Proc. Indian Acad. Sci., Vol. 83 B, No. 5, 1976, pp. 196–201

The cereal thrips *Haplothrips ganglbaueri* Schmutz with particular reference to the trends of infestation on *Oryza sativa* and the weed *Echinochloa crusgalli*

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MS received 11 August 1975

ABSTRACT

The trends of infestation of *Haplothrips ganglbaueri* on *Oryza sativa* and the weed *Echinochloa crusgalli* in paddy fields are discussed, along with its biological and taxonomical aspects.

THE anthophilous, polyphagous, tubuliferan species *Haplothrips ganglbaueri*, very widely distributed all over India, Pakistan, and Ceylon occurring in considerable numbers in such cereal crops as paddy (*Oryza sativa*), wheat (*Triticum vulgare*), Sorghum (*Sorghum vulgare*), *Eleusine coracana* and *Pennisetum typhoideum* has been known to severely damage their inflorescence due to concentrated feeding by numerous larvae and adults.[1] The development of irregularly oval and diffused brownish patches on the lemma, palea and ovarian tissues of paddy has been reported by Abraham *et al.*[2] The population build-up of this small-sized species is often high and being polyphagous it also abounds in the inflorescence of several weeds common in the cultivated fields of the above cereal crops. Examination of the thrips species inhabiting the various weeds in the paddy fields in and around Tambaram (Chingleput District) indicated a correlation between the populations of *Haplothrips ganglbaueri* on paddy inflorescence with those on the weed *Echinochloa crusgalli* (gramineae). The presence of another well-known species inhabiting cereal crops and other Gramineae in Egypt and Sudan—*Haplothrips priesnerianus* Bagnall (= *Haplothrips tolerabilis* Priesner) was also observed in sufficiently large numbers on several weeds alongside with *H. ganglbaueri.*

An idea of the range of diversity of the more important taxonomic features of this important cereal thrips appears essential to emphasise its distinctness from the closely allied *H. priesnerianus.*

Haplothrips ganglbaueri Schmutz

Haplothrips ganglbaueri Schmutz		1913	*Sitz. Akad. Wiss. Wien*: 1034
Haplothrips aculeatus Karny		1913	*Bull. Jard. Bot. Buitenzorg* **10**: 13, 65
Haplothrips aculeatus Karny		1915	*Zeit. Wiss. Ins. Biol.* **11**: 87
Haplothrips ganglbaueri Priesner		1921	*Treubia* **2** (1): 2–7
Haplothrips ganglbaueri Rama-krishna		1925	*J. Bombay Nat. Hist. Soc.*: 8
Haplothrips ganglbaueri Karny		1926	*Mem. Dept. Agr. Ind.* **9** (6): 217
Haplothrips ganglbaueri Rama-krishna		1928	*Mem. Dept. Agr. Ind.* **10** (7): 292
Haplothrips ganglbaueri Priesner		1933	*Rec. Ind. Mus.* **35** (3): 355
Haplothrips ganglbaueri Ramk. and Marg.		1940	*Catalogue of Indian Insects* **25**: 37
Haplothrips ganglbaueri Anantha-krishnan		1964	*Opusc. Ent. Suppl.* **25**: 48.

Macropterous female (*male*).—General colour brown with profuse red pigmentation. Head, thorax, all femora and antennal segments 1, 2, 7 and 8 darker brown; 3 more yellowish, 4–6 becoming more yellowish grey; foretibiae and foretarsi yellow, mid and hind tibiae for most part brown, darker at base and more yellowish at apex. Wings clear, with extreme base inclusive of scale brown. All setae dark, more blunt to expanded, hyaline at apex.

Head about as long as wide. Postoculars 39–46 (35–39) long. Median ocellus slightly overhanging antennal bases, mouthcone narrowly rounded; maxillary stylets oculad, widely separate, with a thin maxillary bridge. Antennal segments, length (width):

Female:—23–25 (25–28), 37–39 (23–25), 39–41 (23–25), 44–46 (28) 39–41 (23–25), 35–37 (23), 28–35 (18–21), 23–25 (9–12).

Male:—21–23 (25), 35–37 (23), 37–39 (21–22), 44–46 (25), 39–41 (21–23), 37 (18), 35 (16), 23–25 (9–12).

Sense cone formula 3^{1+1}, 4^{2+2}, 5^{1+1}, 6^{1}.

Prothorax shorter than head; chaetotaxy: anteroangulars 28–30 (25–28), anteromarginals 23–25 (21–23), midlaterals 21–23 (16–18), postangulars 35–39 (35–37) and epimerals 44–48 (41–46) long. Mesopraesternum

long, broad and parallel sided. Foretarsus with a minute tooth 2–3 (3–5) long. Forewings with 4–5 double fringes in both sexes; basal wing setae 28–32, 30–35, 35–39 (28–30, 30–32, 32–35) long.

