


- MULLA, M. S., R. L. NORLAND, T. IKESHOJI, AND W. L. KRAMER. 1974. Insect growth regulators for the control of aquatic midges. *J. Econ. Entomol.* 67: 167-170.
- QUATE, L. W. 1955. A revision of the Psychodidae (Diptera) in America north of Mexico. *Univ. California Pub. Ent.* 10: 103-273.
- QUATE, L. W., AND J. R. VOCKEROTH. 1981. Psychodidae, pp. 293-300 in McAlphine et al. [eds.], *Manual of Nearctic Diptera*, Vol. 1. Res. Branch Agric. Canada, Monogr. 27.
- RACHESKY, S., AND H. B. PETTY. 1968. Control of *Psychoda alternata* at a wastewater sewage plant. *J. Econ. Entomol.* 61: 1118-1119.
- REDBORG, K. E., T. D. HINESLY, AND E. L. ZIEGLER. 1983. Rearing *Psychoda alternata* (Diptera: Psychodidae) in the laboratory on digested sewage sludge, with some observations on its biology. *Environ. Entomol.* 12: 412-415.
- RUTZ, D. A., R. C. AXTELL, AND T. D. EDWARDS. 1980. Effect of organic pollution levels on aquatic insect abundance in field pilot-scale anaerobic animal waste lagoon. *Mosq. News* 40: 403-409.
- SAUNDERS, L. G. 1928. *Psychoda alternata* Say breeding in the sea. *Entomologist* 61: 209.
- SOLBE, J. F., N. V. WILLIAMS, AND H. ROBERTS. 1967. The colonization of a percolating filter by invertebrates and their effect on settlement of humus solids. *Wat. Pollut. Control* 66: 423-448.
- TURNER, C. L. 1925. The Psychodidae (moth-like flies) as subjects for studies in breeding and heredity. *Amer. Nat.* 57: 545-549.



***EUDEUS PURPUREAS* (HYMENOPTERA: EULOPHIDAE):
A PARASITOID OF SWEETPOTATO WEEVIL
(COLEOPTERA: APIONIDAE) IN SOUTHERN FLORIDA**

RICHARD K. JANSSON AND SCOTT H. LECRONE
Institute of Food and Agricultural Sciences
Tropical Research and Education Center
18905 S.W. 280 Street
Homestead, Florida 33031

The sweetpotato weevil, *Cylas formicarius* (Fabricius) is one of the most important insect pests of sweet potato, *Ipomoea batatas* (L.) Lam., world-wide (Sutherland 1986, Chalfant et al. 1990, Jansson & Raman 1991). Wolfe (1991) recently reported that both *C. f. elegantulus* (Summers) and *C. f. formicarius* (Fabricius) are junior synonyms for the species. The distribution of this weevil is circumglobal; it occurs in most tropical regions where sweet potato is grown and where it is the most important constraint to sweet potato production (Horton & Ewell 1991). Even low weevil densities can reduce marketable yield due to terpenoid production in roots in response to weevil feeding which makes roots unpalatable (Akazawa et al. 1960, Uritani et al. 1975, Sato et al. 1981). Yield losses from weevil damage of up to 60-97% have been reported (Chalfant et al. 1990 and references therein).

Little information is available on natural enemies of *C. formicarius*. Jansson (1991) reviewed biological control programs for this weevil world-wide. Fifteen wasp parasitoids of *C. formicarius* have been reported (Jansson 1991). Parasitoids of this weevil have been reported from only three countries, India, the Philippines, and the U.S. These

parasitoids are members of either the Braconidae, Encyrtidae, Eurytomidae, or Pteromalidae families. Only four parasitoid species (*Bracon* sp., *B. mellitor* Say, *B. punctatus* [Muesebeck], and *Metapelma spectabile* [Westwood] [Cockerham 1944]) were reported from Louisiana in the U.S. This note is the first report of a eulophid wasp parasitoid attacking *C. formicarius*.

On 21 December 1989, while dissecting Jewel sweet potato plants in a research plot (0.4 ha) at the Tropical Research and Education Center in Homestead, Florida, three cream-colored, eulophid parasitoid pupae were found in the vines. A larva of *C. formicarius*, from which the parasitoids exited, was adjacent to each parasitoid. One parasitoid pupa was isolated from the same field on 2 January 1990. Percentage parasitism of *C. formicarius* was approximately 0.3% ($n = 1,252$). Two more parasitoid pupae were found on 18 February 1990. All six parasitoids were found inside vines of sweet potato. Five of the pupae were kept in the vines in which they were found and reared in a Petri dish (9 cm diam.) at room temperature in the laboratory until adult development. Two groups of adults (21 December and 18 February samples), which were metallic green, were held in the laboratory and offered weevil immatures daily. No mating nor parasitism was observed. Three adult specimens were sent to the USDA, ARS, Systematic Entomology Laboratory, Beltsville, Maryland for identification. Adults were identified as *Euderus* sp. (Hymenoptera: Eulophidae).

