Secale cereale Padwick.[2] It has also been reported on the following wild grasses: *Panicum miliaceum* Simonds,[3] *Panicum repens* Thomas,[4] *Panicum ramosum* Butler and Bisby,[5] *Digitaria marginata* Ramkrishnan,[6] and *Dactylotenium ægyptiacum* Thomas.[4]

The authors in 1953 Abi* at Kalvakurthi village in Mahboobnagar District found *Setaria intermedia* to be freely growing on the bunds of a rice seed farm wherein HR.35 was transplanted. The lamina of *Setaria intermedia* showed lesions closely resembling blast. The specimens were, therefore, brought to the laboratory at Himayetsagar and carefully examined.

The lesions on the lamina of *Setaria intermedia* were 3·8 mm. long and 1·9 mm. wide. They had a dull greyish appearance in the centre and the outer rim was dark brown. In the case of severely infected plants, the centre of the lesions was almost straw-coloured. Scrapings from the lesions were examined. Conidia that were biseptate, piriform, with round base and narrowed apex almost hyaline to pale olive were found. They measured 21·96-29·28 × 8·88-10·98 μ. The corresponding measurements of spores of *Piricularia oryzæ* are 14-40 × 6-13 μ. *Setaria intermedia* may, therefore, probably be a host of *Piricularia oryzæ* subject to cross-inoculation test.

It may be mentioned that stray plants of HR.35 from the seed farm bore similar lesions though the incidence was comparatively less. On examination, blast spores were detected from the lesions also. *A priori*, it is difficult to say whether the paddy infected the wild grass or *vice versa*. Cross-inoculation studies are being made.

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Agril. Expt. Station, Himayetsagar, Hyderabad, *April* 12, 1954.

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* First crop season in Hyderabad State, extending from June to December.

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MASS ASSEMBLAGE OF THE COCCINELLID BEETLE, *EPILACHNA BISQUADRIPUNCTATA* (GYLLENHAL) IN CHOTA NAGPUR

ALTHOUGH several interesting cases of mass assemblage of ladybird beetles are known from America, Europe, Russia and Africa, only two such cases have hitherto been recorded from the Indian region, namely, that of the fungivorous species, *Thea bisoctonotata* Mulsant, which was observed by the author[1] in a great congregation on a tree in Model Town, Lahore, in the winter of 1936, and of *Coccinella septempunctata* Linn. very recently observed by Mani[2] on the glacier beds at the Lakka pass (15,000′) in Dholpur Range in the Western Himalayas.

During February 1954, while on a collecting tour with the Zoological Survey of India party in Chota Nagpur, Bihar, the author came across several congregations of a small (4-5 mm. long) herbivorous coccinellid, *Epilachna bisquadripunctata* (Gyllenhal), at Chatra (*ca.* 1,400′) District, Hazaribagh. The congregations were observed in the vicinity of a small stream called Hiru which passed through a thinly wooded area, about 1½ miles south of Chatra dak bungalow. The stream was mostly dry at the time of the visit but here and there a number of small pools, connected by slow-moving water, were present. Along the banks and on the rocks which formed small islands, there was a fairly dense growth of nearly 2′ tall grass (*Eleusine* sp.). It was near the base of the grass and on the ground between the plants that the beetles had congregated. These could not be spotted from a distance but were easily located when the grass was parted with hands. Within an area of about a thousand square yards, four different congregations were observed. The smallest congregation was spread over a piece of ground about 9″ long and 6″ wide. From the sample count in the field it appeared that this lot alone must have contained some three to four thousand beetles. The largest assemblage observed in the area covered a ground which was nearly 4′ long and 2½′ wide. The beetles were lying almost closely packed and over one another. In each assemblage the depth of the mass of beetles varied from 2″-4″ as judged by thrusting a pencil through it. Obviously the beetles were in a resting state as they did not move when disturbed. Most Coccinellidæ simulate death when disturbed but become active after a short time. In the present case they remained inactive throughout; even when disturbed persistently or shaken, they moved

only reluctantly and exuded the yellow fluid characteristic of the family. In no case did they take to flight though they had well-developed membranous wings.

The grass as well as other plants in the vicinity were also examined but these did not show any sign of attack by the lady-bird beetles. Generally it is easy to find out whether or not a herbivorous lady-bird beetle has fed on a certain plant because the beetles leave characteristic markings on the host plant. When a handful of them were brought for further observations in the laboratory, they continued to remain in the resting state and did not accept any food including the grass on which they were collected. A large number of them were dissected but their stomachs were found to be almost empty and without any trace of greenish plant tissue or juices. The abdomen of each, irrespective of its sex, was found to be full of stored fatty bodies and suggested that the beetles were not starved but were in a peculiar physiological state. The sexes were equally represented and the females did not show any advanced stage of development of the ovaries.

The significance of the phenomenon of mass assemblage in Coccinellidæ is little understood. Various explanations such as lack of food, the urge to seek more equitable temperature or be attracted by a peculiar smell or the opposite sex (with a view to ensure maximum fertilization) have been suggested. Others have considered it to be purely of physiological origin and not a result of lack of food or similar conditions. The present observations seem to support the latter view but further records and detailed observations would no doubt be necessary for a fuller explanation of the phenomenon as occurring in India. Such records would also be useful from the economic point of view. In the case of herbivorous species, some of which are notorious pests, the assembled beetles may be easily collected and destroyed as is done in Persia with the 'sun' bug, *Eurygaster integriceps*, which has a similar habit of congregating in masses.[3] On the other hand, if the species of assembled coccinellids are beneficial, these could be collected in large quantities from one place and taken to another for liberation into the fields infested with such pests as would form the food of the lady-bird beetles. The latter practice is followed in the mountains and valleys of the Western United States with regard to the Coccinellid *Hippodamia* which feeds on aphids or plant-lice.[4] A few species of *Hippodamia* and of the related genus *Adonia* occur in the Himalayas and it would be valuable to know if any species of these genera assemble in masses in that region.

Zoological Survey of India, A. P. KAPUR.
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CROSSES BETWEEN *BRACON HEBETOR* SAY AND *BRACON BREVICORNIS* WESM. (BRACONIDAE, HYMENOPTERA

THAT there exists some confusion with regard to the identity of the two allied braconids, *Bracon hebetor* Say and *B. brevicornis* Wesm., is evident from a perusal of literature. Detailed examinations of hundreds of specimens of the two species were made for the various morphological characters including genitalia. In addition, attempts were also made at crossing the one species with the other, with a view to establish whether the two species are the same or distinct, and the results are reported here briefly.

Bracon hebetor specimens obtained from pure cultures in the laboratory here, and *B. brevicornis* obtained from I.A.R.I., Delhi, through the kind courtesy of Dr. E. S. Narayanan were used in these experiments. Care was taken to see that males and females of both species were separated as they emerged from pupæ. Unmated males and females of *B. hebetor* were enclosed separately along with the individuals of opposite sex of unmated *B. brevicornis* in 3" × 1" glass vials for about 24 hours to allow time for mating. Then each lot was enclosed in a separate petri dish containing half- to full-grown larvæ of the rice moth, *Corcyra cephalonica* Staint. Egg-laying by the females, larval and pupal development and finally cocoon-formation of the progenies were found to be normal as in the case of *B. hebetor*, or *B. brevicornis*. Progenies of both series of crosses, namely, *B. hebetor* ♀ × *B. brevicornis* ♂ and *B. brevicornis* ♀ × *B. hebetor* ♂ were found to be fertile both when inbred and crossed with pure *hebetor* or *brevicornis*.

The details of these studies together with those on morphological characters to establish the identity of the two species are being published elsewhere.

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