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Response of Pheasant Chicks to Adult Lady Beetles (Coleoptera: Coccinellidae)[1]

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ABSTRACT: Ingestion of adult lady beetles (Coleoptera: Coccinellidae) by ring-necked pheasant chicks, *Phasianus colchicus* L., was rare but when occurring elicited distress symptoms in the bird. Although possessing warning colors, lady beetles without elytra were still avoided but similarly marked bean leaf beetles, *Cerotoma trifurcata* (Forster), were readily ingested, suggesting olfactory recognition is involved.

Insects are an important food item of newly hatched pheasant chicks, *Phasianus colchicus* L., because they provide a source of the high protein required (Dale and DeWitt, 1958) for the 15-fold increase in weight during the first 5 weeks (Leedy and Hicks, 1945). Loughrey (1951) found that during the first 3 weeks, chicks were almost entirely dependent on animal matter for food. Dalke (1935) reported that animal matter made up 90% of the chick's diet during the first week, and insects remained an important food item for chicks through the summer growth period (Trautman, 1952).

A study was initiated in 1979 to determine which insects 2-week-old pheasant chicks consumed in an oats-sweetclover ecosystem. Chicks were acquired when 3 days old and held in pens until 2 weeks old. During this period, chicks were fed large quantities of insects collected in various habitats with a D-vac® suction sampler. With each sample of insects there were also pieces of plant material and debris.

Observations of 35 chicks during these acclimation feedings indicated that adult lady beetles (Coccinellidae) were rarely ingested. If a chick did take a coccinellid, the following reaction occurred: side to side head shaking, clawing at the beak, and either dislodgement or swallowing of the beetle. At times the distress response was so violent that the chick would sit back on its tail feathers. Only one author (Shick, 1952) has reported coccinellids in the diet of pheasant chicks.

All food items found in a chick's crop are not necessarily intentionally ingested. If a chick missed an intended insect food item and instead picked

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up a bit of grass or piece of debris, it would try to dislodge it by shaking its head and clawing at its beak. Dislodgement was rarely successful and the material usually swallowed. The ingestion of foreign matter was not accompanied by the same apparent distress elicited by ingestion of lady beetles.

To test the apparent rejection of coccinellids, 2 14-day-old chicks which had not been fed for 20 hours were placed in a cage with 50 coccinellids (*Hippodamia convergens* Guer. and *Coleomegilla maculata* Muls.). One of the chicks immediately picked up a beetle, shook its head and successfully dislodged it. No further attempts to feed were made by either chick. Two coccinellids with elytra clipped were placed in a cage with the chicks to determine if the red/yellow elytra caused coccinellids to be avoided. Neither chick attempted to feed. Bean leaf beetles, *Cerotoma trifurcata* (Forster) (red with black markings), were then placed in the cage and all were eaten. Next a sample of mixed insects from an alfalfa field was put in the cage and both chicks ate insects of all types except coccinellids. This clearly indicated that the pheasant chicks were hungry when exposed to coccinellids.

Jones (1932) found that red and yellow insects in general were unattractive to birds. Red and yellow are common warning colors in insects which possess other defensive mechanisms. Weatherston and Percy (1978) listed 14 species of Coccinellidae which utilize leg joint reflex bleeding of alkaloidal materials as a defense mechanism. Both species used in this study were included in the list.

An experience with one lady beetle prevented future contact with the other species. But it seems unlikely that avoidance of lady beetles is learned by color alone since the similarly marked bean leaf beetle was readily ingested while lady beetles without elytra were still avoided. More likely a combination of olfactory and gustatory stimuli is involved but this needs further study.

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Bucoprophilous Pasture Flies and Associated Insect Parasites in Central Missouri.*—Field studies were conducted at 3 sites in central Missouri during 1980 and 1981 to identify species of Diptera breeding in bovine dung on the open pasture and to determine the parasite complex associated with such species. Fresh dung pats were formed weekly, placed on pressboard over recovery boxes, and subjected to natural pasture fly oviposition. Pupae were collected, identified, and retained in the laboratory for parasite emergence.

Thirteen species of Diptera were recovered in this study: *Paregle cinerella* (Fallen) and *Paregle* sp. (Anthomyiidae), *Musca autumnalis* De Geer, *Myospila meditabunda* (Fabr.), and *Orthellia caesarion* (Meigen) (Muscidae), *Oxysarcodexia ventricosa* (Wulp), *Ravinia derelicta* (Walker), *R. latisetosa* Parker, *R. lherminieri* (Robineau-Desvoidy), and *R. querula* (Walker) (Sarcophagidae), *Saltella* sp. and *Sepsis* sp. (Sepsidae), and *Merosargus* sp. (Stratiomyidae). These dipterans were attacked by a complex of 12 parasites: *Aleochara* sp. (Staphylinidae), *Alysia ridibunda* Say and *Aphaereta pallipes* (Say) (Braconidae), *Eucoila* sp. and Unid. sp. (Cynipidae), *Trichopria* sp. (Diapriidae), *Figites* sp. (Figitidae), and *Eupteromalus* sp. (hyperparasitic?), *Muscidifurax raptor* Girault and Sanders, *Spalangia haematobiae* Ashmead, *S. nigra* Latr., and *S. nigroaenea* Curtis (Pteromalidae).

Consistent with previous work in this area, seasonal parasitism was low (ca. 2% for all parasites combined). *A. pallipes* was the most abundant species, followed by *M. raptor*. Parasitism was observed to be greatest in the fall, with a pronounced peak in September. The Sarcophagidae were consistently exploited as hosts by all species of parasites recovered.—D. E. Figg, R. D. Hall, and G. D. Thomas, University of Missouri

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