One *Euderus* sp. pupa was found in the vines of three-month-old 'Jewel' sweet potato plants in another research plot (0.4 ha) in Homestead on 20 September 1990. Percentage parasitism was approximately 0.4% ($n = 245$). One parasitoid pupa was found in the vines of four-month-old sweet potato plants on each of three dates, 24 September and 1 and 2 October 1990, and two additional pupae were found in the same field on 11 October. The level of parasitism in this field (1.4%, $n = 440$) was slightly higher than found previously. All but two of these wasp pupae were reared through to adulthood in the laboratory, and two specimens were sent to the USDA, ARS, Systematic Entomology Laboratory to confirm the identification. Adults were identified as *Euderus* sp. probably *pupureas* Yoshimoto. The only known host for this wasp is *Grapholitha molesta* (Busck) (Lepidoptera: Tortricidae) (M. E. Schauff, personal communication), which is also cryptic like *C. formicarius*, and tunnels and feeds within the fruit and twigs of several fruit trees (Davidson & Lyon 1979). Considering that these wasps were found in a different sweet potato field four months since any known sweet potato plantings were present in the local vicinity, it appears that this wasp is established in the area and achieves very low levels of parasitization of *C. formicarius*. Because of the very low levels of parasitism found, it is doubtful that such a parasitoid will have potential to regulate *C. formicarius* populations.

We thank M. E. Schauff for identifying the specimens. This research was supported, in part, by the U.S. Department of Agriculture under CRSR Special Grant No. 88-34135-3564 (to R.K.J.) managed by the Caribbean Basin Advisory Group (CBAG). This is Florida Agricultural Experiment Station Journal Series No. R-01240. Voucher specimens of *Euderus pupureas* are located at the University of Florida, Institute of Food and Agricultural Sciences, Tropical Research and Education Center, Homestead.

REFERENCES CITED

- AKAZAWA, T., L. URITANI, AND H. KUBOTA. 1960. Isolation of ipomeamarone and two coumarin derivatives from sweet potato roots injured by the weevil, *Cylas formicarius elegantulus*. Arch. Biochem. Biophys. 88: 150-156.
- CHALFANT, R. B., R. K. JANSSON, D. R. SEAL, AND J. M. SCHALK. 1990. Ecology and management of sweet potato insects. Annu. Rev. Entomol. 35: 157-180.
- DAVIDSON, R. H., AND W. F. LYON. 1979. Insect pests of farm, garden, and orchard. 7th edition. J. Wiley, New York.

- HORTON, D. E., AND P. T. EWELL. 1991. Sweet potato pest management in perspective: a social science contribution, pp. 407-427, in R. K. Jansson & K. V. Raman [eds.], Sweet potato pest management: a global perspective. Westview Press, Boulder, Colorado and London.
- JANSSON, R. K. 1991. Biological control of *Cylas* spp., pp. 169-201, in R. K. Jansson & K. V. Raman [eds.], Sweet potato pest management: a global perspective. Westview Press, Boulder, Colorado and London.
- JANSSON, R. K., AND K. V. RAMAN. 1991. Sweet potato pest management: a global overview, pp. 1-12, in R. K. Jansson & K. V. Raman [eds.], Sweet potato pest management: a global perspective. Westview Press, Boulder, Colorado and London.
- SATO, K., I. URITANI, AND T. SAITO. 1981. Characterization of the terpene-inducing factor isolated from the larvae of the sweet potato weevil, *Cylas formicarius* Fabricius (Coleoptera: Brenthididae). Appl. Entomol. Zool. 16: 103-112.
- SUTHERLAND, J. A. 1986. A review of the biology and control of the sweetpotato weevil *Cylas formicarius* (Fab.). Trop. Pest Manage. 32: 304-315.
- URITANI, I., T. SAITO, H. HONDA, AND W. K. KIM. 1975. Induction of furano-terpenoids in sweet potato roots by the larval components of the sweet potato weevils. Agric. Biol. Chem. 37: 1857-1862.
- WOLFE, G. W. 1991. The origin and dispersal of the pest species of *Cylas* with a key to the pest species groups of the world, pp. 13-42, in R. K. Jansson & K. V. Raman [eds.], Sweet potato pest management: a global perspective. Westview Press, Boulder, Colorado and London.



NEW FLORIDA LADYBEETLE (COLEOPTERA: COCCINELLIDAE)

FRED D. BENNETT

Entomology and Nematology Department
IFAS, University of Florida
Gainesville, FL 32611-0740

ROBERT D. GORDON

Systematic Entomology Laboratory, PSI
Agricultural Research Service, USDA,
c/o U.S. National Museum of Natural History
Washington, D.C. 20560

Gordon (1985) provided records of 78 species and 2 subspecies of ladybeetles known to occur in Florida. This note places on record an additional, probably adventive species not previously recorded from the state.

More than 20 adults of a small coccinellid emerged from a collection of *Bidens pilosa* L. and *Chromolaena odorata* (L.) foliage infested with *Orthezia insignis* (Brown) (Homoptera: Ortheziidae) made by one of us (FDB) in Miami on 22. VII. 1991. A similar collection of *O. insignis* on *B. pilosa* from the same locality on 30. VIII. 1991 was held for several days and yielded five additional adults of the same species. No larvae or adult coccinellids were noted when the material was placed in rearing containers, but subsequent examination confirmed that the adults developed from larvae present in the ovisacs of *Orthezia* at the time of collection. The small size of this species makes it probable that the eggs contained in a single ovisac of *O. insignis* provide adequate food reserves for the complete development of one larva.