

Figure 1. Relative response of gamma-irradiated coleoptile segments in relation to elongation _____ and acid RNase activity ----- in the presence (o) and absence (x) of 5×10^{-6} M IAA.

As the growth in unirradiated and 1 kR segments was the same, the corresponding control data are not shown in figure 1.

Segment elongation in -IAA series showed a near absence of radiation effect upto 100 kR but an inhibition thereafter upto 650 kR after which the growth decreased sharply. The growth in + IAA series, compared to -IAA series, was higher at all the radiation doses upto 650 kR except for a sharper and linear fall at high (> 100 kR) doses. This confirmed a marked suppression of the growth response of the oat coleoptiles to IAA at high radiation doses¹. It also revealed a high (100 kR) threshold value for both oat and barley coleoptile as compared to only 13 kR for barley seeds⁶. These two reports and our present study point to the auxin mediation in radiation action, possibly involving nucleic acid metabolism.

Data on acid RNase activity of the irradiated segments, incubated with or without IAA, clearly show that a higher growth was associated with lower enzyme activity. A significant upsurge was recorded upto 800 kR and 500 kR in + IAA and - IAA series respectively followed by a decline thereafter. Also, at any given point in + IAA series the RNase activity was generally lower than the lowest value in the - IAA series. These data are in keeping with the radiation-induced decrease in petiolar rooting and RNA level

which was attributed to rise in RNase activity⁷.

It is, therefore, inferred that gamma radiation damages the tissue sensitivity to applied IAA, probably first at enzyme (RNase) level leading to a similar effect at morphological (cell elongation) level.

30 July 1982; Revised 25 September 1982

1. Miura, K., Hashimoto, T. and Yamaguchi, H., *Radiat. Bot.* 1974, 14, 207.
2. Truelsen, T. A., *Physiol. Plant.*, 1967, 20, 1112.
3. Mathew, T., Dave, I. C. and Gaur, B. K., *Z. Pflanzphysiol.*, 1978, 86, 23.
4. Shortman, K., *Biochim. Biophys. Acta.*, 1962, 55, 88.
5. Ambellan, E. and Hollander, H. P., *Anal. Biochem.*, 1966, 17, 474.
6. Joshi, R. K., Pandey, D. P., Dave, I. C. and Gaur, B. K., *Radiat. Bot.*, 1971, 11, 335.
7. Gordon, S. A., Gaur, B. K. and Woodstock, L., *Radiat. Bot.*, 1971, 11, 453.

OBSERVATIONS ON THE NATURE OF DAMAGE TO RICE EARHEADS BY THRIPS, *HAPLOTHRIPS GANGLBAUERI* SCHMUTZ.

P. S. P. V. VIDYASAGAR AND J. P. KULSHRESHTHA
Central Rice Research Institute, Cuttack 753 006,
India.

DUE to feeding by numerous larvae and adults of polyphagous thrips, *Haplothrips ganglbaueri* Schmutz, the inflorescence of rice was damaged¹. The occurrence and nature of damage by this species was reported in India by Chaudhary and Ramzan², who described the chemical control and Abraham *et al.*³ However, a new symptom/nature of damage has been described for the first time due to the injury caused by *H. ganglbaueri* to rice earheads in the *rabi* season of 1982 at CRRRI farm. Detailed observations revealed the occurrence of three distinct types of damage caused by this pest.

In the first type of damage the inflorescence was attacked even before the opening of the spikelets, resulting in light brown spots with a perforation at the proximal part. The number of adults was much more than larvae. The second type of damage was characterized by the feeding of larvae only on the ovarian tissue at flowering stage. Shortly after the attack the spikelet dries completely giving a sterile appearance. Many a time this damage was confused with sterility. However, the sterile spikelet retains its green colour

throughout development, while the damaged spikelet becomes white and dry. The above damage, perhaps occurs because of the toughening of lemma and palea.

Most striking and characteristic third type of damage observed at CRRI farm was the oozing of milk over the grain without any external feeding marks. The systematic examination of the affected grains in different stages of damage revealed the injury caused to the ovary just after fertilization. Some layers of the kernel were damaged by the larvae resulting in the gradual rupturing of the membrane. Soon afterwards the milk flows out through the tip and dries up over the hull (figure 1). There was considerable degree of

