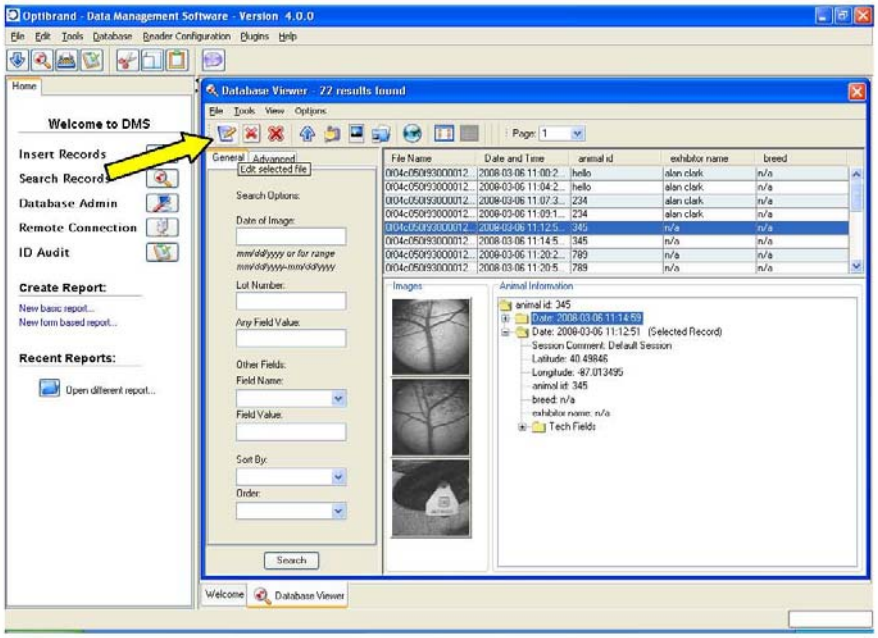
a. If you have set your preferences for the layout, there may be multiple images displayed in the "images" column. Each record in the DMS system that is linked to a certain ear tag will appear in this column. The screenshot for animal 345 is displaying two retinal images and an ear tag photo.

b. If you set a **session comment** when you programmed the compact flash card (for the retinal imaging session), the comment will appear on the animal's information. This can be used to search for the animals in that session, as well.

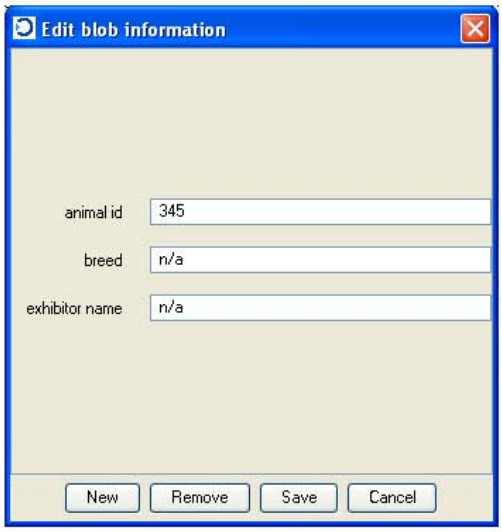
c. The GPS location will appear in this display field.

d. If you have set your preferences for the table, there will be editable fields, indicated by the box on the search screen. Each of these columns may be edited individually or in mass as needed. Information entered in these columns may be used to search as well. Remember, to change the information displayed on the screen, you must click the **Search** button after the changes are made.

7. To edit the information attached to an image, select the image/animal and click the "notepad" on the menu bar.

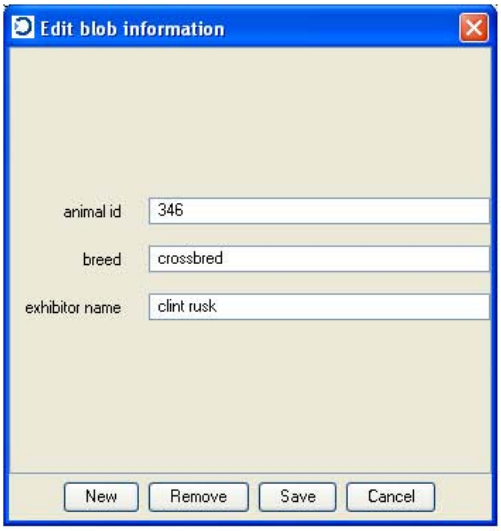


8. A new box will open and display your editable fields.



9. To edit a field, click in the appropriate square, delete the selected information, and type in the new information.

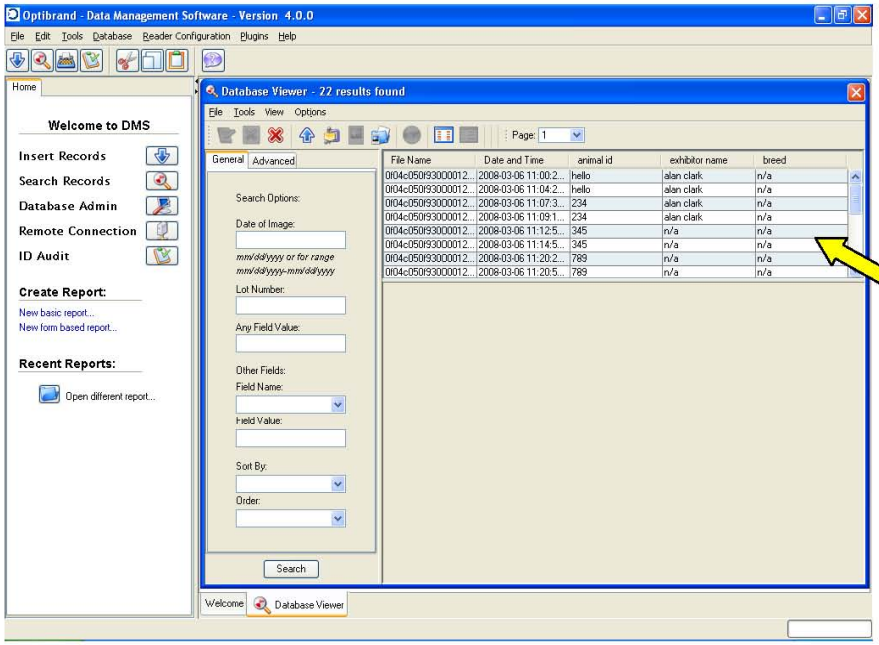
    a. For example, if the animals' ear tag was incorrectly entered as 345, you may edit this number now. This will change all of the records associated with this animal.



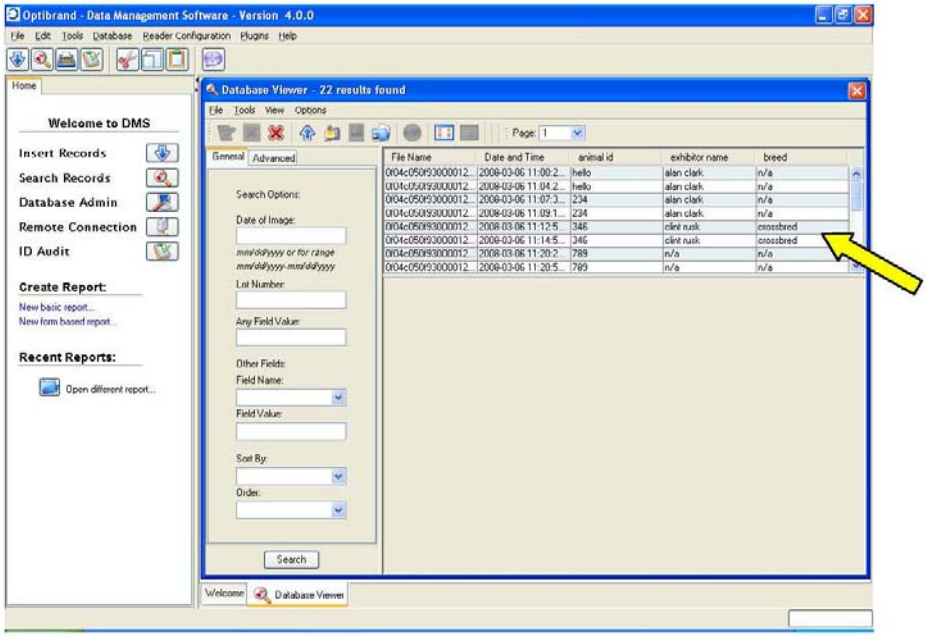
11. Click **Save** when you are finished editing the information fields.

12. The new information will not appear in the table until you click the **Search** button.

a. Before clicking the **Search** button, note that the fields have not changed.

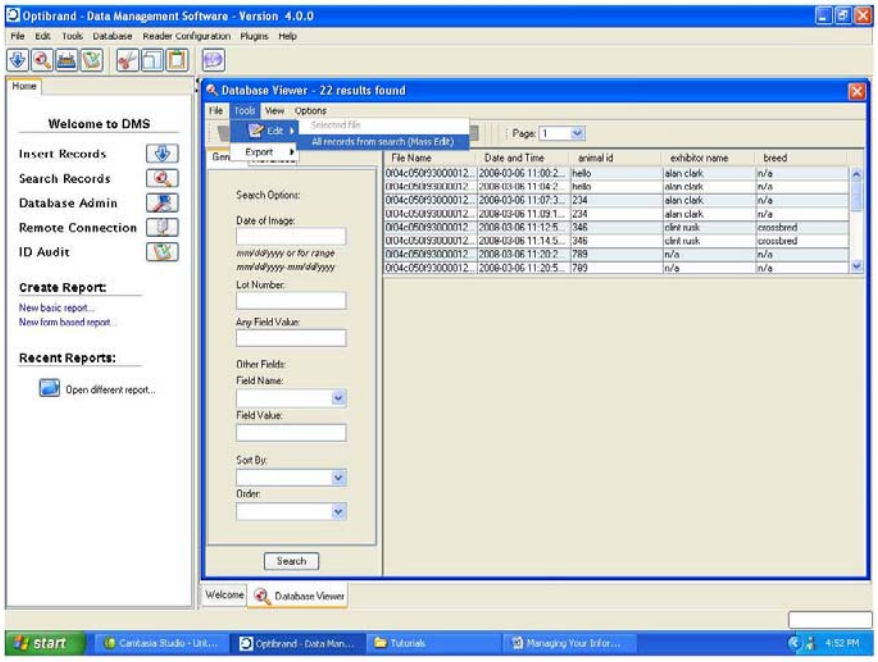


b. After clicking the **Search** button, the fields have changed.



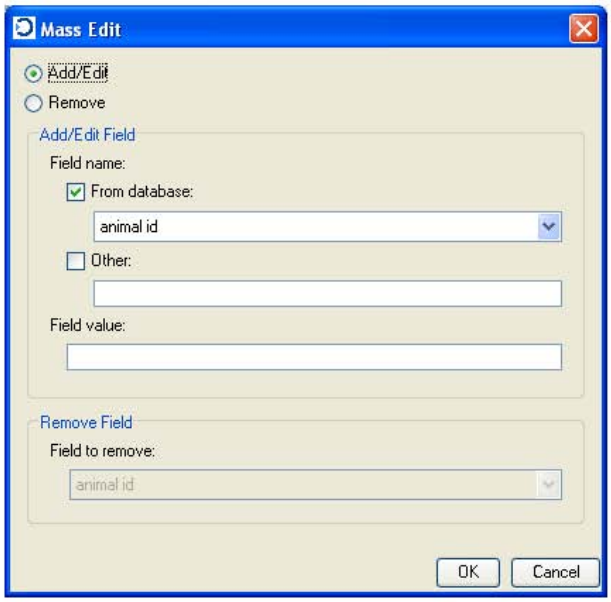
13. If you need to add a notation to all of your entries, there is a mass edit feature.

14. Click on **Tools**, then **Edit** and click "**All records from search (Mass Edit)**". This will allow you to edit all of the entries from your search. If you have not performed a specific search, but have clicked the search button, the program will edit **ALL of the entries in the DATABASE**.



15. A new box will open and ask if you are sure you want to edit all of the entries. Click **Yes.**

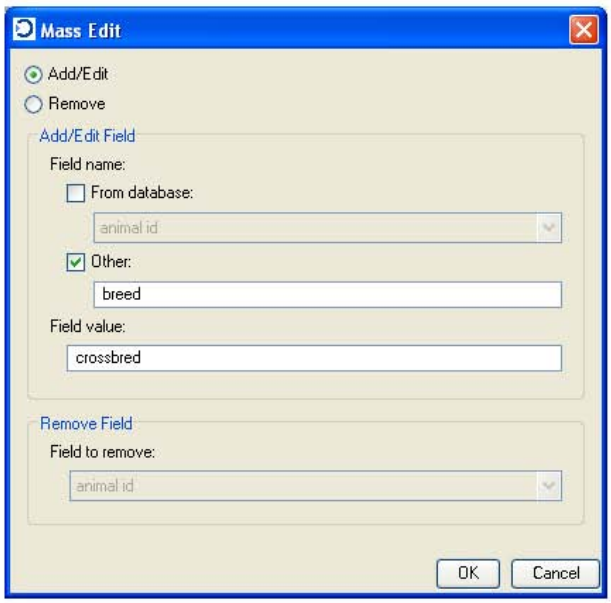
16. This will open a new box that will allow you to edit all of your entries at once.

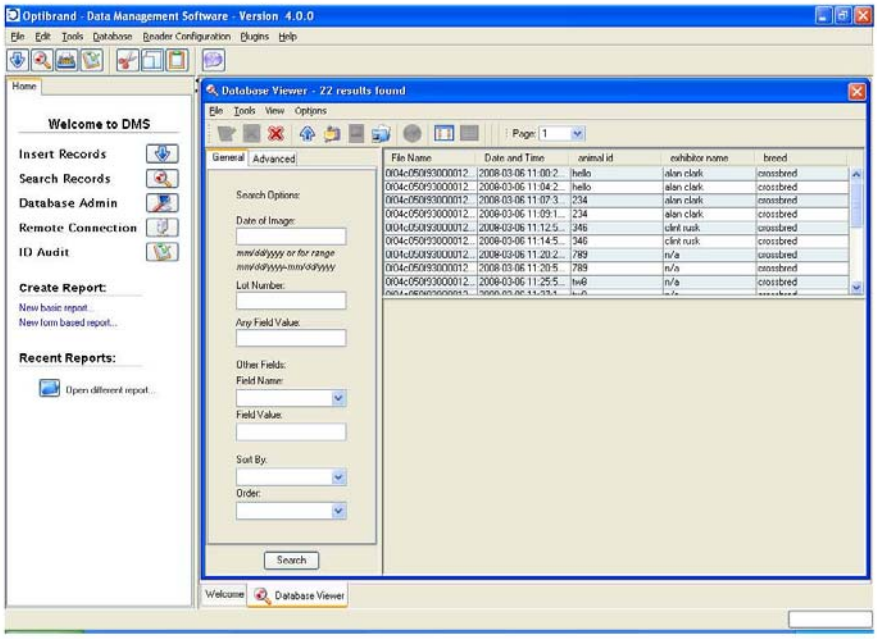


17. You may add/edit or remove entries. Remember, this will edit all of the entries from your search. If you have not performed a specific search, but have clicked the search button, you will edit **ALL of the entries in the DATABASE.**

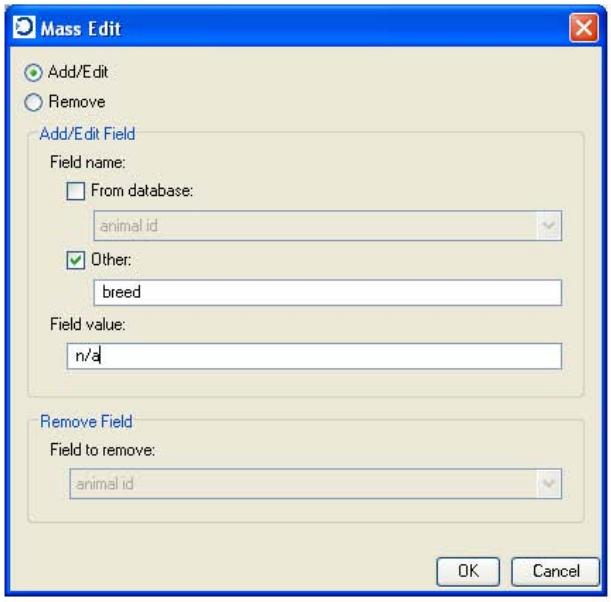
18. If a field is not available in the drop down menu, then the field has not been added to the database yet. To add a field to the database, click the **check box** beside "**Other.**" Next click in the blank beneath "**Other**" and type the category in the box, then type the field value in the "Field Value" blank. There **must be a value** of some sort in the **field value blank.** Type "**n/a**" in the **field value blank** if you do not have a specific field value.

