

NEW DISTRIBUTION RECORDS FOR THE ALFALFA WEEVIL EGG PREDATOR *PERIDESMIA DISCUS* (HYMENOPTERA: PTEROMALIDAE) IN THE EASTERN UNITED STATES

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ABSTRACT

Peridesmia discus (Walker), a pteromalid egg predator of the alfalfa weevil, *Hypera postica* (Gyllenhal), which was previously introduced from Europe as a biological control agent, recently was found to be established in the southeastern United States. During 1987 surveys, this beneficial wasp was found for the first time at several sites in five new states: DE, NJ, PA, VA, and WV. Recoveries of *P. discus* were obtained from 41% of the fields sampled. The current known distribution, which includes localities in ten states, is illustrated.

Key Words: Biological control, natural enemy introduction, *Peridesmia discus*, *Hypera postica*, *Medicago sativa*.

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INTRODUCTION

Of 12 exotic beneficial insects released against the alfalfa weevil, *Hypera postica* (Gyllenhal) (Dysart & Day 1976), six species were known to be established by 1980 in the eastern United States and were causing significant mortality (Day 1981). In 1986, one more of the introduced natural enemies, *Peridesmia discus* (Walker) (= *phytonomi* Gahan), which was previously thought to have failed to establish, was recovered from alfalfa fields in five southeastern states: Georgia, Maryland, North Carolina, South Carolina, and Tennessee. Data from recovery sites in Georgia, South Carolina, and Tennessee indicated that from 5.3 to 16.7% (mean, 7.1%) of overwintering weevil eggs were being destroyed by this egg predator (Dysart 1988).

This paper reports the results of 1987 surveys for *P. discus* in portions of the eastern United States. The new recovery records are being published here not only to document the further spread of this predator, but to encourage additional survey work in other areas of the country infested by the alfalfa weevil. Because this small pteromalid wasp was last released in 1972 (see Dysart & Day 1976 for details), it appears that it has been established here for at least 16 years, but more information is needed to define its distribution and impact.

Biologically, the *P. discus* larva is considered a predator because it is larger than its host (a weevil egg), and it requires more than one host to complete its development. The adult female of *P. discus* punctures the alfalfa stem with her

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ovipositor and lays a single egg on the weevil egg mass. After the *P. discus* larva hatches, it feeds externally on the host eggs and it usually destroys the entire egg mass. When mature, the larva pupates within the stem cavity and the adult issues during late winter or early spring (Gruber & Dysart 1974).

MATERIALS AND METHODS

Surveys for recovery of *P. discus* were made using bulk stem collection methods modified after Gruber & Prieto (1976) and Dysart (1988). Alfalfa stems were collected from fields or field margins during January, February, and March of 1987. Efforts were made to select standing dead stems of the previous year's growth, no less than 15 cm long. From 400 to 1200 stems were cut from each field and were returned to the vehicle where all extraneous vegetation was removed. After alfalfa leaves had been stripped and discarded, the stems were bundled loosely in 4 - 5 sheets of newsprint and promptly mailed or transported to the laboratory.

Upon receipt, stems were held at 7.2°C for 2 - 3 days. Stems from each collection site were loosely arranged in 10 cm layers separated by strips of rigid plastic foam (3 by 3 by 30 cm) within a darkened emergence box (0.03 m³ capacity) and were incubated at 21°C for 4 weeks. This procedure prevented stems from compacting and allowed free movement of air and insects. Adult pteromalids emerging from the stems were attracted to light through a transparent collection tube inserted through the wall of the box. Once each day, the tube was removed, a hand sprayer was inserted and the stems were moistened lightly. Collection tubes were monitored several times each day and any adult wasps found were placed in 70% EtOH for later identification.

RESULTS AND DISCUSSION

Bulk stem collections were obtained from a total of 22 fields in 6 states in 1987. Emergence of *P. discus* adults usually began 7 - 10 days after the start of incubation and continued for about 14 days. Stems were discarded after 28 days. A list of the 1987 positive recovery sites for *P. discus* is shown in Table 1. The numbers of stems collected and incubated are presented to give an idea of the effort required to obtain a positive record. Recoveries of *P. discus* were obtained from 41% (9/22) of the fields sampled. Based on the results obtained, I suggest that a minimum of 1000 stems per field be collected in future distribution surveys. Using the 1987 recoveries and those previously reported (Dysart 1988), the current U. S. distribution of *P. discus* now encompasses 10 states. (Fig. 1).

All new distribution records presented here were based on recovery of adult *P. discus* males. Identification of females is difficult and unreliable, but males can be identified easily because of an unusual glabrous stripe present on the side of the head. An illustration of this diagnostic character is presented by Dysart (1988). Identifications were also confirmed by an appropriate taxonomist (see Acknowledgment).

