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Author: Grubb, Teryl G.

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Haematosiphon inodorus (Hemiptera: Cimicidae) in a Nest of a Bald Eagle (*Haliaeetus leucocephalus*) in Arizona

Teryl G. Grubb, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Forestry Sciences Laboratory, ASU Campus, Tempe, Arizona 85287, USA; **Wade L. Eakle,**[1] Institute for Wildlife Studies, P.O. Box 127, Arcata, California 95521, USA; **and Benjamin N. Tuggle,** U.S. Fish and Wildlife Service, National Wildlife Health Laboratory, 6006 Schroeder Road, Madison, Wisconsin 53711, USA

Haematosiphon inodorus (Duges), the Mexican chicken bug, is a bloodsucking ectoparasite recorded from only nine species of birds of prey (Falconiformes and Strigiformes) and domestic fowl (Galliformes): California condor (*Gymnogyps californianus* Shaw), turkey vulture (*Cathartes aura* Wied), golden eagle (*Aquila chrysaetos* L.), red-tailed hawk (*Buteo jamaicensis* Gmelin), prairie falcon (*Falco mexicanus* Schlegel), great horned owl (*Bubo virginianus* Gmelin), barn owl (*Tyto alba* Bonaparte), domestic chicken (*Gallus gallus* L.), and domestic turkey (*Meleagris gallopavo* L.) (see Wilson and Oliver, 1978, Southwest. Nat. 23: 305–307). The Mexican chicken bug is relatively uncommon in southwestern U.S.A. (Usinger, 1966, Monograph of Cimicidae, Horn Shafer Co., Baltimore, Maryland, 585 pp.; Lee, 1955, Pan-Pac. Entomol. 31: 137–138; Wilson and Oliver, 1978, op. cit.). The USDA Cooperative Extension Service and the Insect Identification Laboratory of the Arizona State Agriculture Commission have no reports of any serious infestations on domestic poultry in Arizona. This note documents the first recorded occurrence of *H. inodorus* in an active nest of a bald eagle in sufficient numbers to have caused or contributed to the death of two eaglets.

The eagle nest was located in east-central Arizona in Sonoran desertscrub habitat. The nest was constructed on a rock pinnacle above the Salt River in Gila County, about 110 km east of Phoenix. Hatching occurred on 8 and 11 April 1984. The younger (7-day-old) nestling died for unknown reasons on 18 April; it was not collected. The second chick, last seen alive on 11 May, was found dead in the nest on 16 May. The degree of decomposition and presence of larval dipterans indicated the bird had been dead for 2–3 days (age 33–34 days). Large numbers of bugs were found among the sticks of the coarse, outer nest structure and within the dried, herbaceous, nest lining. Several specimens were collected on 16 May, preserved in 70% EtOH, and later identified as *H. inodorus*. Representative specimens have been deposited in the U.S. National Parasite collection in Beltsville, Maryland 20705, USA (Accession No. 78644).

A surface density of 0.6–0.9 bugs/sq. cm was estimated over the 0.93 × 0.93 m area around the dead eaglet. These figures yield an estimate of approximately 21,000–31,000 bugs for the nest which measured 2.2 × 1.6 m. Lee (1959, Audubon Mag. 61: 214–215, 224–225) reported large numbers of *H. inodorus* (1,425 and 1,778) in two barn owl nests and Wilson and Oliver (1978, op. cit.) estimated at least 30,000 bugs in a turkey vulture nest cave; however, surface measurements were not given in either case for density comparisons. It should be noted that when our infested nest was revisited on 5 June (3 wk later) for further collections and measurements, only eight bugs were found. No *H. inodorus* were noted in the

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[1] Present address: College of Agriculture, School of Renewable Natural Resources, 325 Biological Sciences East Building, University of Arizona, Tucson, Arizona 85721, USA.

12 other active nests in Arizona that were examined in 1984.

It is not clear how *H. inodorus* got into this particular bald eagle nest. Wilson and Oliver (1978, op. cit.) discussed several theories for transmission of this parasite between distantly related raptors, including successive use of same or synchronous use of adjacent nest sites and associated perches. A documented host species, the barn owl, was seen perched on the eagle nest pinnacle following failure; if it used that perch during the eagles' nesting, an opportunity for parasite transmission existed. Wilson and Oliver also suggest the nesting association of raptors in farm buildings as an alternative explanation to raptors becoming infected by preying directly on poultry as suspected by Usinger (1966, op. cit.). Platt (1975, Wilson Bull. 87: 557) found *H. inodorus* in three prairie falcon eyries and one red-tailed hawk nest in northeastern New Mexico. Chickens were found at one of the ranches in his study area, yet an examination of 65 prey items and 87 pellets revealed no evidence of poultry in the diet of either raptor. A ranch with domestic chickens was located 4.8 km away from our infested eagle nest, well within the birds' foraging range; but, like Platt, we found no evidence of poultry in prey delivery observations, prey remains, or castings.