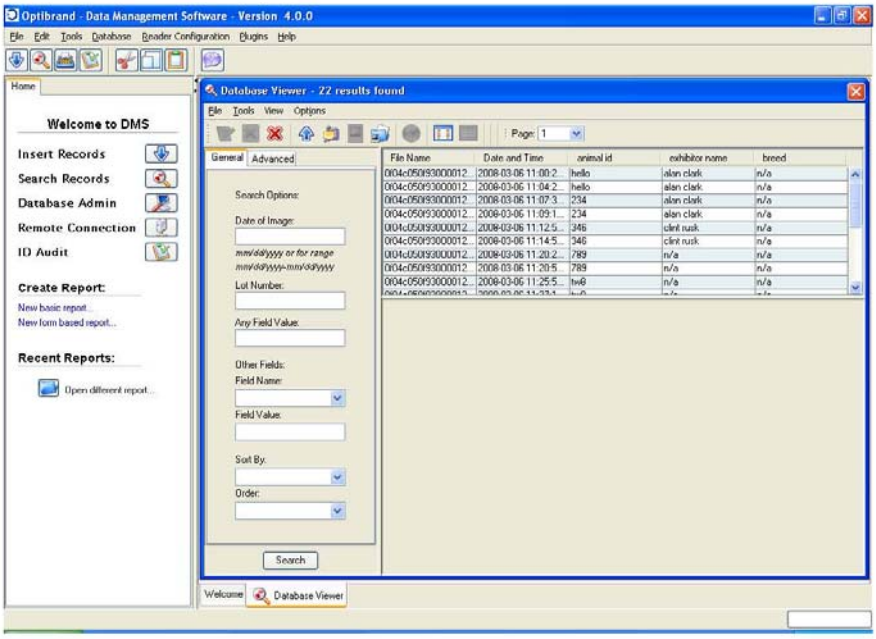
    a. If all of the animals are crossbreds, then you could add a field called "**breed**" and type crossbred in the field value. Click **ok.** Then click the **Search** button to see the result.





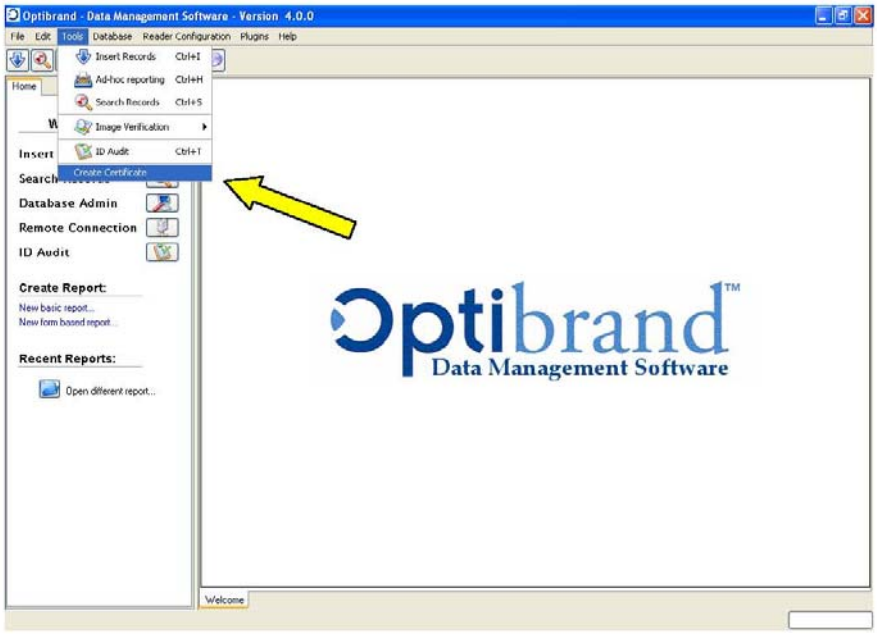
b. If you want to add the breed option but, do not want to designate the animals' breed at this time you may put "**n/a**" in the field value line and add it later. There **must be a value** in the field value line. Click **ok** and then click the **search** button to see the results.


Mass Edit
Add/Edit
Remove
Add/Edit Field
Field name:
From database:
animal id
Other:
breed
Field value:
n/a
Remove Field
Field to remove:
animal id
OK
Cancel

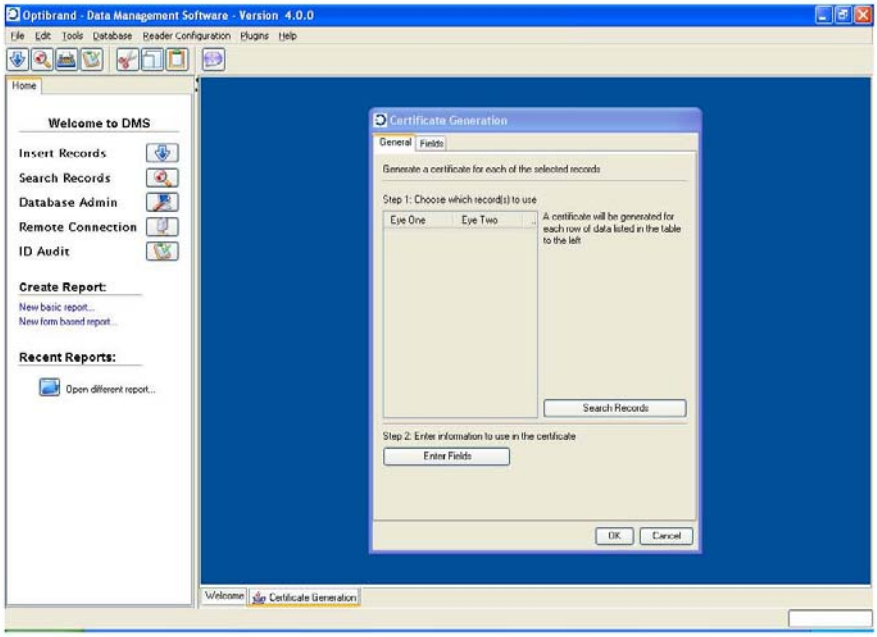

Optibrand - Data Management Software - Version 4.0.0
File Edit Tools Database Reader Configuration Plugins Help
Home
Welcome to DMS
Insert Records
Search Records
Database Admin
Remote Connection
ID Audit
Create Report:
New basic report...
New form based report...
Recent Reports:
Open different report...
Database Viewer - 22 results found
File Tools View Options
Page: 1
General
Advanced
Search Options:
Date of Image:
mm/dd/yyyy or for range
mm/dd/yyyy-mm/dd/yyyy
Lot Number:
Any Field Value:
Other Fields:
Field Name:
Field Value:
Sort By:
Order:
Search
File Name
Date and Time
animal id
exhibitor name
breed
Welcome
Database Viewer

Generating Certificates

1. To generate a **certificate**, click **Tools,** then **Create Certificate**. You must have the Optibrand certificate plugin installed, in order to do this. See the tutorial on adding plugins for additional help.

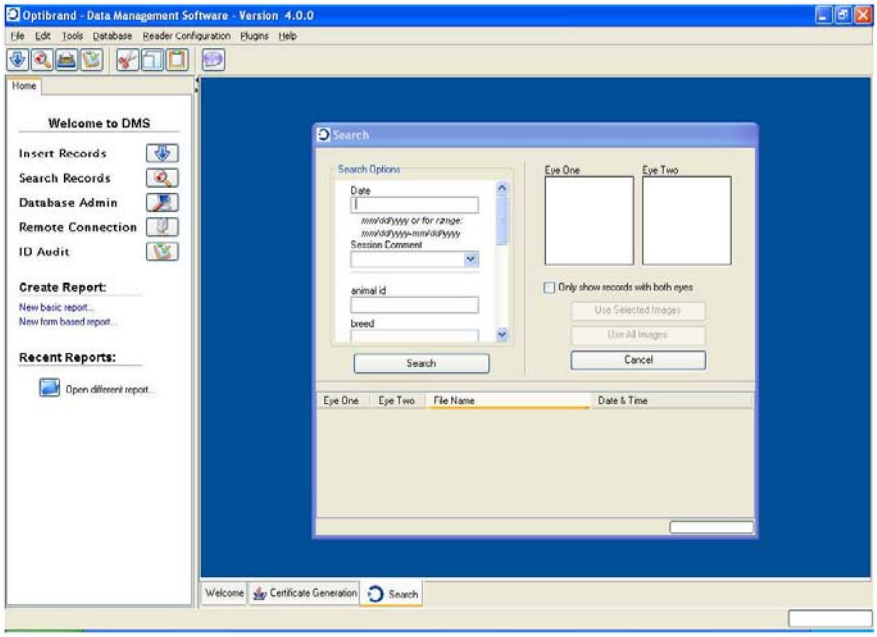


2. This will open a tab in the Data Management Software.

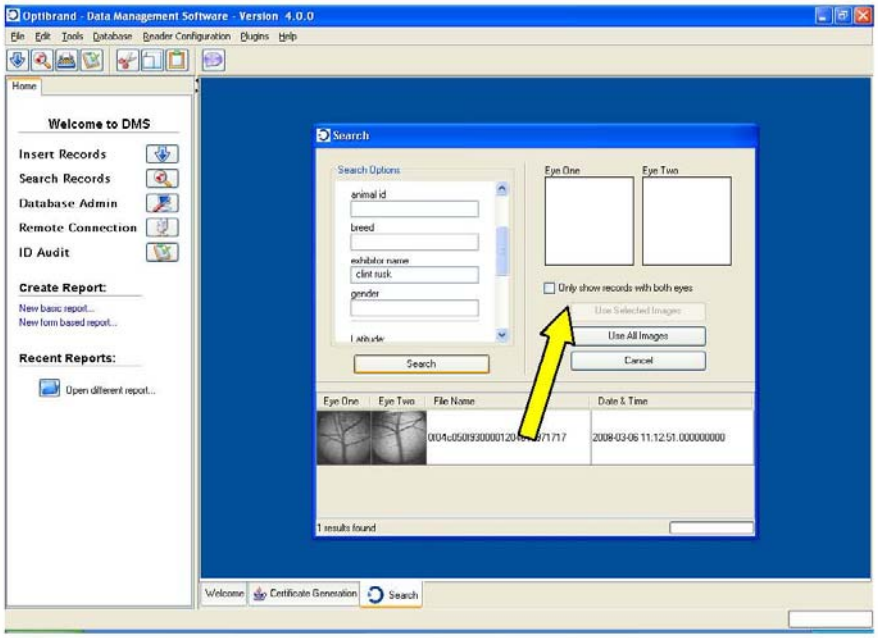


3. Click the **Search Records** button to locate the records for the animals that need certificates. This will open a new tab.

4. Select your search criteria (date, session comment, animal id, breed, etc.) in the search options column. Then click the **Search** button. The same actions used on the Database Viewer (search) tab are used here. Remember to click the **Search** button each time you change a parameter in the search column.



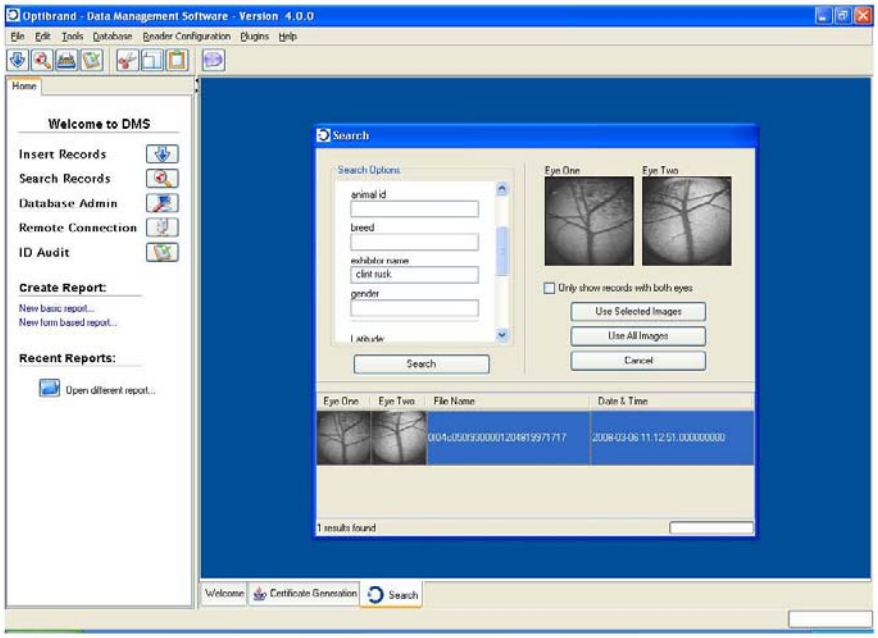
a. For example, type the exhibitor name in the **exhibitor name** blank then click the **Search** button. This will display all of the entries with that exhibitor's name in the table.



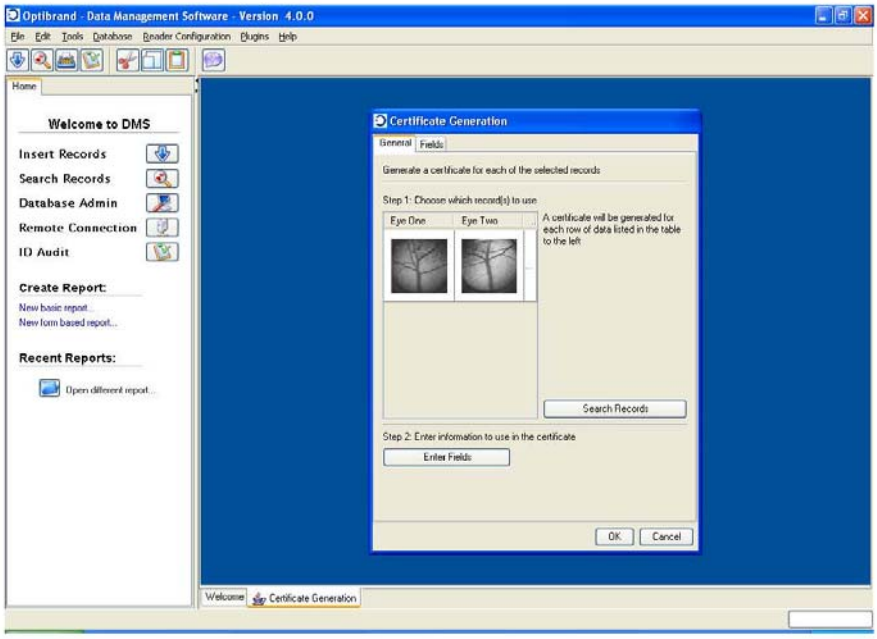
5. The number of results appears at the bottom of the screen.