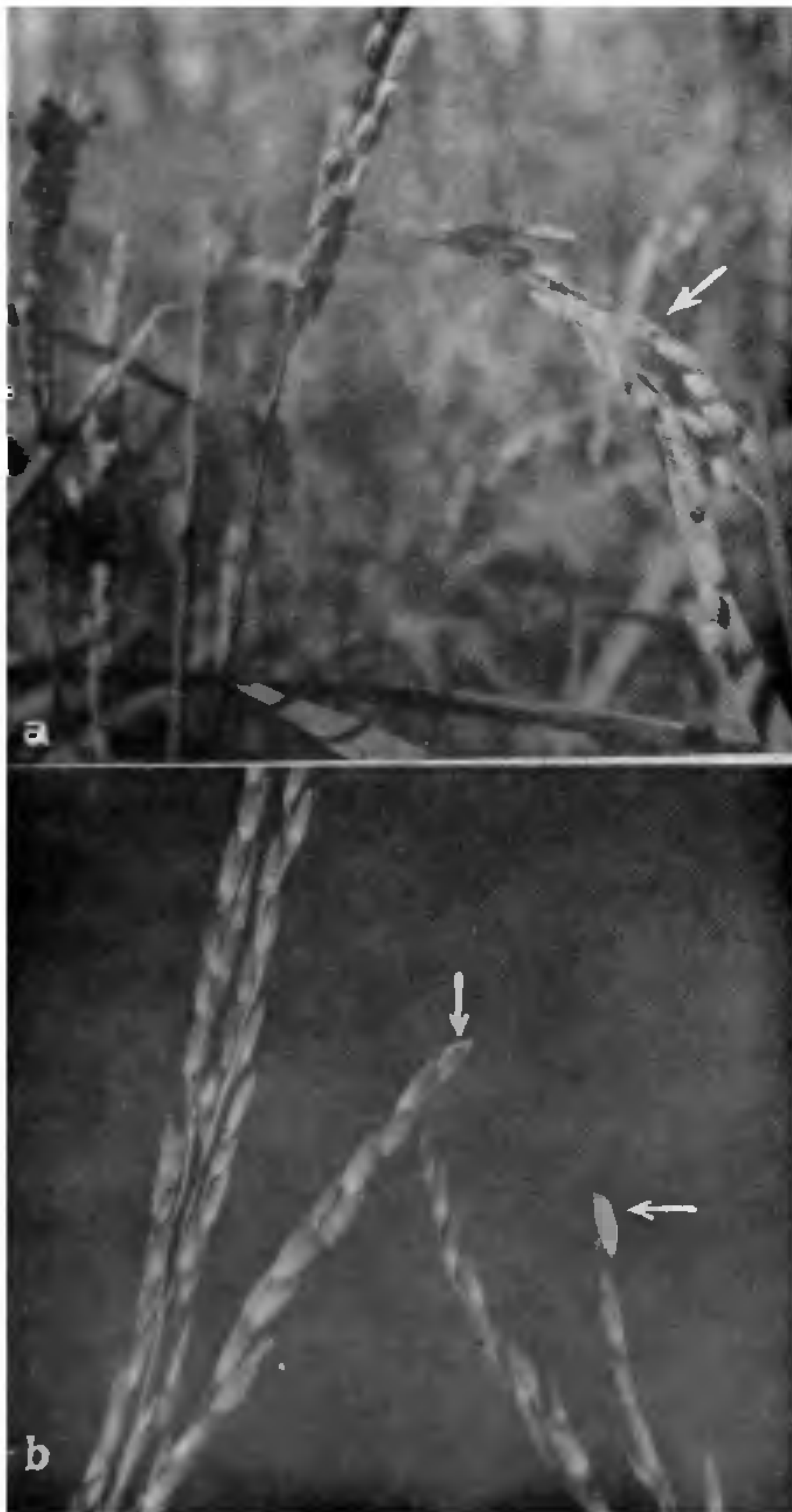


Figure 1. a-b Grains showing damage caused by thrips.

variation in the extent of damage to individual grains and ranges from a completely chaffy grain with white coating to an almost normal grain. Invariably, in all the damaged spikelets, the tip was slightly open through which the larvae make their exit in search of a tender spikelet. The affected panicles become erect due to the dropping of damaged grains in contrast to a normal panicle. This kind of damage was observed in varieties that flowered in the first fortnight of March. In Zhong Hua 1, a very short duration (80 days to flowering) *japonica* variety nearly 60% of the grains were lost due to this type of damage by the pest. In varieties that flowered in April only first and second types of damage were recorded. Another interesting observation was that the varieties with non-synchronous flowering were more susceptible to this pest.

Weather during the months of February and March was generally overcast sky with 8.2 and 7.7 average sunshine hours and 94.5 mm and 90.2 mm total rainfall respectively. This is the first report about the occurrence of *H. ganglbaueri* Schmutz on paddy from Orissa and Eastern India.

Identification of the specimens by Dr. T. N. Ananthakrishnan is gratefully acknowledged. We thank Dr. H. K. Pande, Director, CRRI for facilities and Dr. Y. S. Rao, Head, Entomology Division for encouragement.

7 August 1982

1. Ananthakrishnan, T. N., *Thrips: Biology and Control*, MacMillan, India, 1973, p. 109.
2. Chaudhary, J. P. and Ramzan, M., *J. Res. Punjab Agr. Univ.*, 1971, 8, 214
3. Abraham, C. C., Thomas, B., Karunakaran, K. and Gopalakrishnan, R., *Curr. Sci.*, 1972, 41, 721.

VARIATION OF PROTEIN AND NUCLEIC ACID DURING LARVAL DEVELOPMENT OF *CHIRONOMUS BARBATITARSIS* IN NORMAL AND APOSYMBIOTIC CONDITIONS

AMINUL ISLAM AND SUBRATA ROY
Zoology Department, University of Burdwan,
Burdwan 713 104, India.

CORRELATION of different biochemical parameters with various ontogenetic events in insects has been