Platt (1975, op. cit.) attributed the abandonment of one clutch of three prairie falcon eggs and the death of seven nestling falcons and two nestling red-tailed hawks to the presence of *H. inodorus*. As many as 30 bugs were found attached near the eyes, legs, and wings of one falcon chick. Young birds in particular suffer serious blood loss if attacked by large numbers of bugs (Matthysse, 1972, *In* Diseases of Poultry, Hofstad et al. (eds.), Iowa State Univ. Press, Ames, Iowa, pp. 803–804). Repeated bites are followed by a severe allergic dermatitis caused by the host's reaction to the parasite's saliva. The swelling and itching associated with the dermatitis may persist long after the attacks subside.

The large numbers of bugs reported in this study could have caused or contributed to the death of one or both of the nestling eagles through the depletion of blood and constant irritation associated with repeated feedings. Such an infestation may have led to an anemic condition in the young birds, increasing their susceptibility to pathogenic agents. Unfortunately, the second chick was too decomposed to document such lesions or to determine exact cause of death. The significant drop in bug numbers 3 wk later may be explained by the absence of a fresh food source in the nest. The Mexican chicken bug is very active and mobile; adults and nymphs commonly emigrate in search of available hosts. Although under laboratory conditions adult bugs may survive more than 2 wk without feeding, nymphs on the average survive only 5–8 days without a blood meal (Lee, 1955, Pan-Pac. Entomol. 31: 47–61). The potential for recurrence at this site in subsequent breeding seasons is uncertain. Bald eagles have occupied this nest annually for 10 yr, and it is the only known nest in the breeding area. These factors coupled with the considerable mobility of *H. inodorus*, the renewed presence of a constant food source, and the unknown identity of the original vector make reinfestation possible.

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Addendum:

During the late spring/early summer of 1985, the first and second authors examined 31 eagle nests (18 bald and 13 golden) in central Arizona, including the 1984

infested nest described above. Two young successfully fledged from the same nest in 1985, but there was no evidence of *H. inodorus*. However, another successful bald eagle nest had a concentration of 0.1 bugs/sq. cm 2 wk after fledging. Concentrations of 0.2 bugs/sq. cm were found in two successful golden eagle nests within 1 wk after fledging.

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Ectoparasites of the Eastern Chipmunk (*Tamias striatus*) from Tishomingo County, Mississippi

Jerome Goddard, G. T. Baker, and B. R. Norment, Department of Entomology, P.O. Drawer EM, Mississippi State University, Mississippi State, Mississippi 39762, USA

There have been several studies on the ectoparasites of the eastern chipmunk but the majority of them were undertaken in the northern United States (Amin, 1973, J. Med. Entomol. 10: 110–111; Wilson, 1961, Ectoparasites of Indiana Mammals, Ph.D. Diss., Purdue Univ., Lafayette, Indiana, 548 pp.; Whitaker et al., 1979, J. Med. Entomol. 16: 350–351). Few studies have been undertaken in the southern United States except that of Durden (1983, J. Tenn. Acad. Sci. 58: 16–20) who monitored the epifauna of the eastern chipmunk in a suburban plot in central Tennessee.

Entomological surveys in general and especially those of mammalian ectoparasites are lacking from Mississippi. Chipmunks occur throughout much of central and southern Mississippi (Hall and Kelson, 1959, The Mammals of North America, Vol. I, Ronald Press, New York, 546 pp.), but some scattered populations can be found along the Tennessee River in the northern region. This paper presents information on the ectoparasites found on 31 chipmunks from Tishomingo County, Mississippi from spring 1982 to spring 1984.

An effort was made to collect five chipmunks per season (spring, summer, fall, winter) for 2 yr; however, despite repeated attempts, only one was collected in the winter of 1982–1983, and none was collected in the winter of 1983–1984.

Individual chipmunks were shot, placed immediately in a sealed plastic bag, and frozen until examination. Specimens were usually frozen within 30 min of collection. Upon examination, the hair and skin of the hosts were carefully inspected for larger ectoparasites. Then, individuals were scrubbed in a detergent solution which was subsequently filtered through a Buchner funnel. The plastic bags were rinsed in detergent solution and the solution also filtered. These filtrates were then examined with a 10–40 power dissecting microscope and ectoparasites were removed and placed in 70% ethanol. In addition, chipmunk tails were examined for tail follicle mites by squeezing the bases of the hairs. Ticks, fleas, lice, and botfly larvae were preserved in alcohol; mites were cleared and mounted in Hoyer's medium. Some mites and fleas were identified by the authors and the tail follicle mites were identified by B. O'Conner (University of Michigan). Other mite (partial), tick, lice, and botfly larvae identifications were provided by M. L. Goff (University of Hawaii at Manoa), J. E. Keirans (National Museum of Natural History), K. C. Emerson (Sanibel Island, Florida) and E. P. Catts (Washington State University) respectively. The following voucher specimens were deposited in the Mississippi Entomological Museum, Mis-

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