6. Checking the box beside "Only show records with both eyes" will exclude all records that do not have both eyes. Click the **Search** button to repopulate the table.

7. Clicking one of the results (only one result is displayed in the image) will display the one or two retinal images associated with that record in the "Eye One" and "Eye Two" spaces.

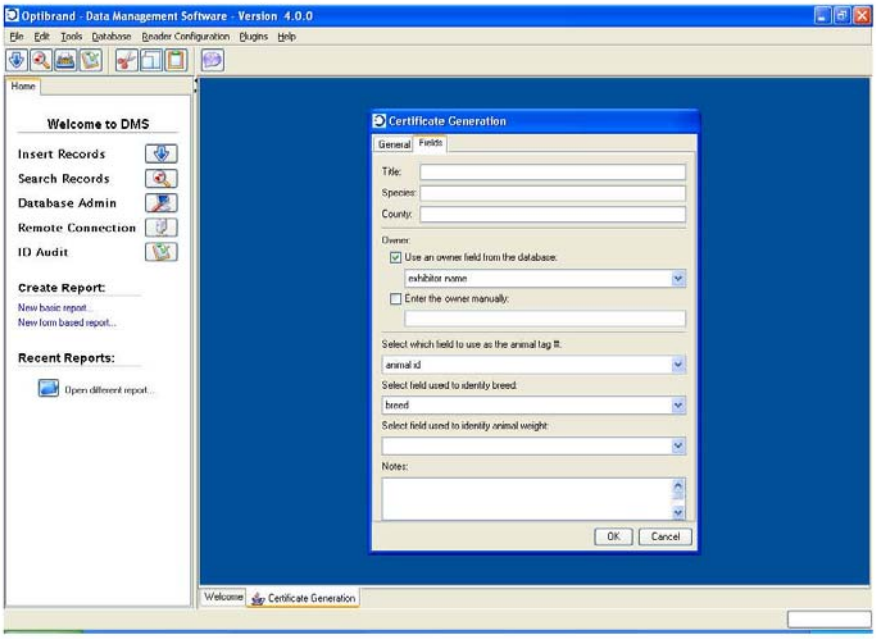


8. To print a certificate for the selected record only, click the **Use Selected Images** button. This will display your selected images in the box on the **General** tab. Now go to step **ten**.



9. To print a certificate for all of the records from the search, click the **Use All Images button**. This will display all of the records returned in the search.

10. Click the **Enter Fields** button. This will take you to the **Fields** tab. You may switch between the General and Fields tab during this process.



11. Enter a title such as "County Specie Year" (Purdue Sheep 2008, Adams Beef 2007, etc.) in the **Title** box. This title will appear on every certificate.

12. Enter the species in the **specie** box.

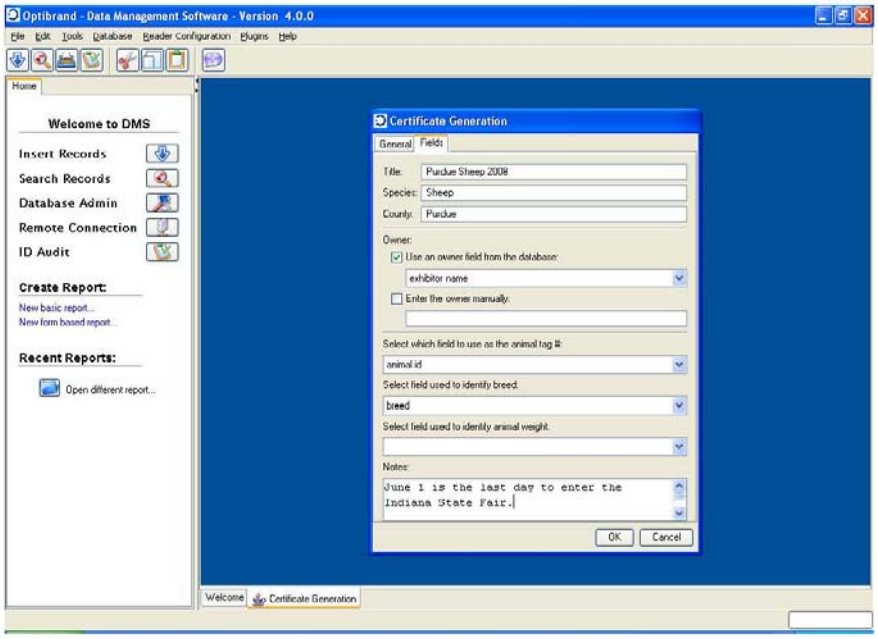
13. Enter your county in the **county** box.

14. If you entered exhibitor names, check the "Use an owner field from the database" box and select "**exhibitor name**" from the drop down menu. If you entered the names under 4H Member Name, select "**4H Member Name**" from the drop down menu.

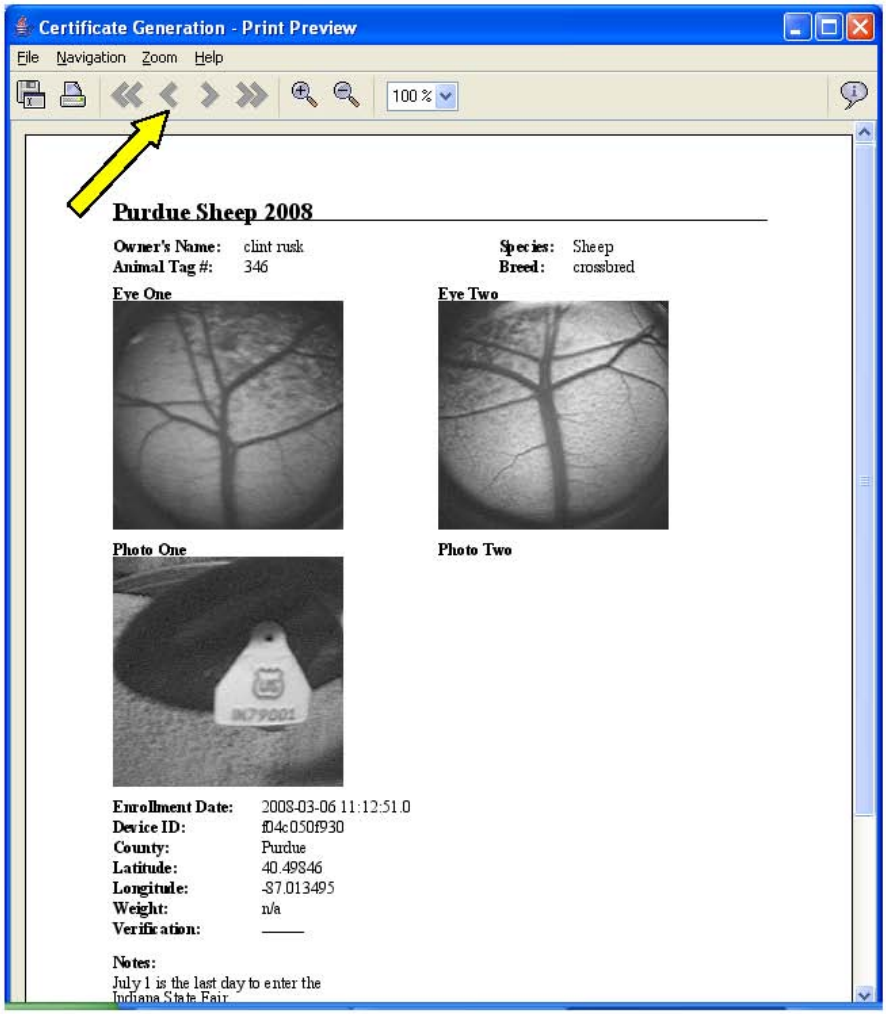
15. If the records selected are all from one exhibitor and the name has not been entered, you may enter the owner manually by checking the "**Enter owner manually**" box and typing in the owner's name.

16. If you have other fields entered, you may "autofill" the fields from the records. Select **animal id** from the drop down menu under "select which field to use as the animal tag #." Then select "**breed**" from the drop down menu for "**select field to identify breed**."

17. The notes box may be helpful for reminders such as the date that Entry Forms are due, Check-In dates for the fair, the last day to enter the Indiana State Fair, etc. Text in this box will be printed on every certificate.

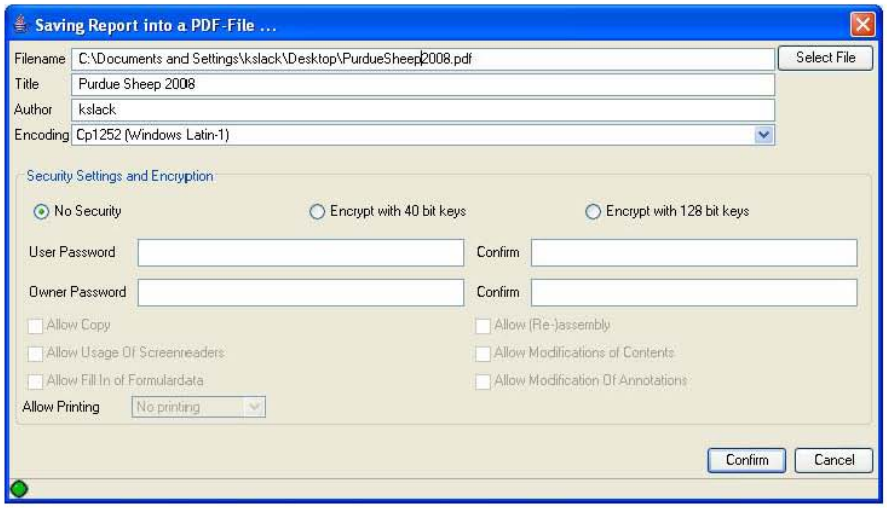


18. Click OK to generate your certificate(s).



19. If more than one certificate has been generated, you may preview your certificates before printing them by using the forward and back arrows at the top of the screen.

20. Click the **Save** icon on the Print Preview screen or select **File** then **Save As PDF.**

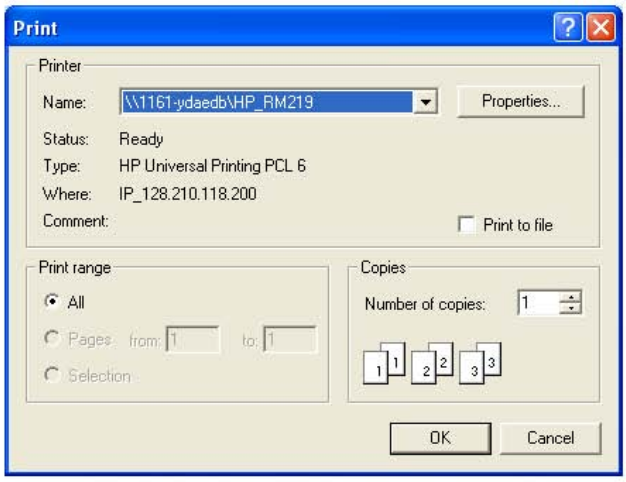


21. Title Your PDF in the title box with your county, specie, and year. For example, this file will be "Purdue Sheep 2008." Next name the file the same thing "PurdueSheep2008.pdf." Note where the file will be saved so that is may be viewed and printed it later. We recommend saving the certificates first and then printing them. Clicking the **"Print"** Icon first will close the window and you will need to generate the report again to save it.

22. Click **Confirm** to save your file as a PDF.

23. Now click on the Certificate Generation window again, then the printer icon to print your certificates.

24. A print window will open. Select your usual settings, but remember not to print the file on duplex.

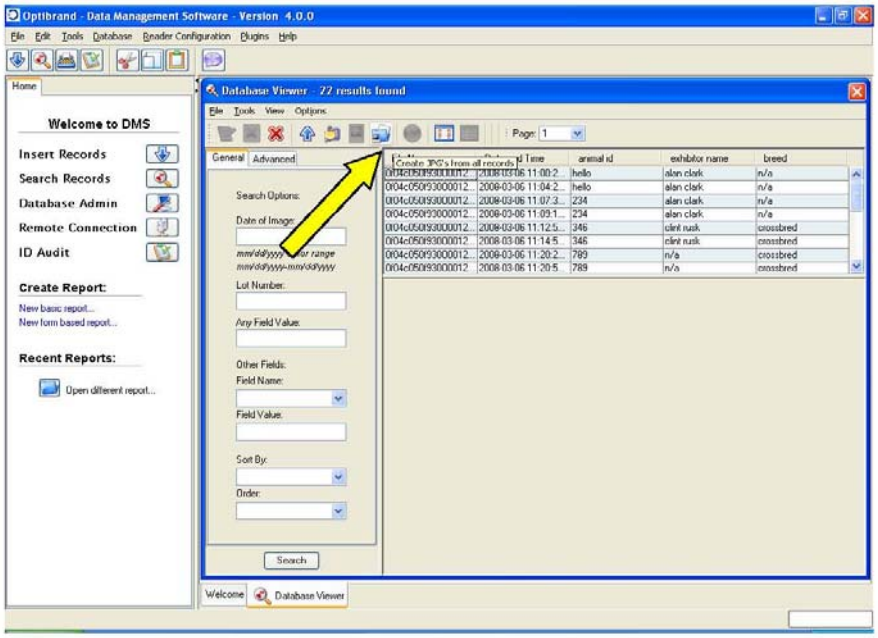


25. Click **ok.**

Note: It may be beneficial to arrange the certificates by specie and tag number for reference at the county fair. Animals may be retinal imaged ring side and checked against the print copy of the retinal image. It may be beneficial to give the 4-H members a copy of their certificates to take to the county fair and the Indiana State Fair for reference.

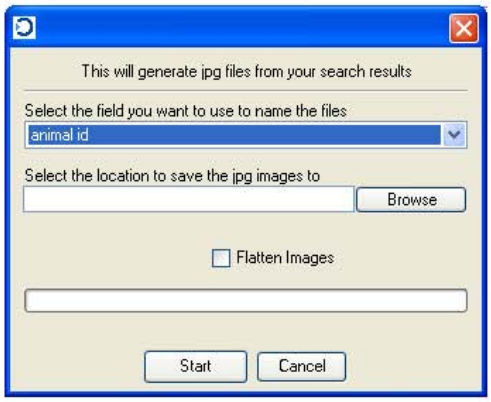
Saving BLOBs as JPEGs

1. Click the "**Search Records**" icon to open the Database Viewer tab. Then perform a search for the records you would like to save as JPEGs.



