

# Western IPM Center Project Report Form

**How to submit:** Please submit this completed form electronically, as an attached Microsoft Word file, to Jane Thomas at [jmthomas@tricity.wsu.edu](mailto:jmthomas@tricity.wsu.edu). If you have questions, contact Linda Herbst, (530) 752-7010. **Content:** Complete each section below, and include responses to as many of the questions listed in Attachment A as are relevant to your project. *These are guidelines.* Provide your readers with enough detail that someone who is not familiar with your project can understand what you were trying to achieve, how you went about it, and what you accomplished, but please keep it concise.

## A. Report Data

**Date:** 16 Feb. 2010

**Reporting Period:** 2006-2009

**Report Type (please check one):**

Progress Report     Final Report

## B. Grant Data

- Grant Agreement #: 2006-41530-03583 and 2006-34103-17199 (ext./res. project)
- Title: Economic analysis of host-based ectoparasite control
- Grant Type: USDA-WRIPM
- Lead investigator:
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- Team members (name, title, institution): D. R. Kuney (Poultry Farm Advisor, UCCE, UC Davis), J. A. Mench (Professor, Dept. of Anim. Sci., UC Davis), N. O'Sullivan (Director of Research, Hyline International, Dallas Center, IA)
- State(s) involved: CA, IA

**C. Nontechnical Summary.** An overview of the project, briefly outlining the problem(s), how your project addresses them, and your results, *written to a lay audience*. (500 words)

Nearly all egg production is from beak-trimmed hens, which are trimmed to prevent pecking damage and reduce feed waste. Beak-intact hen ectoparasite populations are far lower due to better hen grooming. Experiments were done to determine whether hens with intact beaks could control mite and louse populations well enough to prevent economic damage (damage justifying the costs of control), and to quantify the hen grooming behavior. Trials focused on the initial 10 weeks of egg production. During this period, beak-intact hens generally outperformed beak-trimmed hens, whether infested or not. Mites damaged production more than lice did, and ectoparasite damage generally was less on intact hens. Use of beak-intact hens might reduce or eliminate the need to spray pesticides for them, especially if more docile and acceptable strains could be developed.

**D. Objectives and Progress.** List your objectives and describe your progress for each objective.

1. Determine economics of production with beak-intact and beak-trimmed hens challenged with the northern fowl mite, the chicken body louse, or uninfested controls. Three complete trials were done using a docile hen strain (CV-20, aka Hyline W-36) hens raised from chicks and receiving a standard series of disease vaccinations. Trials differed somewhat in overall results. In Trial 1, uninfested, beak-intact controls were \$0.17 more profitable (per hen) than uninfested, trimmed hens. This advantage due to intact beaks was \$0.20 per hen in Trial 2, but was negligible (- 0.03 per hen) in Trial 3. Louse damage was slight to negligible (< \$0.04 per hen) in intact hens in all 3 trials. Mite damage in intact hens was not seen in Trial 1, but slight-moderate mite damage was detectable in Trials 2 (\$0.17/hen) and 3 (\$0.05/hen). Trimmed hens sustained damage from lice and especially mites in most trials. Louse damage in trimmed hens was very notable in Trial 1 (\$0.25/hen), moderate in Trial 2 (\$0.09/hen), and nearly undetectable (\$0.02/hen) in Trial 3. Part of this was due to the general hen condition; body weights improved over the 3 trials (i.e. we were becoming better poultry farmers). Mite damage to trimmed hens was severe in Trial 1 (\$0.21/hen), and quite noticeable in Trials 2 (\$0.11/hen) and 3 (\$0.15/hen). So, the trials confirmed that mites are the more damaging pest. Some damage even in intact hens is probably due to the mites forcing the immune response to engage even under lower pest densities (i.e. the damage function is almost certainly not linear). The immune response is metabolically costly for the host.
2. Determine interactions of hen beak condition and grooming behavior with infestations of lice and mites. We decided to delve more deeply into this part of the data than had originally been planned, documenting behaviors in all hens rather than a representative portion of them. Consequently the behavior analyses are still in progress. With lice, however, the data clearly show infested hens spend more time grooming. Intact, louse-infested hens spend about 30% more time grooming than uninfested/intact hens, but trimmed hens (with far higher louse loads) groom drastically more (about 400%) than their uninfested, trimmed counterparts. It will be interesting to determine the cost of this effort, which might involve less time feeding etc.
3. To inform the industry of potential benefits and drawbacks of using beak-intact hens for egg production vis-à-vis ectoparasite control and general costs. We have presented this set of results, in general terms, at two state UCCE-poultry producer meetings. Producers were quite interested, but the prospects of not trimming are probably still serious enough to prevent immediate, widespread acceptance of the concept. Farmers are conservative for some very good reasons. Acceptance of the concept, if it comes, will likely require time and practical experience/word-of-mouth efforts by the producers themselves.

