STUDIES ON THE LYGAEIDAE. VI
Biological notes on *Metochus abbreviatus* Scott*
(Hemiptera)

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A. Life history of *Metochus abbreviatus* Scott

Metochus abbreviatus Scott always hibernates solitarily as an adult stage under the fallen leaves, the bark of trees, the stones, and among the bushes, but numbers of the bugs of this species are frequently found in one place at the same time. Generally in Southern Kyushu and Shikoku, *Metochus abbreviatus* begins to appear from the end of March to the middle of April and feeds on such seeds as *Digitaria sanguinaris* var. *ciliaris* Doell and *Setaria viridis* Beauvois (Poaceae) which are dropped on the ground. Usually the bug abounds on the surface of the soil near the root of the grasses. From the tenth day after hibernation, we can see a male bug running after his mate at any time. The copulation is successfully performed for 3 or 15 hours. Usually a female copulates twice or thrice before oviposition. During the course of copulation, the bugs do not move actively so far as the strong wind and some artificial stimulations do not disturbe them. From the 2nd or the 3rd day after copulation, a female begins to oviposit her eggs which are laid transversely one by one under the fallen leaves, but sometimes on the upper surface of the leaves. The oviposition is made by the insertion of the long ovipositor among the fallen leaves. The time required for laying an egg is 5 to 6 minutes, the total number of eggs laid by a singl female is 47 on an average, the maximum being 62 and the minimum 8, and numerous eggs are deposited in such damp places as under the fallen leaves in the forest or under the stones in the bush. On the other hand, the adult females, collected at Cape Ashizuri in Kochi Prefecture, Shikoku, and kept in the vial, laid eggs in a narrow space between glass-wall and wire gauze covering the vial. The embryonic development in the egg is strikingly arrested in dry conditions, and a high percentage of humidity is needed for its normal development. After the incubation of 2 weeks, a young larva hatches out after splitting the egg shell longitudinally and rests for about 24 hours arround its egg shell. It starts to show a proper coloration of the instar. The lst instar larva begins to walk actively after 2 or 3 days after hatching. In the botanical garden of the Faculty of Agriculture, Kyushu University, large numbers of each instar larva are found among the fallen leaves and dropped seeds of the maple tree. They immediately take shelter under the leaves when someone approaches the bug or strong wind blows. In the Lygaeidae, it is certainly an interesting fact that the lst instar larva shows such a vigorous activity. The dropped seeds of the maple tree is one of the main foods

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of this species. The duration of the 1st instar lasts from 9 days to 10 days. The 2nd instar larva begins to move actively from the 1st day after the moulting. The period of the 2nd instar larva lasts 2 weeks. The 3rd instar requires 10 days or 13 days before the following moult. The 4th instar period lasts about 10 days and the 5th instar about 13 to 17 days. Consequently the length of one generation is 38 days on an average, the maximum being 55 days and the minimum 32 days. The adult bug begins to copulate from the 2nd or 3rd week after its emergence, it may pass 3 generations in a year in Southern Kyushu. In summer, sometimes all the stages of this species may be found in the bundle of dry firewood laid on heaps, and very often the adults are also observed walking quickly across the mountain path. In 1957 the author observed a large number of the bugs propagating half-way up the Mt. Tachibana in Fukuoka city. As the food plants, the dropped seeds of the maple tree (Aceraceae) and camphor tree (Lauraceae), *Digitaria sanguinarius* var. *ciliaris* Doell and *Setaria viridis* Beauvois (Poaceae) etc. are chosen. Sometimes the larvae devour with one another for the lack of food. In one case, on the 18th of August, 1956, the author observed a female inserting its rostrum into the abdomen of a male, which died soon after a short time.

B. Description of the developmental stages of *Metochus abbreviatus* Scott

1) Egg (Fig. 1.); elongate and ellipsoid in form, and two and a half times as long as wide; the entire surface densely covered with short processes; egg shell with irregular and ventral furrows; egg coloration changes from milky-white into the earlier stage to yellowish brown before hatching.