2. Click the "**file folder**" icon on the tool bar indicated by the arrow.

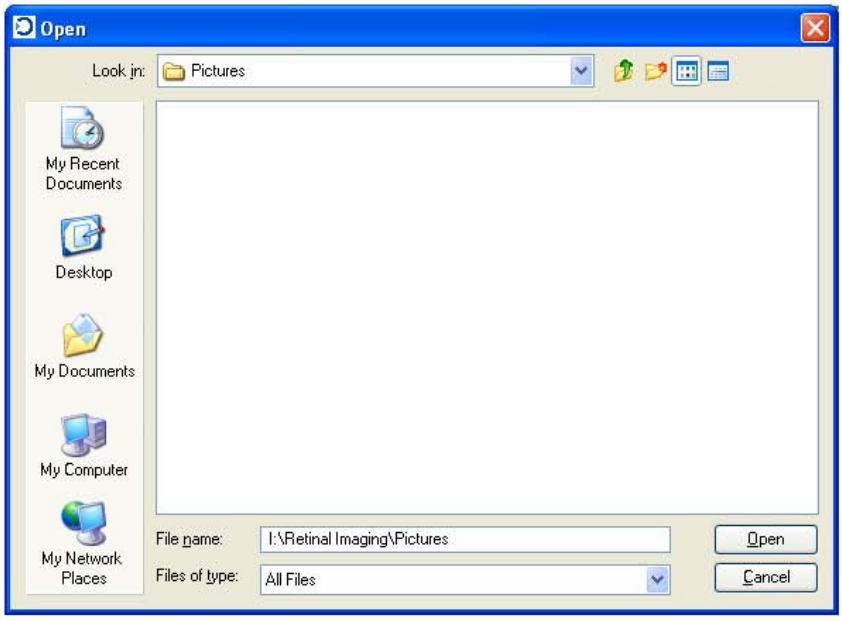
3. This will open up a new box that will allow you to generate JPEG files. This will create files from your search results. If you have not performed a search but, have clicked the **Search** button, you will create JPEGs for **ALL of the records in the DATABASE.**



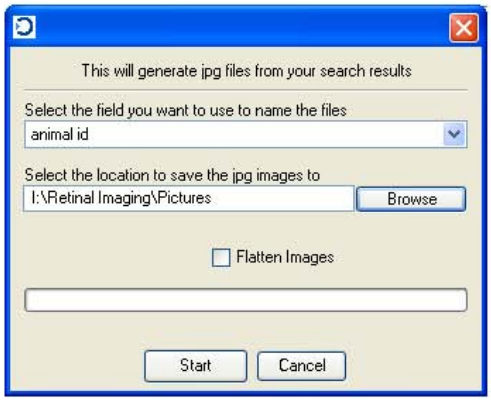
4. Select the field to name the files (animal id).

5. Select the location to save the jpg images to by clicking the **Browse** button.

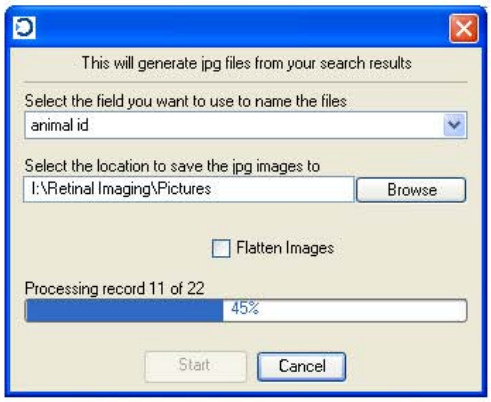
6. This will open a new window. If you have not created a folder for your images, you should do so now.



7. Choose the destination for your images, then click **Open.**



8. Click the **Start** button. The progress bar will fill as the images are translated into JPEGs.

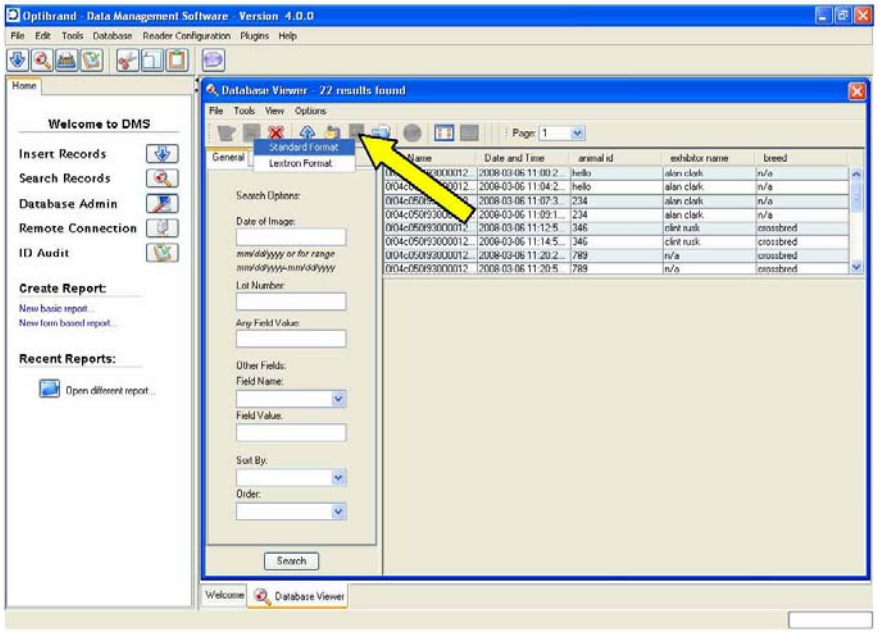


9. Click **Close** when your images have been translated.

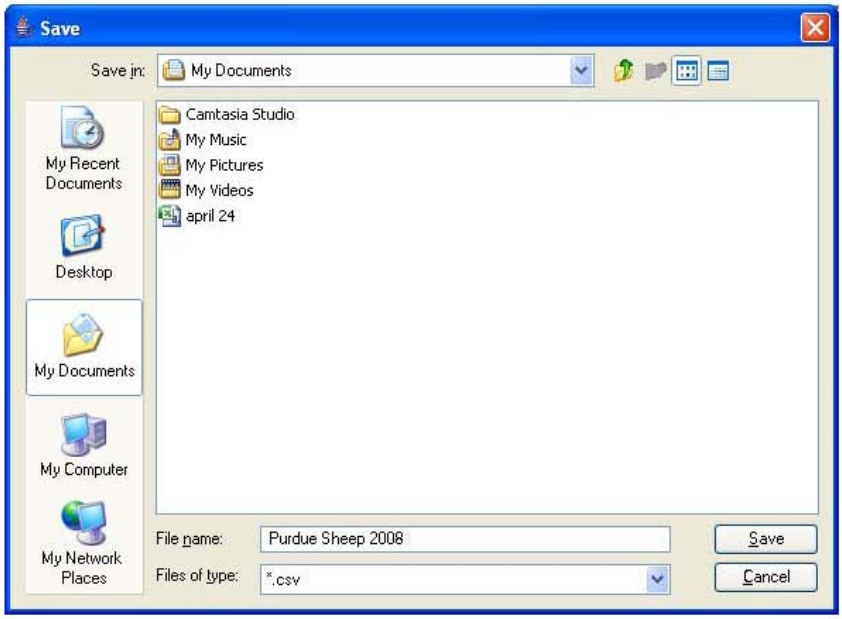
Exporting to Excel

1. On the Database Viewer tab, enter your search specifics, then click the **Search** button.

2. Click the blue arrow on the menu bar. Select "Standard Format."

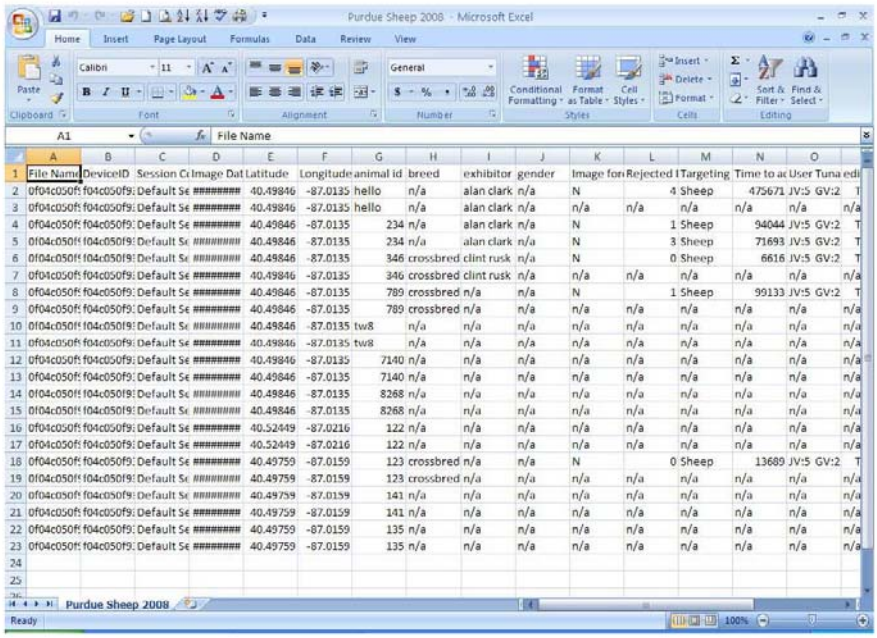


3. A new box will open asking where you want the file saved. Choose your destination and name your file with a title you will remember such as your county, specie, and year. In this example, it is titled "Purdue Sheep 2008." You might also name it with some of your search criteria such as county, specie, year, and gender, e.g. Purdue Sheep 2008 Market Lambs.



4. Click the **Save** button.

5. Locate your file and open it to view your data.



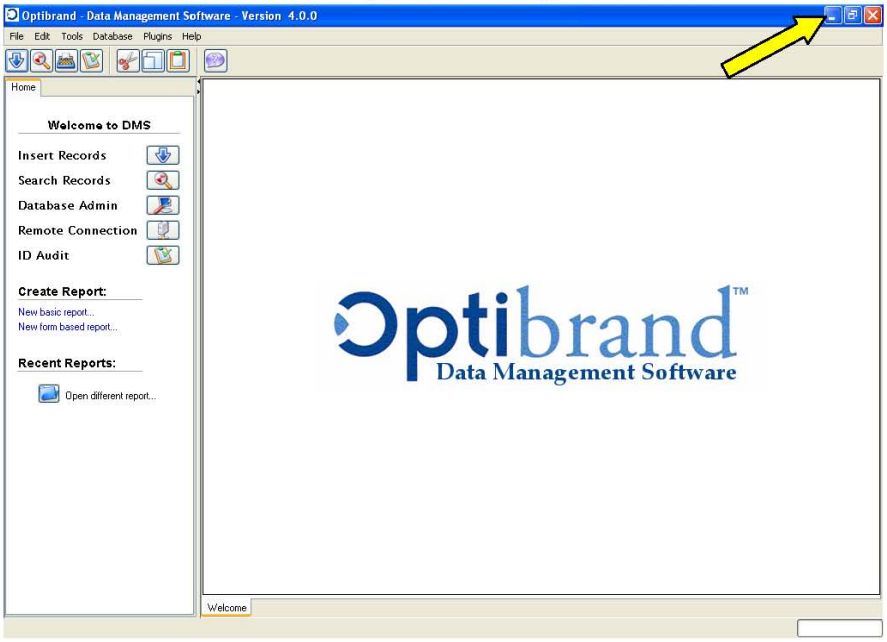
File Name	DeviceID	Session Co	Image Dat	Latitude	Longitude	animal id	breed	exhibitor	gender	Image for	Rejected I	Targeting	Time to ac	User Tuna	edi
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	hello	n/a	alan clark	n/a	N	4	Sheep	475671	JV:5 GV:2	T
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	hello	n/a	alan clark	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	234	n/a	alan clark	n/a	N	1	Sheep	94044	JV:5 GV:2	T
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	234	n/a	alan clark	n/a	N	3	Sheep	71693	JV:5 GV:2	T
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	346	crossbred	clint rusk	n/a	N	0	Sheep	6616	JV:5 GV:2	T
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	346	crossbred	clint rusk	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	789	crossbred	n/a	n/a	N	1	Sheep	99133	JV:5 GV:2	T
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	789	crossbred	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	tw8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	tw8	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	7140	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	7140	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	8268	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49846	-87.0135	8268	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.52449	-87.0216	122	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.52449	-87.0216	122	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49759	-87.0159	123	crossbred	n/a	n/a	N	0	Sheep	13689	JV:5 GV:2	T
0f04c050f	f04c050f9	Default Se	########	40.49759	-87.0159	123	crossbred	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49759	-87.0159	141	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49759	-87.0159	141	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49759	-87.0159	135	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
0f04c050f	f04c050f9	Default Se	########	40.49759	-87.0159	135	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Appendix E. Adding Plug-ins

Adding Plugins

1. Open your Data Management Software (DMS) by double clicking on the **Optibrand DMS** icon on your desktop.

2. After your DMS has opened, you should see the following screen. To add a plugin, you must download it from the Optibrand website at www.optibrand.com.

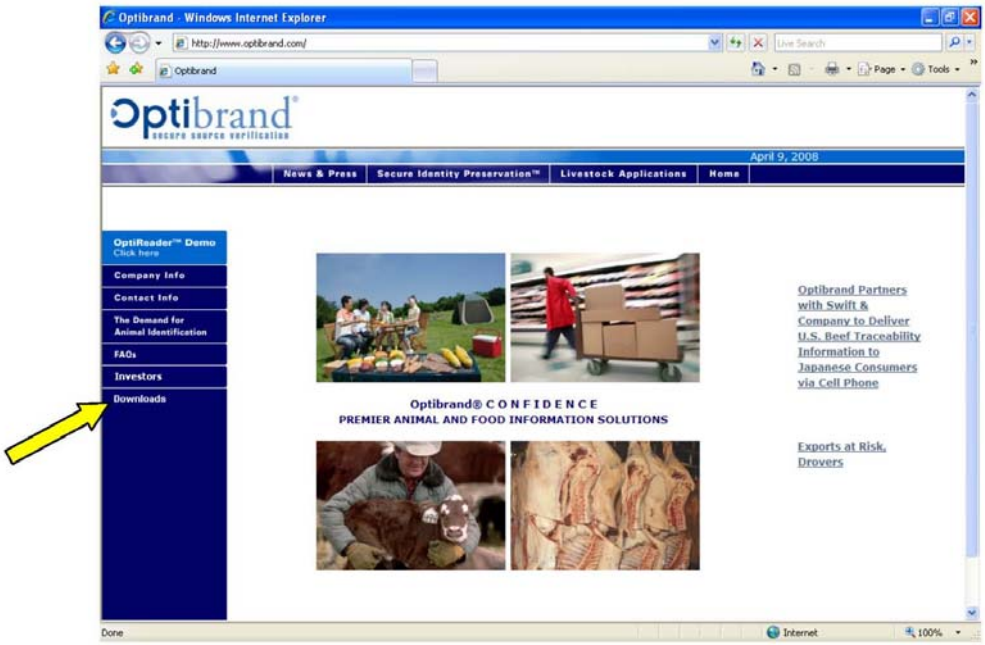


3. Minimize the Optibrand DMS by clicking the **minimize button** at the top of the screen, indicated by the arrow.

4. Connect to the internet, and open a browser window such as Internet Explorer, Netscape, or Firefox.

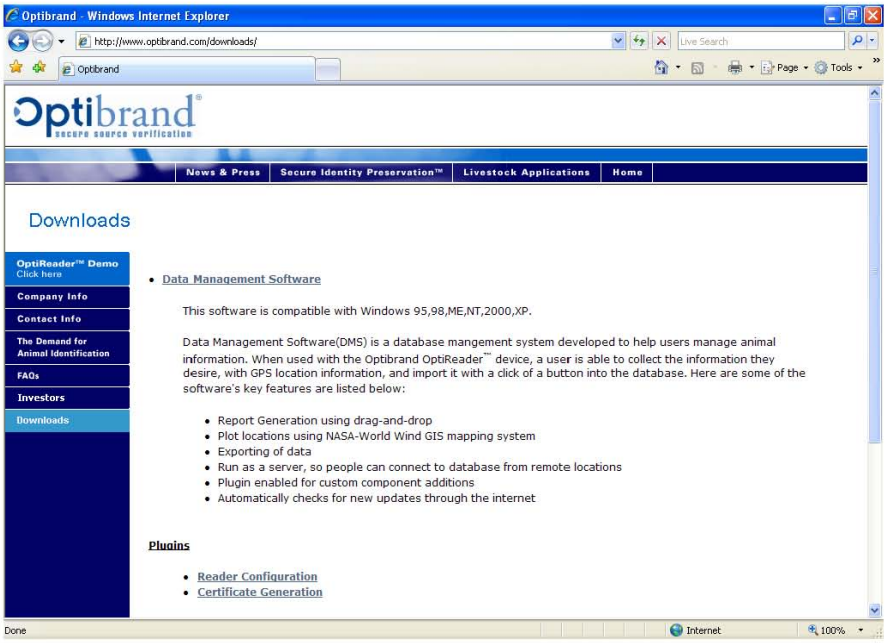
5. Then type www.optibrand.com into the browser's address bar and press the **enter** key on your keyboard.

