

RECORDS OF *TRICHOSPILUS DIATRAEAE*,
AN ASIAN PARASITE (HYMENOPTERA: EULOPHIDAE)
FROM THE CARIBBEAN AND FLORIDA

F. D. BENNETT

Department of Entomology and Nematology
University of Florida, IFAS
Gainesville, Florida 32611

H. GLENN

Tropical Research and Education Center
University of Florida, IFAS
Homestead, Florida 33031

M. YASEEN

Commonwealth Institute of Biological Control
Gordon Street
Curepe, Trinidad and Tobago

R. M. BARANOWSKI

Tropical Research and Education Center
University of Florida, IFAS
Homestead, Florida 33031

Trichospilus diatraeae Cheria and Margabandhu (Hymenoptera: Eulophidae) is an Asian parasite of the pupae of graminaceous stem borers [*Chilo* spp. and *Sesamia* spp. (Lepidoptera: Pyralidae)]. Consignments from India were shipped to the USA and to Trinidad in 1963 for laboratory trials against *Diatraea* spp. which are serious pests of sugarcane in the New World (Rao et al. 1971). Emergence from consignments to the USA, sent to the USDA-ARS, Beneficial Insects Introduction Laboratory, Moorestown, N.J., was very poor and no tests or releases were undertaken (R. Dysart, USDA-ARS-BIRL, Newark, DE, personal communication, 1986). In Trinidad choice tests with material from India, carried out under quarantine, indicated that adults of this gregarious parasite did not discriminate between *Diatraea* pupae and puparia of the beneficial tachinid flies *Lixophaga diatraeae* (Townsend) and *Paratheresia claripalpis* (Wulp) (Bennett 1965). Therefore, cultures were destroyed without making any field releases.

Tests undertaken in Barbados in 1963-1964 confirmed the Trinidad results and no releases were made at that time. However, this parasite was again imported from India into Barbados in 1972 (Alam & Gibbs 1985) against other lepidopterous pests, including *Spodoptera frugiperda* (J. E. Smith) (Noctuidae). There were also reports (Cock 1985) of the introduction of a second species, *Trichospilus pupivora* Ferriere, against the same group of pests and this has led to confusion as to which species is now present in Barbados. Establishment under the name *T. pupivora* was reported by Ingram (1981), Alam (1979), and Cock (1985), whereas Bennett and Alam (1985) listed the species as *T. diatraeae* and Alam and Gibbs (1985) also used this name. Both names represent valid species which are distinctive and can be readily separated (see Boucek 1976).

In 1984, one of us (M.Y.) reared *T. diatraeae* from a noctuid pupa (possibly *S. frugiperda*) collected among rice stubble at Caroni, Trinidad. On May 3, 1985, one of us (H.G.) collected 48 pupae of *Epimecis detexta* (Walker), a geometrid pest of avocado, from a commercial grove in Dade Co., Florida; 2 of these yielded adults of *T. diatraeae*

and also an unidentified hyperparasite on May 15. These collections were thought to represent the first records of this parasite from Trinidad and from continental USA. However, when specimens from both countries, as well as material from Barbados, were sent to the Commonwealth Institute of Entomology for confirmation and clarification of the earlier determinations, Dr. Z. Boucek, who identified all of our material as *T. diatraeae*, reported that there were specimens in the British Museum (Natural History) collected in Trinidad by Dr. J. Noyes in 1976 and also a specimen caught in a Malaise trap at Gainesville, Florida, in 1983.

The main purpose of this note is to put on record the presence of this Asian culophid in Trinidad and Florida and to correct the reports by Alam (1979), Cock (1985) and Ingram (1981). There appears to be no evidence that *T. pupivora* is established in Barbados, whereas material reared from field-collected lepidopterous pupae in Barbados by M.M. Alam in 1986 was confirmed to be *T. diatraeae* (det. Z. Boucek).

Although it can be postulated that *T. diatraeae* established in Trinidad as the result of escapes while the species was undergoing host range tests, this does not account for its presence in Florida. Its occurrence in north Florida (Gainesville) as well as in south Florida (Homestead) indicates that it is probably wide spread in Florida. Whether it arrived there as an accidental immigrant direct from Asia or from Barbados cannot be ascertained.

T. diatraeae has been present in Trinidad for at least 10 years, based on J. Noyes' collection (or as long as 22 years, if it escaped during the host range tests in 1965). It has never been reared from field-collected tachinid puparia, although several hundred of these have been collected in connection with biological control investigations.