Chamberlin (1924) made the first field observations on *P. discus* in Europe during a 2 - year evaluation of alfalfa weevil natural enemies for introduction

Table 1. Summary of 1987 recovery records for *P. discus* (adults reared from bulk stem collections).

State	County	Locality	Sample date	No. alfalfa stems	No. <i>P. discus</i> males
DE	Kent	Smyrna	Jan. 16	1,135	1
	New Castle	Newark	Mar. 25	400	1
NJ	Cumberland	Fairton	Mar. 18	900	13
PA	Chester	Oxford	Mar. 20	942	1
VA	Augusta	Stuarts Draft	Mar. 12	1,045	10
	Page	Luray	Mar. 12	970	19
	Rockingham	Bridgewater	Mar. 12	1,045	4
WV	Berkeley	Martinsburg	Mar. 10	1,050	13
	Hardy	Moorefield	Mar. 11	1,100	1

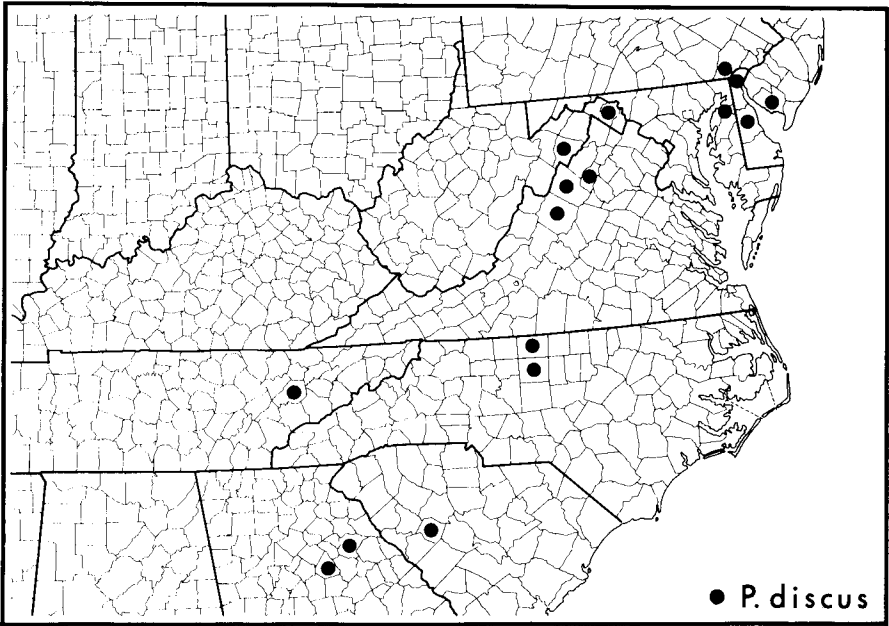


Fig. 1. Distribution of *Peridesmia discus* (Walker) in the United States as of March 1987.

into the United States. He considered it the most promising species attacking the egg stage and he was impressed with its ability to survive in both warm and cold climates. He also reared *P. discus* from eggs of the clover leaf weevil, *Hypera punctata* (Fabricius), in Europe. This weevil is common in clover and alfalfa fields in this country and it probably will serve as an alternate host for *P. discus*. Because the immature stages of *P. discus* develop within plant stems, its dispersal also might be aided by the commercial movement of alfalfa and clover hay. Based on the above factors and the distribution seen thus far, it seems likely that this egg predator is more widely distributed than presently known and eventually it will extend its range throughout much of North America.

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LITERATURE CITED

- Chamberlin, T. R. 1924. Studies of the parasites of the alfalfa weevil in Europe. *J. Econ. Entomol.* 17: 623-32.
- Day, W. H. 1981. Biological control of the alfalfa weevil in the northeastern United States, pp. 361-74. *In* G. C. Papavizas [ed.], *Biological control in crop production*. Allanheld, Osmun, Totowa, N. J.
- Dysart, R. J. 1988. Establishment in the United States of *Peridesmia discus* (Hymenoptera: Pteromalidae), an egg predator of the alfalfa weevil (Coleoptera: Curculionidae). *Environ. Entomol.* 17: 409-11.
- Dysart, R. J., and W. H. Day. 1976. The release and recovery of introduced parasites of the alfalfa weevil in eastern North America. U. S. Dept. Agric. Prod. Res. Rep. 167. 61 pp.
- Gruber, F. and R. J. Dysart. 1974. *Peridesmia discus*, an egg predator of *Hypera postica* in Europe. *Environ. Entomol.* 3: 789-92.
- Gruber, F. and C. A. Prieto. 1976. A collecting chamber suitable for recovery of insects from large quantities of host plant material. *Environ. Entomol.* 5: 343-44.
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