6. It should route you to the Optibrand website, which may look like this.



7. Click on the **Downloads** button at the bottom of the menu bar on the left hand side.

8. The website will send you to a new page that looks like this.

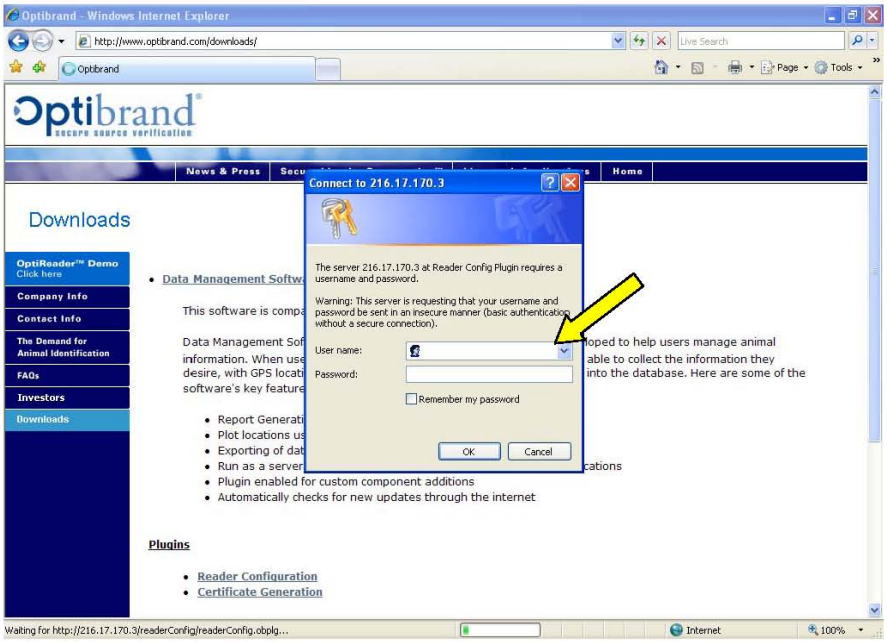


9. There are two choices for plugins, **Reader Configuration** and **Certificate Generation.**

10. To download these plugins you must contact Optibrand at 1-866-516-1462, extension 110 to obtain the **user name** and **password**.

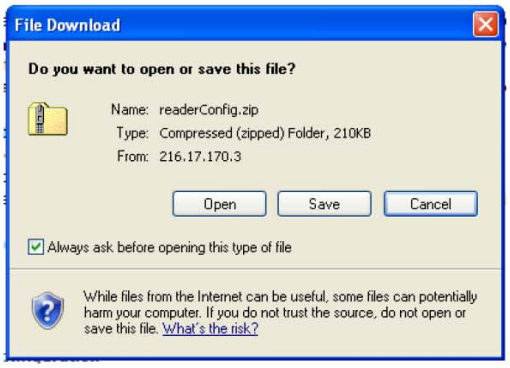
11. To download **Reader Configuration**, click **Reader Configuration** under Plugins on the webpage.

12. A new box will appear.



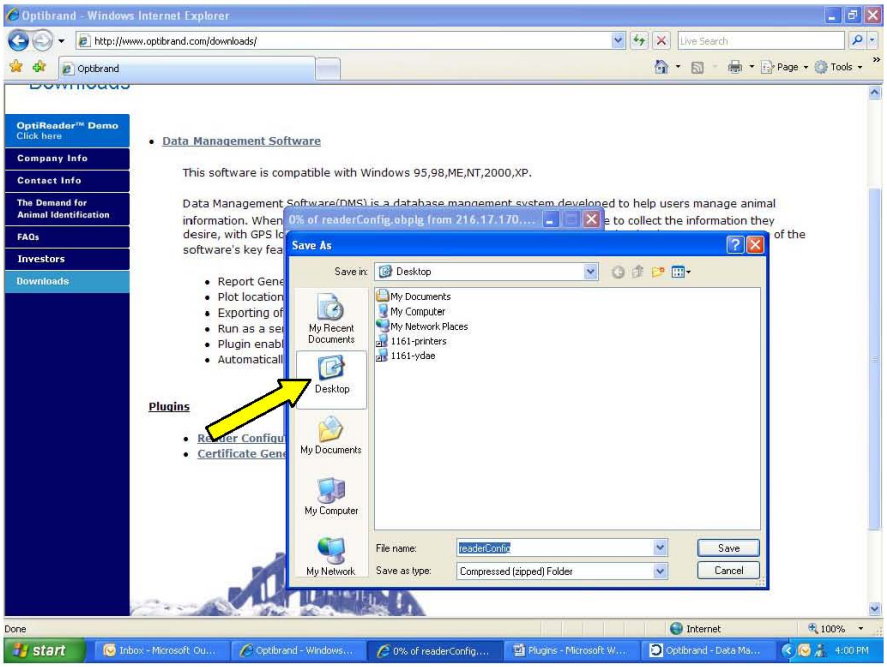
13. After you have entered the **user name** and **password** given to you by Optibrand in the corresponding boxes, click **ok**.

14. A new box will appear asking if you want to open or save the file.



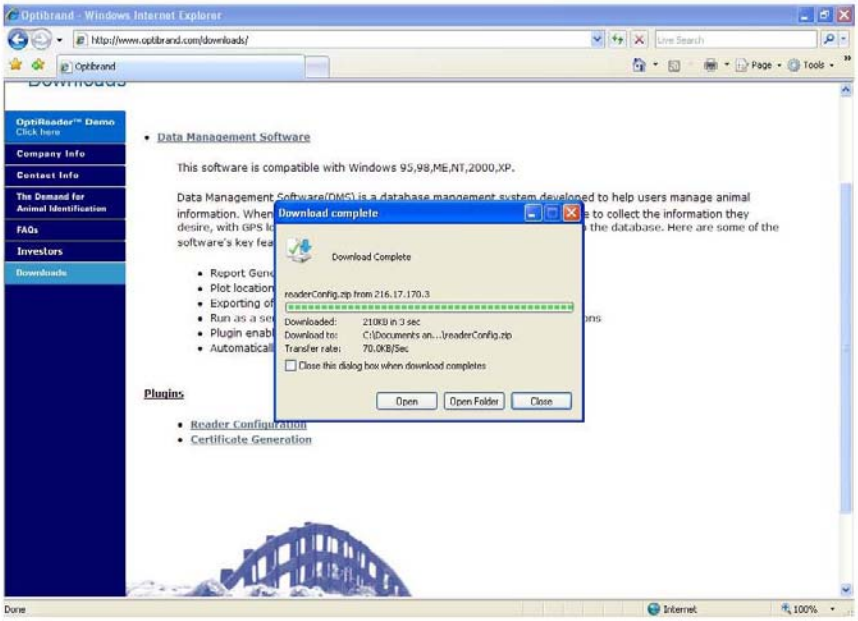
15. Click **save**.

16. A new box will appear, asking where the file should be saved to.



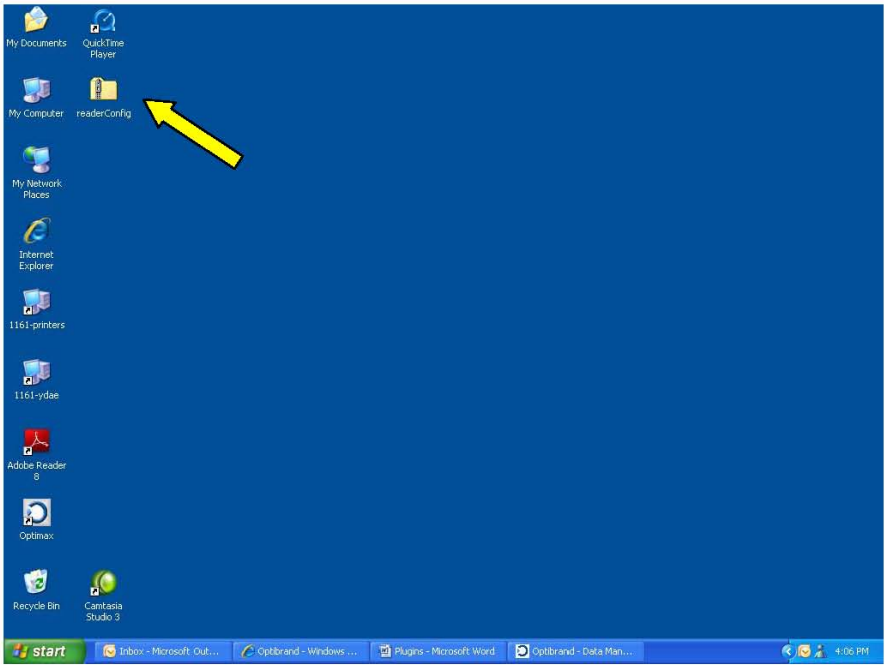
17. Save this file to your **desktop** by clicking the desktop icon, indicated by the arrow, and then click **save.**

18. After the file has been saved to your desktop, a new box should appear stating that the download is complete.



19. Click **close**.

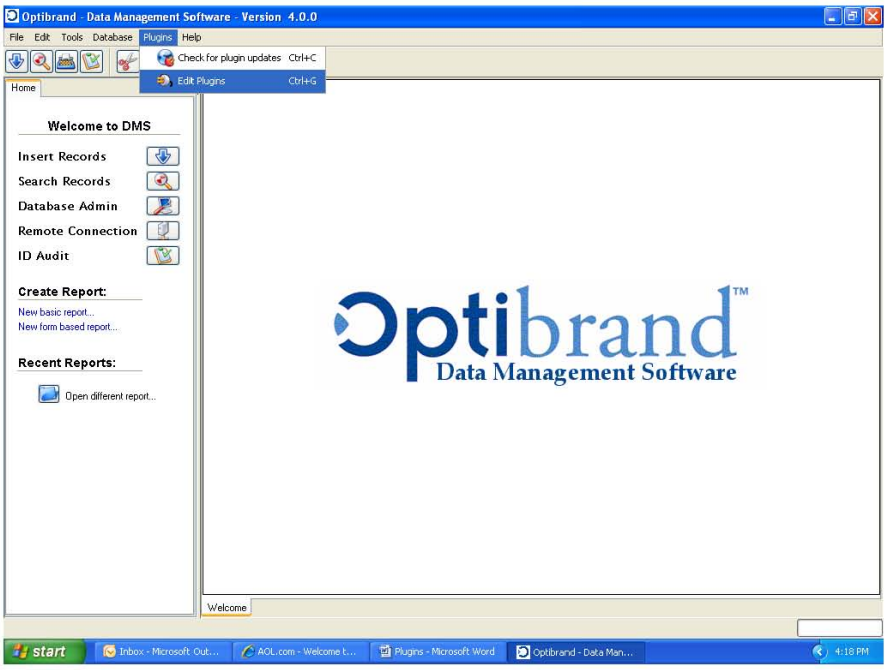
20. Minimize any open applications and look for the file on your desktop.



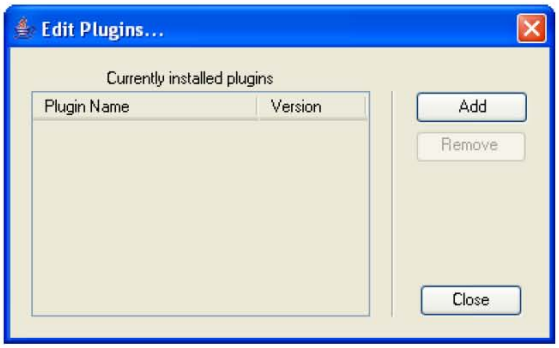
21. The file should be zipped and located on your desktop.

22. Restore your Optibrand Software to its normal size by clicking on the Optibrand tab at the bottom of your toolbar.

23. After the software has returned to the normal viewing size, right click the **Plugins** tab at the top of the tool bar.

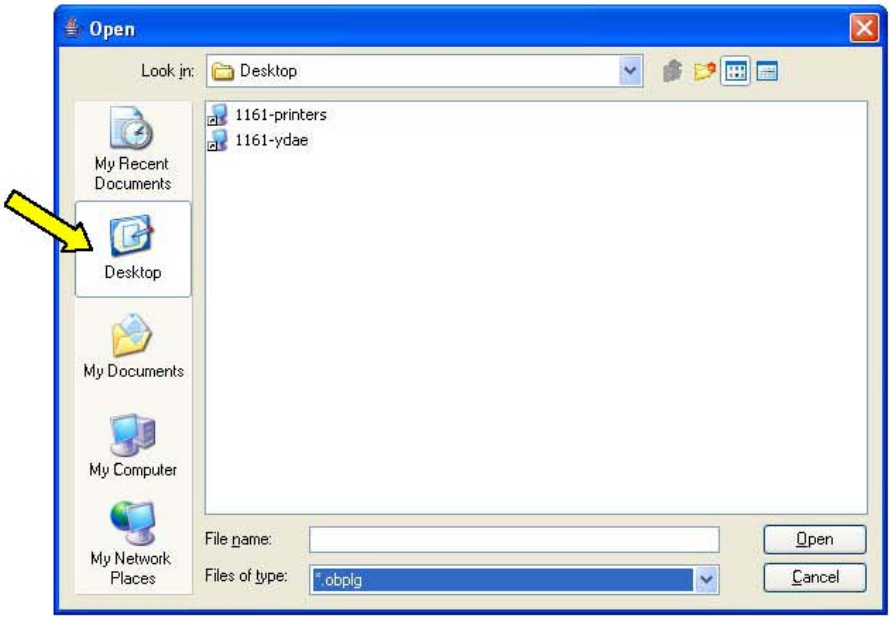


24. Select **Edit Plugins**. A new box will appear.

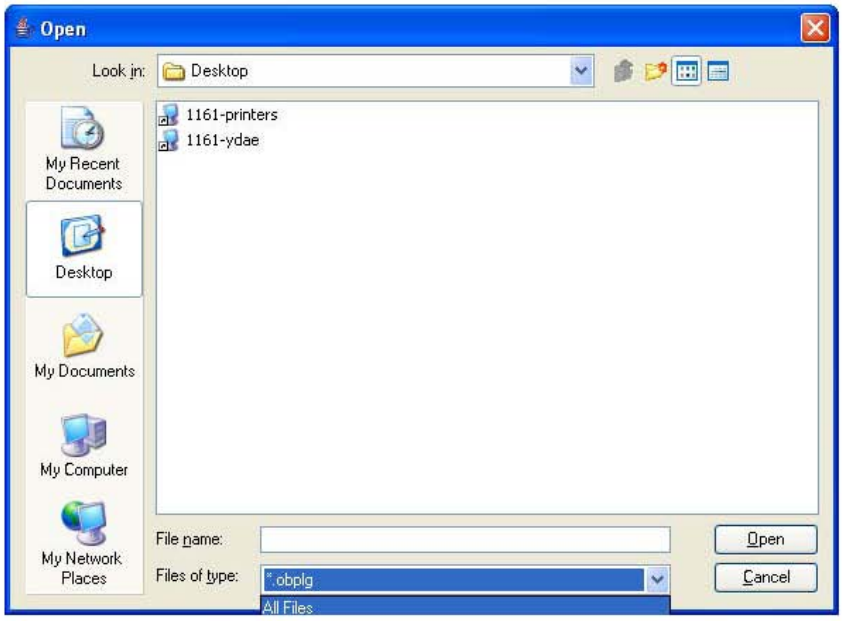


25. Click the **Add** button.

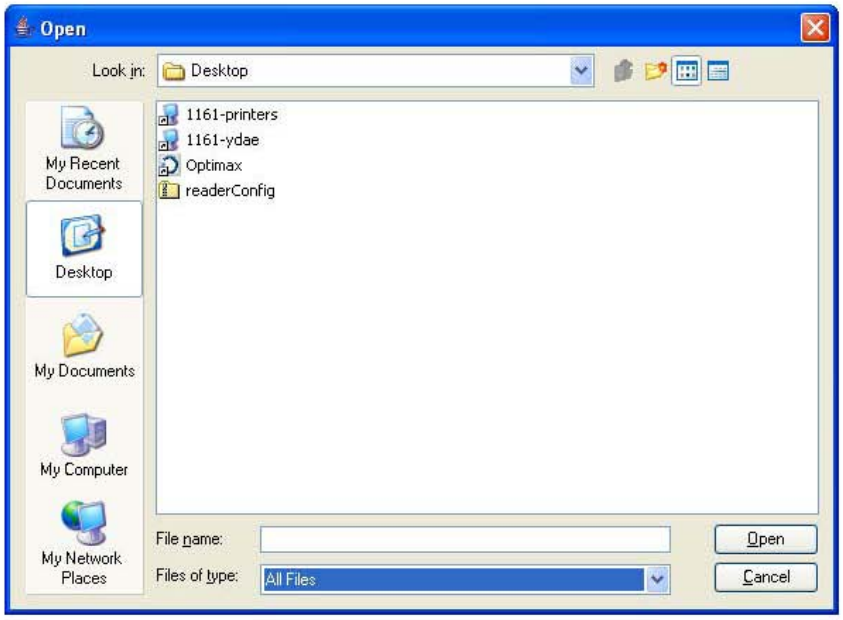
26. A new box will open. If desktop is not selected on the left hand side, you should select it now by clicking on the desktop icon.