2) The 1st instar larva (Fig. 2); Body blackish brown mixed with yellowish brown; antennal segments reddish brown, anterior half of the 4th segment white; central portion of eye darker than the rest which is reddish; rostrum yellow with the 1st segment reddish brown; head and pronotum dark brown; each femur yellow with distinct reddish spots, fore and middle tibiae and tarsi dark yellow, the opening of the evaporating area of the scent gland, the 4th, 5th, and the 6th abdominal sternites, and the apex of abdominal sternites black, a pair of spots on the 1st abdominal tergite blackish brown, basal margin of each tergite slightly reddish.

Body slender; antennae longer than two-thirds the length of body, the proportional lengths of the antennal segments – I : II : III : IV = 3 : 6 : 5 : 7, the apex of the 1st antennal segments with two pairs of tubercles, the 2nd, 3rd, 4th segments of antennae densely pilose; head a little wider than long, but the distance between eyes slightly broader than the width of pronotum, eyes granular, apex of head acutely pointed, rostrum reaching hind coxae; pronotum wider than long (1 : 2), rectangular, and the posterior margin of pronotum with long hairs; fore femora more swollen than the other ones, apex of tibiae with a tubercle, apical segment of tarsi equal to the posterior one, legs with sparse hairs; abdomen prominently expanded, each abdominal tergite with two pairs of long hairs and the apex of abdomen with two small tubercles.

3) The 2nd instar larva (Fig. 3): Body a little darker than in the 1st instar larva; head, pronotum, mesonotum, thoracic pleura, the opening of the evaporating area of the scent gland, and the apex of abdomen black; eyes reddish brown; Y-shaped

line of head and a longitudinal line which is extending from pronotum to the 2nd abdominal tergite yellow; the 1st and 2nd segments of antennae brown; the 3rd more or less darker; the 4th antennal segment and abdomen (except for the 3rd and 4th abdominal tergites which are light yellow) dark brown; fore femora and hind tibiae blackish yellow; apical two-thirds of middle and hind femora light reddish brown; but their bases yellow; fore and middle tibiae and the apical segment of tarsi dark yellow; and the basal segment of tarsi yellow.

Head a little longer than wide, the distance between eyes narrower than the maximum width of pronotum; the 1st segment of antennae surpassing the apex of head, and with a long hair on its apical area, the 2nd segment pubescent, the 3rd and 4th segments with dense and short hairs, and the proportional lengths of the antennal segments–I : II : III : IV=4 : 9 : 9 : 12; apex of rostrum extending beyond hind coxae; pronotum wider than one and one-fifth times as long as wide, both apical and basal margins almost straight, and pro-, meso-, and metanotum each with two or three pairs of long hairs; legs very slender, anterior margins of all tibiae with thorn-like spines, fore femora more swollen than the other ones, upper part of each femur with a short tooth; abdomen oval in shape, the 3rd, 4th, and 5th abdominal tergites broader than the other tergites, apex of abdomen with a pair of hairs.

4) **The 3rd instar larva** (Fig. 4): Head, thorax, the 1st abdominal tergite, the opening of the evaporating area of the scent gland, anterior half of rostrum, and fore femora black; thorax distinctly shining; eyes yellow; the 1st, 2nd, and 3rd antennal segments, apical segment of tarsi, and the posterior half of rostrum yellow; the 4th segment of antenna and each leg light blackish yellow; abdomen brown faintly tinted with grayish white.

Body long and slender; the proportional lengths of the antennal segments–I : II : III : IV= 6 : 14 : 12 : 15, antennae with short hairs, apex of rostrum slightly surpassing hind coxae; pronotum quadrate in form; lateral margins of pronotum laminately ampliated and reflexed; legs slender and with sparse hairs, fore femora somewhat swollen, and the apical part of fore tibiae with distinct hairs; apex of abdomen with a pair of tubercles.