Pelta broadly triangular with an almost squarish apex. Abdomen as wide at base as pterothorax, 163–168 (122–127) across VIII, 102–112 (82–92) across IX; setae on IX 51–58, 55–60, 58–64 (51–55, 30–32, 58–60) long, blunt. Tube 92–112 (82–92) long; 48–53, 37–41, 30–35 (41–48, 35, 26–28), wide at base, middle and apex respectively. Anal setae 103–133 (115–127) long.

Total body length: 1·530 — 1·846 (1·275 — 1·377) mm.

Sex ratio—Males : *Females*.—1 : 4 to 1 : 8 in *Oryza sativa* and 1 : 5 to 1 : 7 in the weed *Echinochloa crusgalli*, as observed over the year.

H. ganglbaueri closely approaches *H. priesnerianus*, differing from it in having two sense cones on segment 3 (only one in *H. priesnerianus*). In the more elongate B3 of basal wing setae, in the foretarsal tooth ranging from a hardly recognisable to a small, but well-developed condition, in the longer B1–B3 of abdominal segment IX and in the different nature of the pelta and shape of the pseudovirga, *H. priesnerianus* is distinct from *H. ganglbaueri*. The cephalic and prothoracic setae in *H. ganglbaueri* are dark brown for most part and clear only at apex, but completely transparent in *priesnerianus*.

The host plants so far recorded in the present studies are as below: *Apluda varia*, *Andropogon pertusus*, *Chloris barbata*, *Dactyloctenium aegyptiacum*, *Eleusine aegyptiacum*, *Eleusine coracana*, *Eleusine indica*, *Echinochloa crusgalli*, *Eragrostis diarrhena*, *Eragrostis interrupta*, *Eragrostis nigra*, *Oryza sativa*, *Panicum ischane*, *Panicum javanicum*, *Panicum trypheron*, *Pennisetum typhoideum*, *Pennisetum* sp.; (horse tail grass), *Sorghum vulgare*, *Triticum vulgare*, *Zea mays* (Gramineae); *Ageratum conyzoides*, *Blumia wightiana* (Compositae), *Asytasia* sp. (Acantaceae), *Borreria hispida* (Rubiaceae), *Boerhaavia diffusa* (Nyctagineaceae), *Celosia argentia* (Amarantaceae), *Cyperus niveus*, *Cyperus rotundus*, *Cyperus corymbosus*, other *Cyperus* sp., *Kylinga monocephala* (Cyperaceae), *Hydroleia zeylanica* (Hydrophylliaceae), *Leucas aspera* (Labiatae).

Of the several weeds examined, *Echinochloa crusgalli* in view of its abundance and luxuriant growth almost all through the yaer, harbours in its inflorescence, numerous adults and larvae of *H. ganglbaueri* and is hence an important alternate host of this species. During the October-January season of IR–20 cultivation in 1974–75, an early heavy build up of *H. ganglbaueri* populations was observed in the inflorescence of the weed during the second and third week of November and a gradual decline in number in

subsequent weeks, reaching a minimum in the last week of December and in the first week of January (figure 1). Collections of similar samples of *Oryza sativa* inflorescence from the beginning of the spikelet stage to the ripening of the earhead, indicated a build up of this species during the last week of November to the second week of December, a period when the build up in *Echinochloa crusgalli* is also equally heavy. A similar trend of infestation was observed during the year 1975–76, but the population was considerably low in view of the very heavy rainfall during this period, recording as much as 422–477 mm. In view of the comparatively meagre number of *H. ganglbaueri* on the other weeds listed above, it may be inferred that the infestation of paddy is evidently from *Echinochloa* which is abundant on the field bunds as well as rows of paddy plants near the periphery of the fields and occasionally sparsely distributed in the interior as well. As such the timely removal of this weed particularly during the early stages when the inflorescence has not developed, will go a long way in keeping down the populations of *H. ganglbaueri.*

Life-cycle of H. ganglbaueri:

Observations on the duration of the various stages in the life-cycle of *H. ganglbaueri* were made on the uninfested inflorescence of *Echinochloa crusgalli* in rearing cages (5 cm × 2·5 cm) open at one end. Moistened