27. The readerConfig folder will not be visible. To make it visible, click the "down" arrow by "Files of type" and select **All Files**.

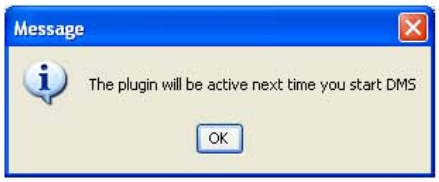


28. This readerConfig folder should now be visible.



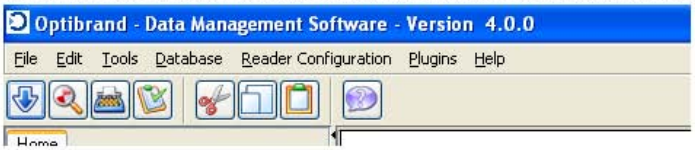
29. Select **readerConfig** by double clicking on the file. The file will be inserted into the software automatically.

30. A new box will appear.



31. Click **ok**, then close your DMS by clicking on the red "X" in the upper right hand corner.

32. Reader Configuration will be available on the toolbar the next time you start the DMS.



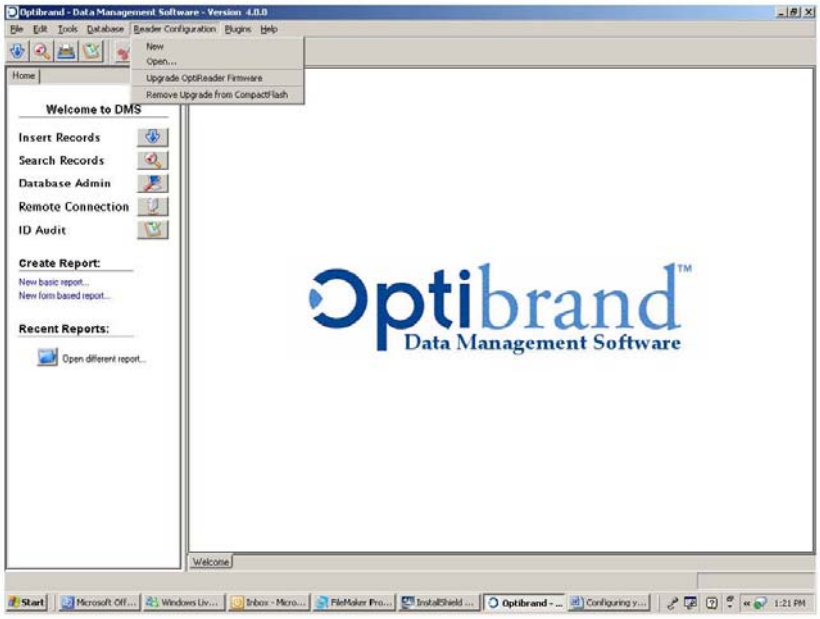
33. Follow the steps again to download the **Certificate Generation** plugin.

34. The **Reader Configuration** plugin must be inserted in the DMS software to configure the Compact Flash card for your retinal imaging machine.

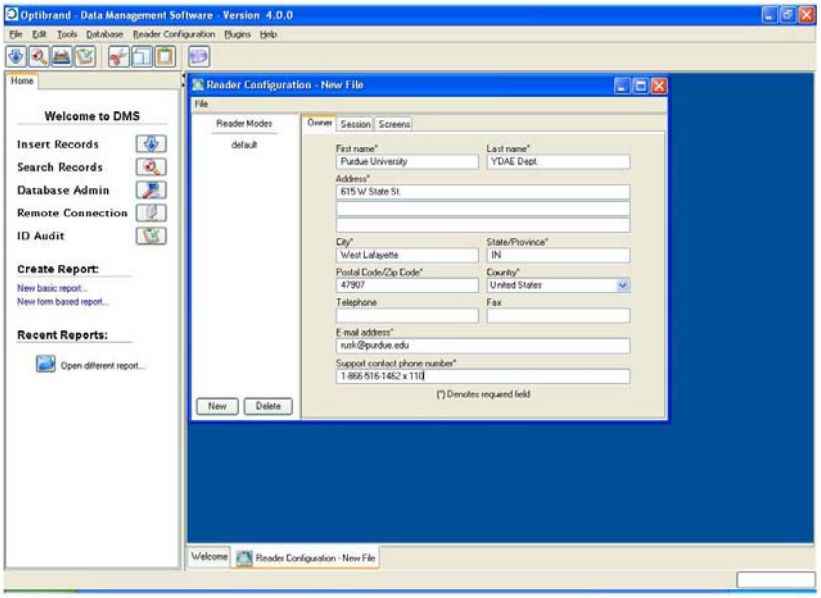
35. The **Certificate Generation** plugin must be inserted in the DMS software to print certificates.

Appendix F. Setting Up Your Reader Configuration

Setting Up Your Reader Configuration

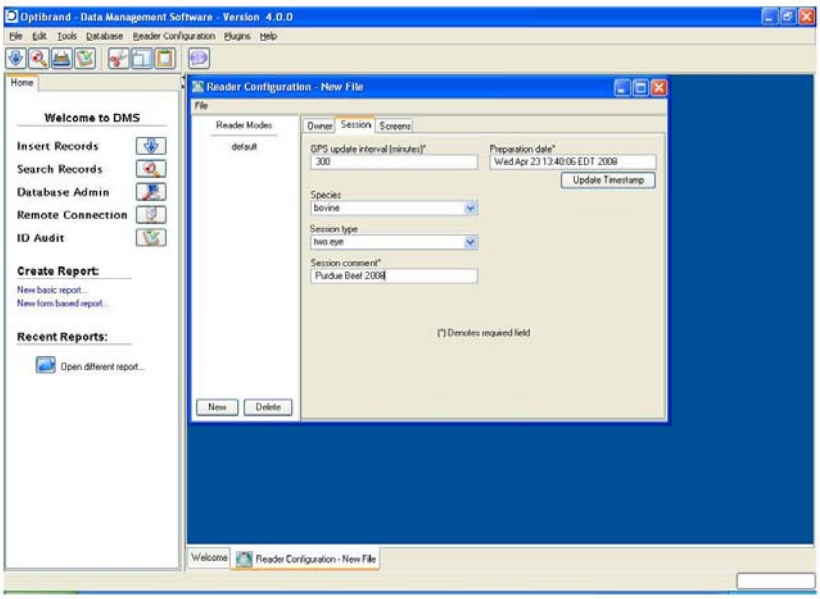


1. Open the Data Management Software program
2. Select **Reader Configuration** from the main tool bar
3. Select **New**


Optibrand - Data Management Software - Version 4.0.0
File Edit Tools Database Reader Configuration Plugins Help
Home
Welcome to DMS
Insert Records
Search Records
Database Admin
Remote Connection
ID Audit
Create Report:
New basic report...
New form based report...
Recent Reports:
Open different report...
Reader Configuration - New File
File
Reader Modes
default
Owner Session Screens
First name* Purdue University
Last name* YDAE Dept.
Address* 615 W State St.
City* West Lafayette
State/Province* IN
Postal Code/Zip Code* 47907
Country* United States
Telephone
Fax
E-mail address* rusk@purdue.edu
Support contact phone number* 1-866-516-1462 x 110
(*) Denotes required field
New
Delete
Welcome
Reader Configuration - New File

Owner Screen

4. Fill in the information for your office or group that owns the scanner. On the support contact number, put Optibrand's number. 1-866-516-1462 X 110



Session Screen

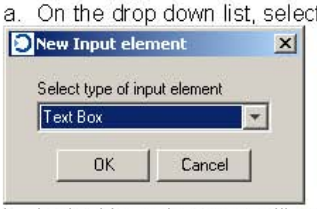
5. Select the **session tab**.
6. GPS update interval should be set to 300 minutes
7. Species will be ovine (sheep/goats) or bovine (Beef/Dairy Beef/Dairy Feeder Calves)
8. Session type should be two eye
9. You do not need to do anything to **session comment.** However, it can be helpful to put in "County", "Species", and "year" in this line. This field is a searchable field once the records are inserted into the database. This can be used to separate by county and by species when managing the information in the system. See the file titled "Managing Your Information" for help.
10. You can update the timestamp. This will let you know when you created or updated the information for the configuration.

Screens Tab

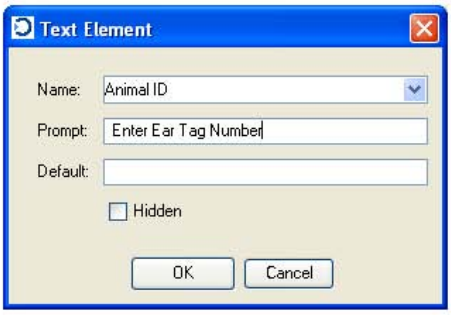
These are the screens that will be visible for the person using the OptiReader device, unless you choose to hide the screen. Hidden screens can be accessed

by the person inputting data in the Optibrand software. Below is an example. You can adjust the settings to fit your county.

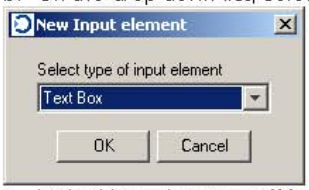
11. Select the **screen tab**.
12. The first prompt you will want is **enter animal ID**. Select **new**.
    a. On the drop down list, select **text box**. Click the **OK** button.



    b. In the Name box, you will type in: Animal ID
    c. In the Prompt box type: Enter Ear Tag Number
    d. In the Default box: leave blank
    e. Do NOT select "Hidden," as you want this screen to be visible for the person who is imaging
    f. Click the **OK** button.



13. Next, put in **4H member**. (This will be a hidden field to help edit the information later)
    a. Select **new**
    b. On the drop down list, select **text box**. Click **OK**.

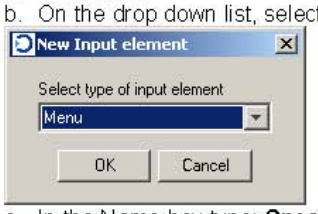


    c. In the Name box type: **4H member**
    d. In the Prompt box type: Enter **4H member**
    e. In the Default box type: **4H member**

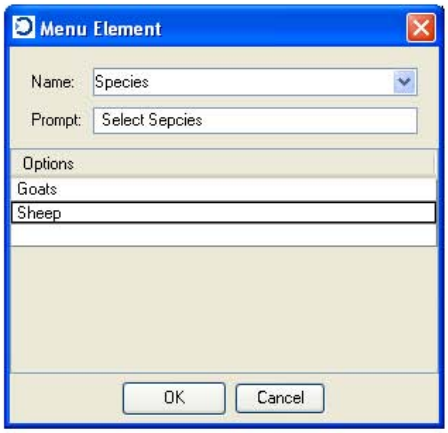
f. Check **hidden** so that this screen will not be visible to the person who is imaging
g. Click **OK**

*Caution must be taken in programming any symbols into the Reader Configuration. Using symbols (-,&,#, etc.) can sometimes cause issues with the Optibrand system.

14. If your sheep and goats are enrolled on the same day, you can create a species list. This will be a screen where the person imaging must choose the species before imaging the animal.
    a. Select **new**
    b. On the drop down list, select **menu**. Click **OK**.

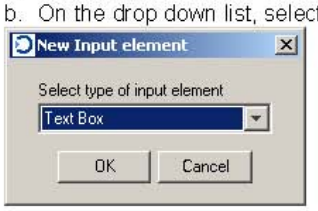


    c. In the Name box type: **Species**
    d. In the Prompt box type: **Select Species**
    e. Then list the species in the boxes below. For example: **sheep**, then **goats**.
    f. Click **OK**

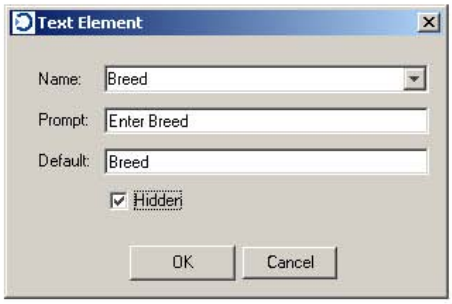


*Note: The "Options" list will populate in the order each item is added, not alphabetically.

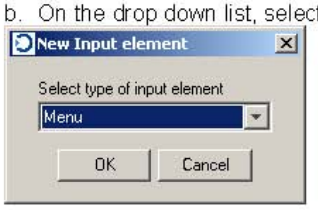
15. You can add additional screens to help you sort animals later. Make this a hidden file so that the person inputting data can add this later. For example, let's add a screen where you can enter the **breed**.
    a. Select **new**
    b. On the drop down list, select **text box**. Click **OK**.



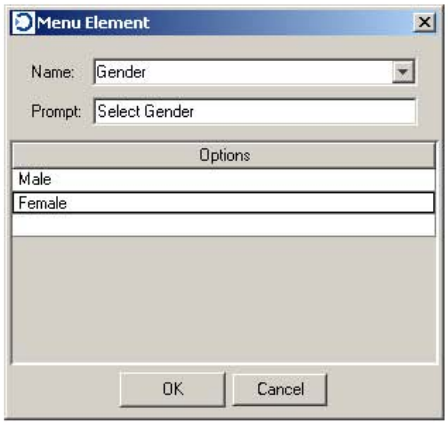
    c. In the Name box type: **Breed**
    d. In the Prompt box type: **Enter Breed**
    e. In the Default box type: **Breed**
    f. Check **hidden** so that this screen will not be visible to the person who is imaging.
    g. Click **OK**.



