

# Egg Industry Center Research Priorities

## As identified by EIC Advisory Board

(In no particular order of importance)

**Updated November 2018**

### **Egg Production Sustainability**

- Opportunities to improve sustainability of egg laying operations going forward
- Impact of various housing types on sustainability
- Impact of access to outdoor vegetation/cover on welfare, health, environment, production performance (including body weight and body weight uniformity), economic efficiency and utilization of indoor/outdoor spaces
- Alternative uses for spent hens

### **Precision Flock Management**

- New systems/tools for data gathering/analysis in egg layer production
- Applications of Artificial Intelligence and Data Science Analysis to egg production
- Automation of flock management
  - Exploration of using robot or other automation means to perform tasks normally done by humans (e.g., flock inspection – health, mortality, floor eggs, piling; application of litter additive; body weight measurements; behavior monitoring; area usage – floors, nests, outdoors, etc.)
  - Innovative ways to expedite catching hens in cage-free systems (e.g. practical ways to reduce time needed to humanely capture hens in these systems)

### **Behavior/Welfare**

- Outcome-based research informing the creation/revision of animal welfare standards
- Impact of various cage-free housing styles on mortality, behavior and production
- Impact of housing type (cage, enriched, cage-free) and design (e.g., amount and placement of nest boxes, perches, feeder space, horizontal space between rows in cage-free housing)
- Impact of management schemes under a given housing type or system design (e.g., temporary closure of doors normally cage-free housing for nest training, stocking density, hanging of toys or devices in attempt to reduce aggression, etc.)
- Impact of factors influencing living areas and behavior (e.g., lighting, nutrition, gases, particulate matter, electromagnetic fields)
- Impact of pullets rearing environment or conditions on hens during laying period
- Practical strategies to reduce egg-laying on litter floor without compromising hen welfare
- Use of mechanical barriers to protect hens (e.g., pecking, etc.)

### **Economics**

- Effects of national vs. state-by-state policies (e.g., production systems, supplies, export regulations, transport, labeling, etc.)
- Costs of further processing and packaging
- Cost-effective alternatives (e.g., items to replace micro ingredients)
- Economics of production and processing (e.g., marketing, software development, standards, price discovery)
- New technologies or management strategies that will lead to reduced cost of production

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### Environment

- Practical means and strategies to improve indoor air quality and reduce air emissions from cage-free facilities (e.g., ammonia, dust, airborne bacteria, odor)
- Improvement of heating, cooling and ventilation uniformity, especially in cage-free housing systems that require supplemental heat
- Quantification of environmental footprint for different production systems and/or management practices
- Manure value-added opportunities
- Resource utilization efficiency
- Practical means for environmentally-sound mass disposal of infected flocks

### Egg Safety & Quality

- Movement of egg products, especially during sensitive times (e.g., HPAI)
- Incidence of microbial contamination as affected by production systems and/or management (e.g., hen, egg shell, interior egg)
- Management practices contributing to egg safety including, but not limited to:
  - sanitation of facilities/equipment within animal living areas
  - sanitation of facilities/equipment within egg handling and processing areas (e.g. grading machine sanitation, breaking machine sanitation or entire processing plant sanitation)
- Possibility of achieving and maintaining products 100% free of all salmonellas
- In shell pasteurization
- Irradiation technology (e.g., Irradiation of shell eggs)
- Shell contamination/egg breakage throughout various housing systems
- Egg cleaning
  - Egg washing protocols
  - Effectiveness of industry egg washing detergents as disinfectants for elimination of microbial substances surface of eggs and handling devices/equipment such as plastic flats, pallets, divider boards, etc.
  - Effectiveness of egg washer operations in elimination of surface substance (e.g., effectiveness of maintaining detergent strength at various organic loads in washer tank)
  - Cost effective chlorine disinfectant alternatives effective at keeping shell surface pH conditions of 9 to 11 and not requiring post application rinse with potable water
  - Egg wash water reuse/recycling
  - Alternatives to egg washing

### Flock Health

- Understanding, control and prevention of persistent or emerging flock health issues (e.g., FDN, red mites, northern fowl mites, false layer syndrome, etc.)
- Comparison of disease frequencies in colony and cage-free systems between the U.S. and Europe
- Health or disease transmission risks associated with various housing systems
- Nutritional protocols or means to enhance flock health (e.g., gut health)
- Efficacy of new biosecurity measures
- Efficacy of alternative cleaning and disinfection measures/protocols

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### **Value-added Egg Processing or Increased Utilization of Eggs/Egg Products**

- Component isolation/marketing (e.g., yolks)
- Eggs and fowl as part of the human diet
- Composition analysis or nutritional value of eggs