5) **The 4th instar larva** (Fig. 5): Head, rostrum, the 3rd and 4th (median part of the latter segment white) segment of antennae, thorax, the opening of the evaporating area of the scent gland, and the apex of abdomen black; eyes reddish brown; the 1st and 2nd antennal segments yellowish brown; basal halves of middle and hind femora and the basal segment of tarsi grayish white; anterior halves of middle and hind femora, tibiae, the basal segment of tarsi dark brown; abdomen yellow with reddish brown spots, each abdominal tergite light brown, abdominal sternites dark yellow, a pair of spots on the 4th abdominal sternite yellowish white, lateral margins of the 5th, 6th, and 7th abdominal tergites with yellowish spots.

Body slender; head longer than wide; the distance across eyes narrower than pronotum; antennal segments (except the 2nd segment of antennae) densely pilose, especially the apex of the 1st antennal segment with a pair of long hairs, the proportional lengths of the antennal segments–I : II : III : IV= 6 : 16 : 12 : 6, apex of rostrum surpassing base of hind coxae; pronotum slightly narrowed anteriorly,

its anterior and posterior margins straight, lateral margins of the dorsum of mesonotum laminately ampliated; each tibia with tubercles, and apex of femora with a pair of hairs: apex of abdomen with a pairs of long hairs, posterior margin of each of the 3rd, 4th, 5th, and 6th abdominal tergites sinuate.

6) The 5th instar larva (Fig. 6): Body black; median portion of the 4th antennal segment white; eyes reddish brown; middle and hind legs, basal half of femora, middle tibiae, basal two-thirds of tarsi, basal margin of the 3rd abdominal tergite, and a pair of spots on each of the 5th, 6th, and 7th abdominal tergites yellowish white; the 1st and 2nd segments of antennae dark brown.

Head wider than long; the proportional lengths of the antennal segments–I: II: III: IV=10: 20: 19: 17, the 1st segment distinctly surpassing apex of head, and with long hairs, the other segments densely pilose; rostrum reaching hind coxae; pronotum wider than long and anteriorly narrowed, lateral margins of pronotum slightly sinuate and its anterior margin straight, lateral margins of pronotum and mesonotum margined longitudinally; apex of femora with a pair of long hairs, each tibia with tubercles, basal segment of tarsi distinctly longer than the apical one; the opening of the evaporating area of the scent gland projected outwardly; abdomen elongate and oval.

Key to the instar

1) Wing pads not visible..... 2
   Wing pads visible..... 4
2) Head including eyes narrower than pronotum.....The 3rd instar.
   Head including eyes nearly equal to the width of pronotum..... 3
3) Lateral margins of pronotum laminately ampliated and reflexed.....
   ..... The 2nd instar.
   Lateral margins of pronotum not laminate .....The 1st instar.
4) Head and thorax shorter than 1/2 of the body length.....The 4th instar.
   Head and thorax longer than 2/3 of the body length.....The 5th instar.

Summary

In this paper, some observations on the bionomics and the developmental stages of *Metochus abbreviatus* Scott (Hem.; Lygaeidae) are given.

As a rule, the present species hibernates as an adult stage under the fallen leaves, the bark of trees, and among the bushes, etc. After overwintering, the adult bug begins to appear from the end of March to middle of April. Eggs are laid transversely one by one under the fallen leaves and sometimes on the upper surface of the fallen leaves. The duration of each developmental stage of the bug is as follows: Egg-two weeks, the 1st instar-about 10 days, the 2nd instar–two weeks, the 3rd instar–12 days, the 4th instar–10 days, and the 5th instar–12 days. The number of eggs laid by a single female is 47 on an average. As the average length of one generation is 38 days, this bug may pass three generations throughout a year. The food plants so far investigated are dropped seeds of the maple tree, the camphor tree, and of such grasses as *Digitaris sanguinaris* var. *ciliaris* Doell and *Setaria viridis* Beauvois (Poeaceae). etc., but sometimes cannibalism may occur among the adults and larvae in the breeding cages owing to the shortage of food.