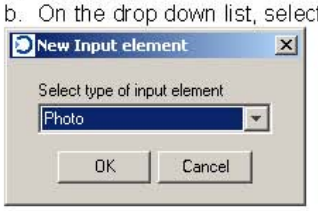
16. Here is another example. In this example, we will add a **menu** screen to select the gender of the animal. This will be chosen by the person imaging the animal and must be selected before the person images the animal.
    a. Select **new**
    b. On the drop down list, select **Menu**. Click **OK**.



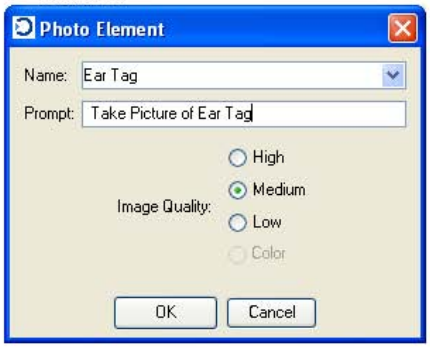
    c. In the Name box type: **Gender**
    d. In the Prompt box type: **Select Gender**
    e. Then list the genders in the boxes below: **Male** and **Female**. This could also be **wethers** and **ewes**, **heifers** and **steers**, or **does** and **wethers**, etc.
    f. Click **OK**.



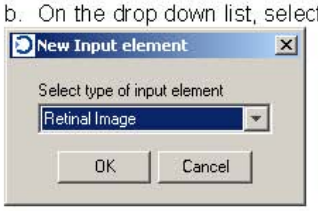
17. Now let's add a prompt to take the picture of the **ear tag**.
    a. Select **new**
    b. On the drop down list, select **Photo**. Click **OK**.



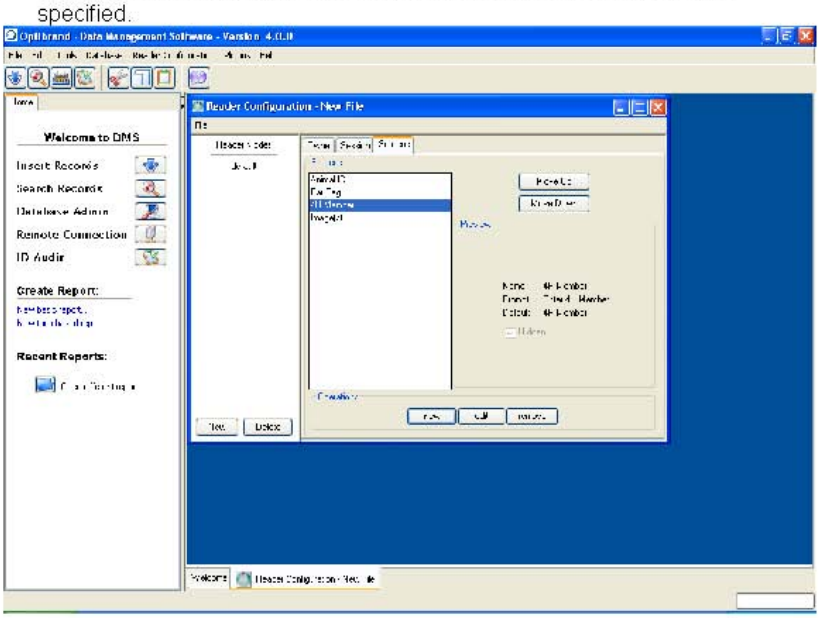
    c. In the name box select: **Ear Tag** (from the drop down list)
    d. In the Prompt box type: **Take Picture of Ear Tag**
    e. Under Image Quality select: **Medium**
    f. Click **OK**



18. Next add a prompt to image the eyes. You already selected **two eye session** on the **session tab**.
    a. Select **new**
    b. On the drop down list, select **Retinal Image**. Click **OK**.

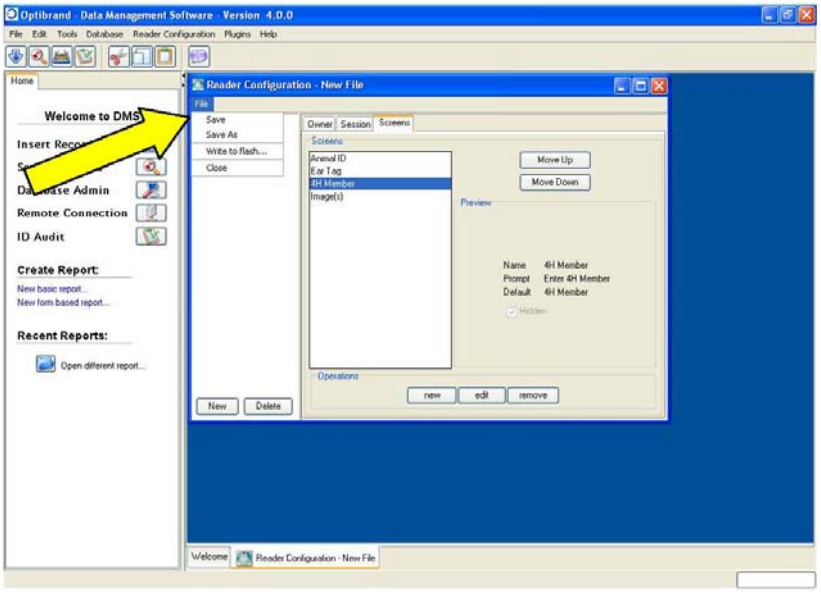


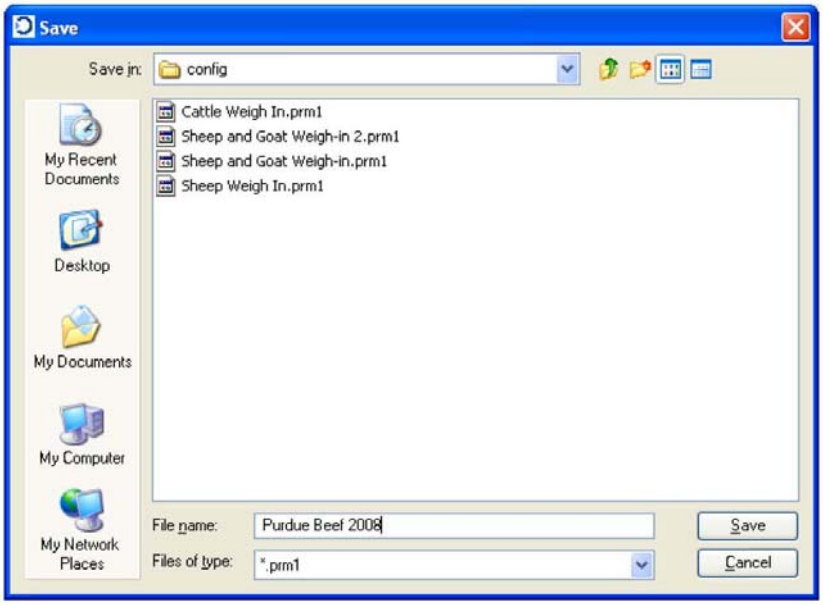
19. This is what your screen may look like depending on the functions you specified.



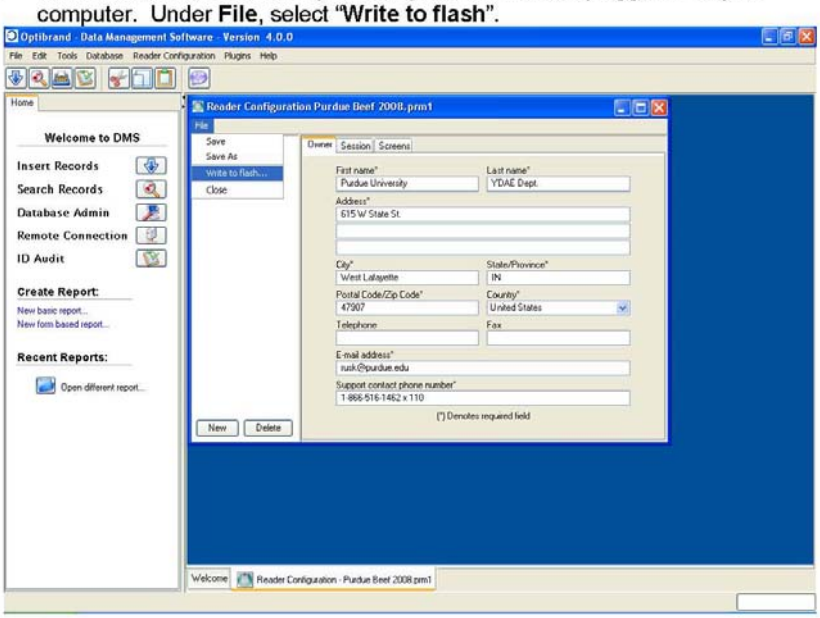
Saving and Writing to the Flashcard

20. Under **File** in the reader configuration box, select **Save As**. This will put it into a file under a "**config**" folder. Name it something specific, for our example you might choose "Purdue Beef 2008".

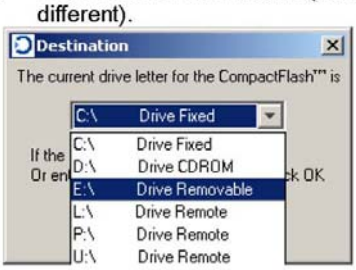

Optibrand - Data Management Software - Version 4.0.0
File Edit Tools Database Reader Configuration Plugins Help
Home
Welcome to DMS
Insert Reco
Database Admin
Remote Connection
ID Audit
Create Report:
New basic report...
New form based report...
Recent Reports:
Open different report...
Reader Configuration - New File
File
Save
Save As
Write to flash...
Close
Owner Session Screens
Screens
Animal ID
Ear Tag
4H Member
Image(s)
Move Up
Move Down
Preview
Name 4H Member
Prompt Enter 4H Member
Default 4H Member
Hidden
Operations
new edit remove
New Delete
Welcome
Reader Configuration - New File


Save
Save in: config
Cattle Weigh In.prm1
Sheep and Goat Weigh-in 2.prm1
Sheep and Goat Weigh-in.prm1
Sheep Weigh In.prm1
My Recent Documents
Desktop
My Documents
My Computer
My Network Places
File name: Purdue Beef 2008
Files of type: *.prm1
Save
Cancel

21. After it is saved, make sure your compact flash card is plugged in to your computer. Under **File**, select "**Write to flash**".

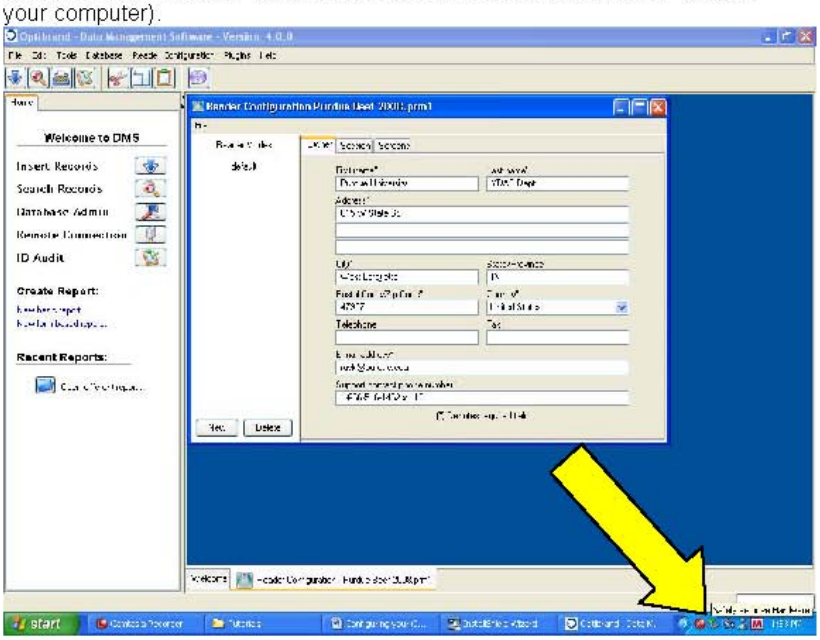


22. You will select the E: drive (in some cases this drive letter may be different).



23. Click **OK**. It will let you know that you are about to erase any images on the disk. If you have saved the images on your CompactFlash disk to your hard drive, select **OK**. If you have not saved the images on your CompactFlash disk, you should do so now before clicking **Yes**.

24. After the data has been written to the CompactFlash disk, you will need to click on the green arrow on the bottom of your screen (down by the clock on your computer).



25. Select, "**Safely Remove Flashcard**". After the computer prompts you that it is safe to remove the compact flash card, then you may remove the card.
26. If you are formatting two cards, you will need to unplug the flash drive from the USB port and plug it back in (for some reason the computer does not recognize the compact flash card after you have ejected one card).
27. Plug the flash reader into the computer and insert the next card. Click again on **File**, and then "**Write to flash**". Follow steps 21 through 25 again. Once you are finished, you can close out the Optibrand software. You will be able to access the file again and write it to your compact flash card without having to redo the set-up.

Appendix G. Tips for Retinal Imaging

Tips for Retinal Imaging

Sheep/Goats:

* Make sure that sheep targeting is active (this can be accessed through the function button)
* Angle the Optireader camera through the eye and towards the base of the opposite ear
* The Optireader camera should be held approximately parallel to the ground
* Be sure the retinal image is centered on the screen and the camera is resting or nearly resting against the animal's cheek

Cattle:

*Make sure that either cattle or sheep targeting is active (this can be accessed through the function button)
*Point the Optireader camera through the eye and towards the base of the opposite ear at approximately a 45 degree angle
* Be sure the retinal image is centered on the screen and the camera is resting or nearly resting against the animal's cheek

Inputting Data:

*Check the ear tag twice before entering the number, or have another person read the number to you
*Do not use letters when entering an ear tag (i.e. 7124 CD should be input as 7124)
*Do *NOT* use the Scrapie tag in sheep and goats as the animal's identification number

Ear Tag Photos:

*It may be beneficial to have an index card with the 4-H member's last name printed on it, to hold under the animal's ear tag prior to taking a photo of the ear tag
* Ear tag photos should be taken with the ear tag already inserted in the animal's ear

Appendix H. Tips for Preparing to Use the Optireader Device

Tips for Preparing to Use the Optireader Device

- Obtain a programmed compact flash card from the appropriate person
- Check to see that the compact flash card has been inserted into the CF card slot on the side of the Optireader device
- Check to see that the batteries are charged by pushing the indicator button on the end of the battery
- A fully charged battery will have three lights turn green when the button is pushed
- Insert the battery with the sticker side up and push it in as far as it will go
- The battery pack should be positioned with the Optibrand logo facing up toward the sky
- Make sure the battery pack is as far from the Optireader device as possible to ensure a faster GPS lock
- If the Optireader device will not turn on, check to make sure the battery is charged, inserted, and pushed down as far as it will go in the battery case
- If the Optireader device has not obtained a GPS lock after 10 minutes, turn the imager off, check the components, go through the steps listed above once again if necessary, and try again
- Turning the Optireader device on and obtaining a GPS lock the day before you plan to retinal image animals, may allow the Optireader device to obtain a lock faster on the actual day you collect images

Appendix I. Pre-Test

Pre-Test Demographics:

Initials: ____ ____ ____ County: _____

1. Have you been to Purdue for retinal imaging training? _____yes _____ no

2. Have you attended a retinal imaging training somewhere else? _____ yes _____no

3. Have you used the Optibrand software before? _____yes _____no

4. Have you attended a training that included instructions on how to use the Optibrand software?
   _____yes _____no

5. How old are you? _____< 20 years _____20-29 years _____30-39 years
   _____40-49 years _____50-59 years _____60 years or older

6. What is your gender? _____Female _____Male

7. Please select the *term or terms* that best describe your involvement with 4-H:
   I am a(n) _____:

_____ Extension Educator _____ Purdue Employee, but not an Extension Educator
_____Parent of a 4-H Member _____Volunteer
_____Former 4-H Member _____Current 4-H Member
_____ Other (please give a description)

8. Please rate your familiarity with the retinal imaging system with "1" being Not Familiar and "5" being Very Familiar.
   Not Familiar 1_____2_____3_____4_____5_____Very Familiar

Retinal Imaging Technology Questions:

1. Retinal imaging can best be described as a technology that:
   a. allows permanent identification by taking images of the Retinal Blood Vessels (RBV)
   b. allows permanent identification by taking images of the iris
   c. allows permanent identification by implantation of a microchip
   d. allows permanent identification by reading a Radio Frequency ID (RFID) ear tag

2. Which of these is **not** an advantage of retinal imaging compared to other forms of identification?
   a. the retinal image can not be altered
   b. the retinal image can be read by anyone
   c. the retinal image can be linked to a GPS location
   d. the retinal image can not be sent electronically

3. Which of the following may be saved to the compact flash disk at the time of retinal imaging?
   a. Ear Tag Number b. Weight c. Breed d. All of the above

4. Which part of the eye creates the pattern in a retinal image?
   a. pupil b. iris c. arteries and veins d. vitreous humor

5. Why is it important to identify the optic disk?
   a. it can ruin the retinal image b. it helps to orient the picture
   c. it is a sign of infection in the eye d. it is close to the top of the eye

6. Which of the following causes the pupil to constrict?
   a. too little light b. red light c. direct sunlight d. moonlight

7. If one pupil constricts, what happens to the other pupil?
   a. it enlarges b. it stays the same c. it constricts, as well d. it spins

8. Retinal blood vessels develop in the eye during which stage of development?
   a. between 1 and 2 days after birth b. between 3 and 6 months after birth
   c. during embryonic development d. at the time of birth

Please indicate whether the following statements are true or false:

_____ 9. The angle of the camera is important when capturing retinal images.
_____ 10. Animals must be restrained to capture a good image.
_____ 11. The person controlling the camera must force the camera to capture the image.
_____ 12. The person controlling the camera must decide if the image is acceptable.
_____ 13. There are three major components to the Optireader Device.
_____ 14. The Optireader device must be connected to an electrical outlet to operate.
_____ 15. All images will be acceptable for identification.
_____ 16. To capture a retinal image, you must use the cattle function for cattle and the sheep function for sheep and goats.