In Barbados this parasite has been reared from field-collected pupae of the following Lepidoptera: *Trichoplusia ni* Hubner and *Pseudoplusia includens* Walker (Noctuidae), and *Diaphania hyalinata* (Linnaeus) and *Stenorrhages flegia* (Cramer) (Pyralidae), but there are no records of it from field-collected tachinid puparia (Bennett & Alam 1985). Although it has been recorded as a hyperparasite in Asia, Boucek (1976) in a revision of the genus, states that it is mainly a gregarious pupal parasite and rarely a hyperparasite. Our extensive records from Trinidad and Barbados, and the unique one from Florida support this conclusion and suggest that despite its failure to discriminate between lepidopterous pupae and tachinid puparia in laboratory tests it functions as a primary parasite of Lepidoptera in the field. Based on the absence of any field records as a hyperparasite in Barbados, *T. diatraeae* is currently being bred in that country for distribution elsewhere in the Caribbean for the control of lepidopterous pests of food crops (M. M. Alam, Caribbean Agric. Res. Dev. Inst., personal communication, 1986). It has also been introduced into and established in Mauritius and Reunion for the control of sugarcane borers and has been bred in Taiwan for mass release against lepidopterous pests of the same crop (Boucek 1976). On the basis of our records which indicate that it usually functions as a primary parasite of Lepidoptera, Prof. J. W. Smith, Jr., Texas A&M, requested a culture obtained from *E. detexta*, Homestead, to assess its potential as a control agent for the pyralid sugarcane borers *Eoreuma loftini* (Dyar) and *Diatraea* spp.


ACKNOWLEDGMENT

We thank M. E. Schauff, USDA, Agric. Res. Ser., Systematic Entomol. Lab., Washington, D.C., for the identification of *T. diatraeae* from Florida; Z. Boucek, Commonwealth Institute of Entomology, London, England, for identification of the remainder of the parasite material and for information of specimens in the British Museum; R. Dysart, USDA-ARS, BIRL, Newark, DE, for details of shipments sent from India to the USA; and M.M. Alam, Caribbean Agric. Res. & Dev. Inst., Bridgetown, Bar-

bados, for providing parasite specimens and for information on developments in Barbados. We also thank G. Buckingham, J. H. Frank and J. L. Stimac for their critical review of the manuscript. Florida Agric. Exp. Sta. Journal Series No. 7634.

REFERENCES CITED

- ALAM, M. M. 1979. Attempts at the control of insect pests of maize in Barbados, W.I. Proc. Caribbean Food Crops Soc. 15: 127-135.
- ALAM, M. M., AND I. H. GIBBS. 1985. Pigeon-pea pod borers and their natural enemies in Barbados, West Indies. Proc. Caribbean Food Crops Soc. 20: 38-41.
- BENNETT, F. D. 1965. Tests with parasites of Asian graminaceous moth-borers on *Diatraea* and allied genera in Trinidad. Commonw. Inst. Biol. Control Tech. Bull. 5: 101-116.
- BENNETT, F. D., AND M. M. ALAM. 1985. An annotated check-list of the insects and terrestrial arthropods of Barbados. Caribbean Agric. Res. Dev. Inst., Barbados. 81 pp.
- BOUCEK, Z. 1976. The African and Asian species of *Trichospilus* and *Cotterellia* (Hymenoptera, Eulophidae). Bull. Entomol. Res. 65: 669-681.
- COCK, M. J. W., ed. 1985. Review of biological control of pests in the Commonwealth Caribbean and Bermuda up to 1982. Commonw. Inst. Biol. Control. Tech. Commun. 9. 244 pp.
- INGRAM, W. R. 1981. Pests of West Indian sea island cotton. Centre for Overseas Pest Res., London. 35 pp.
- RAO, V. P., M. A. GHANI, T. SANKARAN, AND K. C. MATHUR. 1971. A review of biological control of insects and other pests in south-east Asia and the Pacific regions. Commonw. Inst. Biol. Control Tech. Commun. 6. 149 pp.



INDUCED PUPATION IN *DIAPREPES ABBREVIATUS*
(COLEOPTERA: CURCULIONIDAE)

W. J. SCHROEDER

U.S. Horticultural Research Laboratory
Agricultural Research Service
U.S. Department of Agriculture
2120 Camden Road, Orlando, FL 32803

Diaprepes abbreviatus (L.), is a well known root weevil pest of sugarcane and citrus in the Caribbean Basin (Ballou 1912). The insect was first reported in the United States in 1964 (Woodruff 1964). Beavers (1983) developed an artificial diet and rearing procedures to establish laboratory colonies. Although the larvae grew rapidly on the diet the insects failed to pupate making it impossible to maintain the laboratory colony. Obviously, improved rearing procedures were needed to induce pupation.

We observed that when 120 day larvae were removed from diet and placed in soil, the larvae formed pupal cells. To determine if pupation could be consistently induced by placing 120 day larvae in soil, we collected 280 diet-reared larvae. The average weight/larva was 620 ± 9.5 mg (mean \pm SE). One hundred and forty larvae were placed individually in 100 ml vials with diet and 140 in a potting soil mix. The soil was Terra-Lite[®] Mix 500 and consisted of Canadian sphagnum moss, horticultural vermiculite, processed bark (patented), composted pine bark, and washed granite sand. The soil mois-