**E. Outputs.** List your project's outputs, which might include publications, information, data, meetings held, attendance at meetings held, etc.



## H. Appendices

1. With your report, please attach *at least two (2) photographs* that illustrate your project. Please describe the photo and indicate the name and institution of the person who took the photo. (If you submit more than two photographs, please include those additional descriptions and photo credits under "I. Additional Information," below.)

Photo #1 description:

The sharper and hooklike upper beak of intact hens is critical to louse and mite control through grooming (versus photo 2 with a trimmed beak).

Photo #1 credit (photographer's name and institution):

Bradley A. Mullens, University of California, Riverside

Photo #2 description:

Filming grooming behavior in a trial testing economic effects of ectoparasites on hens of different beak condition (intact versus trimmed).

Photo #2 credit (photographer's name and institution):

Bradley A. Mullens, University of California, Riverside

2. Also attach any printed fact sheets or other publications resulting from your work that will enhance our understanding of your project and its impacts. Please provide a description of each attached publication below.

Document #1 description:

Document #2 description:

Document #3 description:

## I. Additional Information

*Credit: Some of the language about impacts and potential impacts was adapted from a PowerPoint presentation by H. Michael Harrington, Executive Director, Western Association of Agricultural Experiment Station Directors, Colorado State University.*

## Attachment A

### Questions to Help in Reporting Impacts and Potential Impacts

Below are some questions that will guide you in assessing and then describing the impacts and potential impacts of your project. The relevance of each question may vary depending on whether yours is a research or extension project. Please answer as many as you can to the best of your ability, and feel free to describe any additional types of impacts not mentioned below. Remember to identify any potential impacts.

**1. Innovations in IPM:**

Are there new IPM practices that have been (impacts) or could be (potential impacts) adopted as a direct result of your project? What is the total number of acres (or homes, schools, greenhouses, nurseries) on which these practices could realistically be implemented?

**2. Safeguarding human health and the environment:**

- a. Has the project reduced risk (or could it potentially do so) by changing the use of pesticides on farms, in homes, in schools, etc.? For example, could it result in fewer sprays per season or a switch to lower-risk pesticides? If possible, quantify the changes in condition. (Since there is no unanimous definition of *high* and *low risk*, investigators selecting this indicator are asked to categorize the pesticides they are reporting on as *high* or *low risk* according to the particular situation [e.g., lower risk to natural enemies]).
- b. Are there any other impacts or potential impacts on human health or the environment as a result of your project?

**3. Economic benefits:**

- a. What is (or could be) the economic benefit (e.g., dollars saved) for clientele who adopt IPM strategies and systems you studied? Do you envision potential commercialization or mass production of these systems?
- b. How many clients are satisfied with IPM results (such as improved yield, improved quality of yield, reduced pest populations, more effective pest control, greater preservation of nonpest species)?
- c. Are there other financial benefits that might be realized (potential impact) as a result of your project?

**4. Implementation of IPM:**

- a. How many IPM strategies and systems have been validated through this project (e.g., through on-farm trials, large plot tests, or other methods used to confirm efficacy)?
  - b. How many educational materials were delivered? To whom? And what are the impacts or potential impacts?
  - c. What is the number of growers/personnel trained? And what are the impacts or potential impacts?
  - d. For a Web site, what volume of traffic and type of use has the site experienced? (For example, number of visitors per day or month; number of page views; number of unique user sessions; change in volume during growing season; average viewing time.) And what are the impacts or potential impacts?
  - e. How many more people adopted IPM practices as a direct result of your project, or how many people adopted new IPM practices?
  - f. Are there other ways in which your work will result in improved use or increased implementation of IPM strategies in your region or across the West?
5. Has your project or study increased collaboration among stakeholders interested in the development and implementation of improved IPM strategies and systems?