Data Management Software Questions:

17. Once the compact flash card has been written, the reader must be re-_____ to change the order or the fields.
    a. created b. configured c. purposed d. cycled

18. Fields such as breed and sex may be entered by the person using the retinal imaging device or they may be _____ and entered later.
    a. hidden b. enclosed c. buried d. downloaded

19. When programming the reader configuration, which of the following species are available?
    a. caprine b. ovine c. bovine d. both b & c

20. Which session type should be programmed into the reader configuration for capturing the retinal images?
    a. two eye session b. one eye session c. four eye session d. none

21. The additional plugins for the Optibrand software must be obtained from:
    a. Purdue University b. the Cooperative Extension Service
    c. Ag. Information Technology d. the Optibrand website

22. Which of the following functions requires an additional plugin?
    a. Inserting records b. searching the database
    c. creating the reader configuration d. editing record information

23. The maximum number of columns that may be displayed on the Database Viewer tab is:
    a. 4 b. 5 c. 6 d. 7

24. To display a new search on the Database Viewer tab, which button must be clicked after each change?
    a. Search b. Reformat c. Save d. OK

25. Which "wild card" symbol is used when searching for all animal id numbers beginning with "14"?
    a. & b. # c. @ d. *

Please indicate whether the following statement is true or false.

_____ 26. Once the configuration has been created, the configuration can be saved and written to multiple flash cards.
_____ 27. When saving the configuration to the compact flash card, any images contained on the flash card will be saved as well.
_____ 28. Insertions do not need to be available to insert records into the software.
_____ 29. Images should be copied to another folder before insertion into the Data Management Software.
_____ 30. There are two editing options: one for individual records and one for mass editing.
_____ 31. Records can not be deleted from the Data Management Software.
_____ 32. There is only one search blank available on the Database Viewer tab.
_____ 33. A session comment may be used to sort images.
_____ 34. There is more than one way to open the Insert Records tab.
_____ 35. The Optibrand Data Management Software allows the user to edit the retinal images.
_____ 36. There are two different ways to edit information in the Data Management Software.
_____ 37. Certificates may be printed for one or more exhibitors.
_____ 38. Information entered into the Data Management System may be exported to Excel.

Appendix J. Post-Test

Post-Test Demographics:

Initials: ____ ____ ____ County: _____

Retinal Imaging Technology Questions:

1. Retinal imaging can best be described as a technology that:
   a. allows permanent identification by taking images of the Retinal Blood Vessels (RBV)
   b. allows permanent identification by taking images of the iris
   c. allows permanent identification by implantation of a microchip
   d. allows permanent identification by reading a Radio Frequency ID (RFID) ear tag

2. Which of these is **not** an advantage of retinal imaging compared to other forms of identification?
   a. the retinal image can not be altered
   b. the retinal image can be read by anyone
   c. the retinal image can be linked to a GPS location
   d. the retinal image can not be sent electronically

3. Which of the following may be saved to the compact flash disk at the time of retinal imaging?
   a. Ear Tag Number b. Weight c. Breed d. All of the above

4. Which part of the eye creates the pattern in a retinal image?
   a. pupil b. iris c. arteries and veins d. vitreous humor

5. Why is it important to identify the optic disk?
   a. it can ruin the retinal image b. it helps to orient the picture
   c. it is a sign of infection in the eye d. it is close to the top of the eye

6. Which of the following causes the pupil to constrict?
   a. too little light b. red light c. direct sunlight d. moonlight

7. If one pupil constricts, what happens to the other pupil?
   a. it enlarges b. it stays the same c. it constricts, as well d. it spins

8. Retinal blood vessels develop in the eye during which stage of development?
   a. between 1 and 2 days after birth b. between 3 and 6 months after birth
   c. during embryonic development d. at the time of birth

Please indicate whether the following statements are true or false:

_____ 9. The angle of the camera is important when capturing retinal images.
_____ 10. Animals must be restrained to capture a good image.
_____ 11. The person controlling the camera must force the camera to capture the image.

_____ 12. The person controlling the camera must decide if the image is acceptable.
_____ 13. There are three major components to the Optireader Device.
_____ 14. The Optireader device must be connected to an electrical outlet to operate.
_____ 15. All images will be acceptable for identification.
_____ 16. To capture a retinal image, you must use the cattle function for cattle and the sheep function for sheep and goats.

Data Management Software Questions:

17. Once the compact flash card has been written, the reader must be re-_____ to change the order or the fields.
    a. created b. configured c. purposed d. cycled

18. Fields such as breed and sex may be entered by the person using the retinal imaging device or they may be _____ and entered later.
    a. hidden b. enclosed c. buried d. downloaded

19. When programming the reader configuration, which of the following species are available?
    a. caprine b. ovine c. bovine d. both b & c

20. Which session type should be programmed into the reader configuration for capturing the retinal images?
    a. two eye session b. one eye session c. four eye session d. none

21. The additional plugins for the Optibrand software must be obtained from:
    a. Purdue University b. the Cooperative Extension Service
    c. Ag. Information Technology d. the Optibrand website

22. Which of the following functions requires an additional plugin?
    a. Inserting records b. searching the database
    c. creating the reader configuration d. editing record information

23. The maximum number of columns that may be displayed on the Database Viewer tab is:
    a. 4 b. 5 c. 6 d. 7

24. To display a new search on the Database Viewer tab, which button must be clicked after each change?
    a. Search b. Reformat c. Save d. OK

25. Which "wild card" symbol is used when searching for all animal id numbers beginning with "14"?
    a. & b. # c. @ d. *

Please indicate whether the following statement is true or false.

_____ 26. Once the configuration has been created, the configuration can be saved and written to multiple flash cards.

_____ 27. When saving the configuration to the compact flash card, any images contained on the flash card will be saved as well.

_____ 28. Insertions do not need to be available to insert records into the software.

_____ 29. Images should be copied to another folder before insertion into the Data Management Software.

_____ 30. There are two editing options: one for individual records and one for mass editing.

_____ 31. Records can not be deleted from the Data Management Software.

_____ 32. There is only one search blank available on the Database Viewer tab.

_____ 33. A session comment may be used to sort images.

_____ 34. There is more than one way to open the Insert Records tab.

_____ 35. The Optibrand Data Management Software allows the user to edit the retinal images.

_____ 36. There are two different ways to edit information in the Data Management Software.

_____ 37. Certificates may be printed for one or more exhibitors.

_____ 38. Information entered into the Data Management System may be exported to Excel.

Reflections (Post Test Only):

1. Was this online course easily accessible? _____ yes _____no

2. Did you have any technical difficulties accessing the material? _____yes _____no

3. If so, please describe your technical difficulties in the space provided.

4. What is your preferred method to receive instruction?
   _____ on-line _____ face-to-face _____mixed on-line/face-to-face
   _____other (please describe) _____

5. Please list suggestions for improvement in the space provided below:

Appendix K. Recruitment E-mail

Dear Extension Educators,

I am seeking Extension Educators, support staff, or 4-H volunteers to participate in an on-line Retinal Imaging Technology and Software tutorial. If possible, I would like to have at least one participant from each county. The tutorial will be available through the 4-H website and include several short videos, a PowerPoint tutorial, and written software guides. Access and completion will be at the participant's pace, though I would like to ask that the post-test be completed by September 15, 2008.

Participants should complete the pre-test and demographic survey through the Zoomerang link included here http://www.zoomerang.com/Survey/survey-intro.zgi?p=WEB227XQTDKGDJ .

After completing the survey, the tutorial materials will be available through the 4-H website located at this link http://www.four-h.purdue.edu/Retinal .

Upon finishing the tutorial, participants may then access the post-test and reflections through the Zoomerang link included here and on the website http://www.zoomerang.com/Survey/survey-intro.zgi?p=WEB227XZ9GQMAM .

Please feel free to contact me with any questions at kslack@purdue.edu, by phone at 765-496-6123, or via my cell phone at 765-404-9442.

Thank you for your assistance,

Kelli Slack

Appendix L. Reminder E-mail

Dear Extension Educators, Extension Support Staff, and Volunteers.

First, I would like to thank those of you who have already completed my post-test. Your assistance in my project is greatly appreciated.

Second I have received a few questions about participation and I would like to share my answer with all of you. The question that has come into my inbox the most has been: do you want someone who has experience retinal imaging? The answer to this is yes and no. I do want participants who are experienced with retinal imaging, but I would also like participants that may be unfamiliar with retinal imaging. I've also been asked about who can participate and the answer to that is Extension Educators, Support Staff, and Volunteers may all participate. If you have more than one person in your county who would like to participate, please invite them to.

Lastly, if you've thought about going through my tutorial, but are worried about how much time it will take, the consensus has been that it takes about 2 hours from pre-test through post-test including interruptions. This tutorial was designed to be broken into segments and worked at your own pace. So if you have about two hours of time to give between now and Sept. 15, I would greatly appreciate your participation. I am including the links again below.

Participants should complete the pre-test and demographic survey through the Zoomerang link included here http://www.zoomerang.com/Survey/survey-intro.zgi?p=WEB227XQTDKGDJ .

After completing the survey, the tutorial materials will be available through the 4-H website located at this link http://www.four-h.purdue.edu/Retinal .

Upon finishing the tutorial, participants may then access the post-test and reflections through the Zoomerang link included here and on the website http://www.zoomerang.com/Survey/survey-intro.zgi?p=WEB227XZ9GQMAM .

Please feel free to contact me with any questions at kslack@purdue.edu, by phone at 765-496-6123, or via my cell phone at 765-404-9442.

Thank you,

Kelli Slack
kslack@purdue.edu
765-404-9442

Appendix M. Second Reminder E-mail

Dear Extension Educators, Support Staff, and Volunteers,

Now that Galaxy III is behind us and your SAM reports are in, I am asking you to please take some time to respond to Kelli Slack's request for assistance with her Master's project. We are still seeking Extension Educators, support staff, and 4-H volunteers to participate in an on-line Retinal Imaging Technology and Software tutorial. The tutorial is available through the 4-H website and includes several short videos, a PowerPoint tutorial, and written software guides. Access and completion is at the participant's pace. The tutorial will remain open until October 1, 2008 to accommodate those of you who would still like to participate in our study, but may have been unable to find the time.

Participants should complete the pre-test and demographic survey through the Zoomerang link included here http://www.zoomerang.com/Survey/survey-intro.zgi?p=WEB227XQTDKGDJ .

After completing the survey, the tutorial materials will be available through the 4-H website located at this link http://www.four-h.purdue.edu/Retinal .

Upon finishing the tutorial, participants may then access the post-test and reflections through the Zoomerang link included here and on the website http://www.zoomerang.com/Survey/survey-intro.zgi?p=WEB227XZ9GQMAM .

Please remember to complete the post-test if you have taken the pre-test. Feel free to contact Kelli Slack with any questions at kslack@purdue.edu, by phone at 765-496-6123, or via her cell phone at 765-404-9442.

Thank you for your assistance,

Clint Rusk
(765) 491-9437
rusk@purdue.edu

Appendix N. Descriptions of Technical Difficulty

"I wasn't sure everything was being displayed correctly. I had a lot of the boxes either not fill-in or [they] were extremely slow filling in."

"The server was not accessible on the day that I took the post-test. I used the [HTML] copies without images and could not access any of the material in section 6 - Managing your records."

"I could not reopen after [the] first session."

"When I went to the nose print tab, I could not get back into the session."

"Pictures did not always appear when using the HTML option."

"On my home computer, the animation from slide to slide would not show up. I could access the different sections, but there [weren't any] images. I switched to a different computer and did not have this problem."

"Videos were too small to see."

"I could not enlarge the videos."[1]

[1] Comments were edited for punctuation and spelling.

Appendix O. Suggestions for Improvement

“Since I had no idea how this process worked, the tutorial helped me get an idea of what to expect. However, until I have a machine available [. . .], most of the technical information does not mean too much to me at this time. I'm sure once I get a chance to try it and save it to the computer, it will make a lot more sense.”

“Where was the on-line course -- I could not find it and therefore was not able to answer the questions.”

“Videos [should] be enlarged [so people can see] exactly which buttons are being clicked, etc.”

“You make it easier to understand [for] those who are teaching the information. Because not all people learning about the retinal imaging need to know about the computer side. I do not think I saw all the slides, because some of the questions I answered, I [had] not [seen the] slides for.”

“The materials I saw last week were well done and concise. I believe there is a great need for [. . .] office staff and volunteers to learn more about RI [from the tutorials]. It would have been better if there had been access to the materials in all forms today.”

“[I would like] more detail [about how to actually run] the scanner in the field. Only one person in the office does the computer work, but the scanner could have several that use it.”

“The last part of the test dealt with software. I did not find a section of the tutorial that dealt with software. [It] seemed a little frustrating to take the test without having reviewed the application.”

“I would consider adding a glossary of terms for the Optibrand software. Another thought is to list the basic steps for software use in a one page summary sheet.”

“I thought the tutorials were good. I hope you keep them on-line to refer back to when we do scanning.”

“The tutorial was extremely lengthy for county staff to observe. These sessions would have been better had it all been in one document. When switching between documents, my attention span became shorter.”

“This method saves time for me. I understand the Optibrand image machine better as a result of this tutorial.”

“The material was accessible in the different formats you offered, but I noticed there weren't any tabs for the quiz answers in .html format. Thanks.” [2]

[2] Comments were edited for punctuation and spelling.