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Position Statement:

Feed Allocation Programs of Broiler Breeder Pullets

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It is the position of the American Association of Avian Pathologists (AAAP) that feed allocation programs of broiler breeder pullets are an acceptable and humane husbandry practice. Because of the genetic potential for rapid growth, *ad libitum* feeding of broiler breeders can cause distress resulting from obesity, lameness, aggression, and reproductive disorders that may have fatal complications. Feed allocation programs promote better broiler breeder welfare by improving health, reducing mortality, and in many cases, allowing the flock to achieve greater reproductive potential. Because there may be perceived hunger and distress associated with feed allocation programs, we recommend additional research to identify new physiological measures of poultry welfare and to develop alternative husbandry practices. Future research should also emphasize objective research parameters and practical husbandry strategies to evaluate feeding programs and their net benefit for broiler breeder welfare.

Background: Feed Allocation Programs of Broiler Breeder Pullets

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Standard commercial broiler chicken lines have been genetically selected for rapid growth and increased meat yield in order to produce abundant and affordable food more efficiently (Havenstein 2003). These desirable growth and production characteristics of the broiler chicken also ensure that the broiler breeder parent stock chickens have high growth potential. To maximize broiler breeder flock health, fertility, and egg laying potential, specialized feed allocation programs (often referred to as 'feed restriction programs') are used for commercial broiler breeders. The primary breeder companies that develop genetic lines also perform extensive research and establish target weights throughout the life of a broiler breeder in order to optimize flock health and welfare as well as maximize production. Nonetheless, the practice of feed allocation for broiler breeders has recently been a welfare topic in public forums mainly due to concerns regarding hunger and distress in birds that are restricted of feed.

Counter to these welfare concerns, multiple studies have shown that broiler breeders with free access to feed have increased morbidity and mortality. Broiler breeders fed more than their nutritional requirements suffer health problems associated with obesity. (Robinson 1991, [A] Yu 1992). These problems include increased mortality, decreased male and female fertility, and decreased egg production (Buckner 1986, Hocking 1990, [A] Katanbaf 1989, [B] Katanbaf 1989, McDaniel 1981, Robinson 1993, Whitehead 1987, Wilson 1986, [B] Yu 1992). Studies have also shown that broiler breeder hens allowed to feed ad libitum have excess nutrient consumption and develop more yellow yolk follicles in their ovaries than their reproductive tracts can process into eggs. ([A] Hocking 1989, [A] Hocking 1993). Increased ovarian activity will predispose hens to reproductive problems including internal laying, peritonitis (inflammation of the body cavity), salpingitis (inflammation of the reproductive tract), multiple ovulations, and shell abnormalities (Bruggeman 2005, [C]Hocking 1993, [B]Katanbaf 1989, McDaniel 1981, Robinson 1993). A further complication of ad libitum feeding is increased susceptibility to heat stress (Hocking 1994). Male broiler breeders given unlimited access to feed can also show increased aggression (Mench 1988, Millman 2000), resulting in increased trauma and mortality. Additionally, overweight broiler breeders can develop mobility problems leading to distress and impairment of mating ability

-hence reduced egg production. ([B]Hocking 1989). Feed allocation programs appear to moderate feed consumption. If however, broiler breeders are fed less than what is nutritionally required, hens will stop laying eggs because their nutritional needs are not met. Severe feed deprivation is a cause of other health issues and increased bird mortality.

The amount of feed provided to broiler breeders and the amount of feed provided to commercial broilers should not be compared as a welfare issue. Commercial broilers typically have free access to feed throughout their life, which is approximately 5-8 weeks. Commercial broiler diets are designed to facilitate efficient weight gain during this limited time period. Broiler breeders live longer than commercial broilers and will not become reproductively active until approximately 5 months of age. Their weight needs to be more tightly regulated because of the health and welfare reasons cited previously. Diets for broiler breeders are designed to provide optimal nutrition without excessive weight gain and are formulated to be more nutritionally dense per unit of volume to maintain breeder health. Increased resistance to disease and improved humoral immunity has been observed in broiler breeders on

feed allocation programs (Han 1972, Hocking 2001). Because broiler breeders' weight gain is controlled, they will weigh less and consume less feed than commercial broilers at the same age.

Several studies have evaluated potential physiological and behavioral distress parameters and indicators of hunger in broiler breeders reared on feed allocation programs. Broiler breeders that are on these programs are more active and tend to exhibit foraging behaviors such as pecking at litter, walls, and empty feed lines. These foraging behaviors in non-production chickens have been suggested to be responses to hunger and therefore an indicator of distress ([A] Savory 1993, [B] Savory 1993). Foraging has also been interpreted as normal avian activity. Some research suggests that foraging behaviors are normal displacement activities (Decuypere 2006, [B] Hocking 1993) and may actually decrease other physiological stress parameters (Kostal 1992). Increased foraging activity therefore may be normal behavior and actually benefit broiler breeder health.

Corticosterone levels in the blood have been used as a prospective indicator of stress in feed allocation programs of birds (De Jong 2002, [B] Hocking 1993, Hocking 1996, Hocking 2001). However, elevations of corticosterone in birds occurs naturally as a response to fasting so it is unclear if this is a valid method of assessing welfare for feed allocation programs. Furthermore, there is evidence that corticosterone levels may return to normal within 5 weeks of initiation of a feed allocation program (Freeman 1981), suggesting that any distress associated with feed allocation may be short lived.

Other blood parameters have been evaluated as measures of stress in feed allocation programs. White blood cell parameters such as heterophil/lymphocyte (H/L) ratios have been frequently used to evaluate distress. Results of testing for elevated H/L ratios after the initiation of feed allocation programs were inconsistent (De Jong 2002, [B] Hocking 1993, Hocking 1996, Hocking 2001, Maxwell 1990, Maxwell 1992). Creatine kinase (CK), an enzyme released when muscle is damaged, is often elevated when birds are free-fed ([B] Hocking 1993, Hocking 1996, Hocking 2001). This suggests that free-fed broiler breeders may have muscle pathology. Although these diagnostic indicators for distress may be helpful in the evaluation of broiler breeder welfare, an evaluation of egg production, long-term health problems, reproductive abnormalities, and aggressive behavior may be clearer indicators of actual distress of the bird and the long-term health and well-being of the breeder flock.

There have been attempts to alleviate perceived hunger and distress in breeders on feed allocation programs with non-conventional interventions, but without apparent success as measured by current poultry welfare metrics. Some studies on controlling hunger in broiler breeders have utilized increased fiber in the diets (Hocking 2006) or have increased the bulk of the feed while maintaining the nutritional and energy content (Savory 1996, Savory 2000). The studies however, have not shown benefits in flock welfare compared to standard feed allocation programs.

New physiologic measures of poultry welfare need to be developed to better assess potential hunger and distress related to the use of feed allocation programs in broiler breeders. Furthermore, because the genetics of commercial broiler breeders are continually changing to improve production and efficiency, welfare assessment of feeding programs will need to be regularly evaluated.

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Additional Recommended Reading

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