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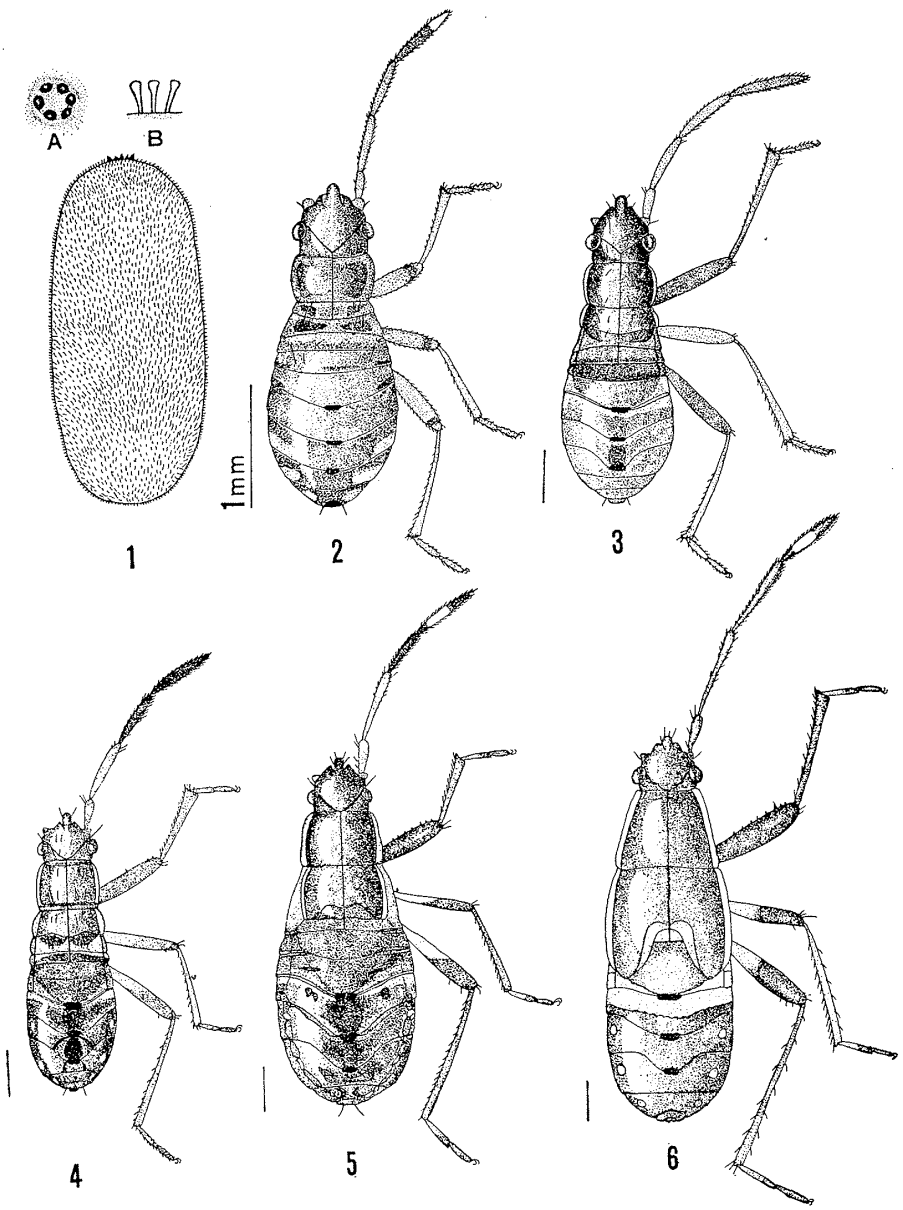

Fig. 1. Egg of *Metochus abbreviatus* Scott, A : Egg-process, dorsal view. B : Ibid., lateral view. Fig. 2. The 1st instar larva. Fig. 3. The 2nd instar larva. Fig. 4. The 3rd instar larva. Fig. 5. The 4th instar larva. Fig. 6. The 5th instar larva.