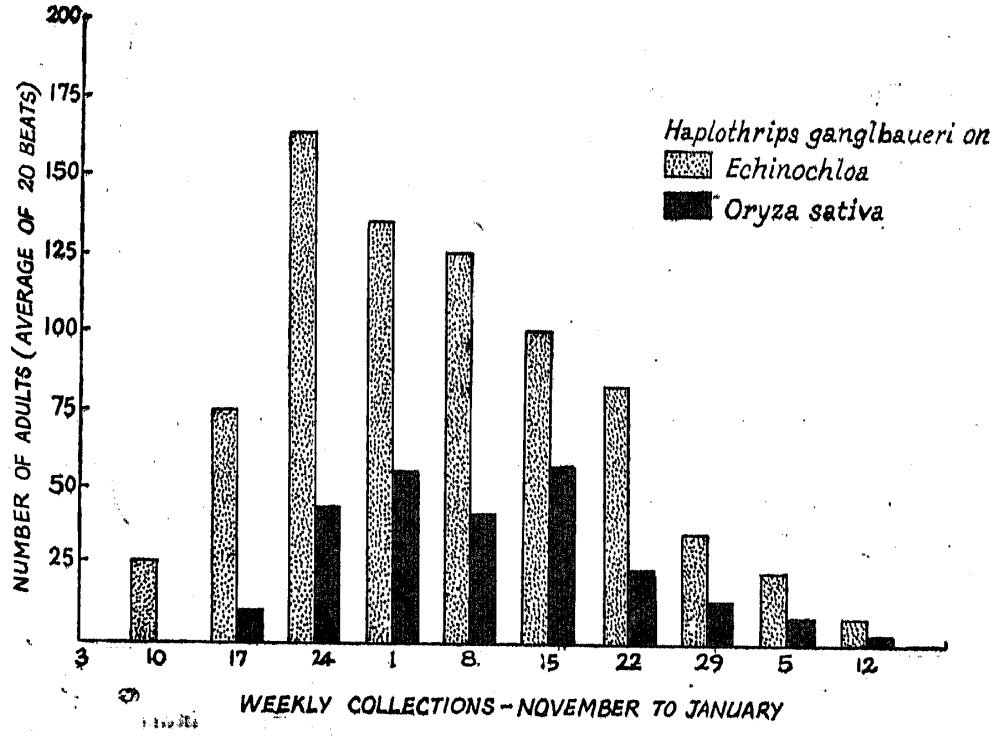

Figure 1. Trends of infestation of *Haplothrips ganglbaueri* on *Oryza sativa* and *Echinochlo crusgalli*

fitter-paper was placed at the bottom of the rearing cage and the open end covered with fine muslin. Six replicates were set up and the cages placed in petri dishes containing a little water, as otherwise the mortality rates were found to be heavy. *Echinochloa* inflorescence was renewed periodically and examined for possible oviposition and counting of eggs. Mated females were isolated in separate cages to note the preoviposition period and subsequent development. Eggs were laid on the outer surface of the lemma and palea mostly in clusters of 4, 8, 12 and rarely 2. The duration of the preoviposition period lasted from 2 to 3 days and of the entire life-cycle from the egg to the adult was 15–20 days, the duration of the individual stages being: egg stage 2–4 days, larval 2–3 days, larva II 6–8 days, prepupa 1 day, pupa I–2 days, pupa II 2 days. The females lived for 12–15 days and the males only for 3–5 days.

Incidentally, it may also be mentioned that prior to the flowering stage this weed also harbours another economically important terebrantian species *Baliothrips biformis* (Bagnall) (= *Chloethrips oryzae* (Williams) responsible for considerable damage to the crop during seedling stage. *Echinochloa* harbours this species in all stages of its development from the seedling to the mature stage, being very heavy in the seedling stage and sparse subsequently. Before transplantation, the infestation appeared to be almost equal in both *Oryza* and *Echinochloa*. However, soon after transplantation there appears to be steep decrease in *B. biformis* in paddy, but continue to infest *Echinochloa* leaves, though in fewer numbers.

The anthocorid bug *Orius maxidentex* Ghauri appears to be a very common predator all over India, feeding on many species of thrips in the inflorescence of several grasses as well as cereal crops and also feeds on the larvae and adults of *H. ganglbaueri.*

ACKNOWLEDGEMENT

This work was carried out during the tenure of an ICAR grant. The kindness of Mr. L. A. Mound of the British Museum of Natural History, London, enabling us to examine type material of *Haplothrips priesnerianus* is also acknowledged.

REFERENCES

1. Ananthakrishnan, T. N., *Thrips: Biology and Control,* Macmillan India pp. 109 (1973).
2. Abraham, C. C. *et al.*, *Curr. Sci.* **41** (19): 721 (1972).

3. Ananthakrishnan, T. N., *Indian Thysanoptera*, CSIR Zoological Monograph No. 1, Publications and Information Directorate, CSIR, New Delhi, 138 (1969).

4. Ananthakrishnan, T. N., *J. Scient. and Ind. Res.* **30** (3): 113 (1971).

5. Faure, J. C., *Jour. Ent. Soc. S. Africa* **19** (1) 115 (1956).

6. Priesner, H., *Rec. Indian Mus.*, **35** 347 (1933).

7. Schmutz, K., *Sitzb. d. mathem. naturw. Kl.* **122**, 1, 1034 (1913).