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A NEW SPECIES OF *EMESOPSIS* UHLER, 1893 (INSECTA: HEMIPTERA: REDUVIIDAE) FROM PENINSULAR MALAYSIA, WITH NOTES ON ITS BIOLOGY

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ABSTRACT.- A new species of the reduviid genus *Emesopsis* is described. The specimens of *Emesopsis streiti,* new species, were found on decaying bamboo culms of *Gigantochloa scortechinii* Gamble at the Ulu Gombak University of Malaya Field Studies Centre, Peninsular Malaysia. Notes on the habitat, abundance, life cycle, prey and predators of *E. streiti* are presented.

INTRODUCTION

The reduviid genus *Emesopsis* belongs to the subfamily Emesinae, which is characterized by a trend toward a progressive narrowing of the body and lengthening of the appendages (Wygodzinsky, 1966). The Emesinae walk on their mid and hind legs, while the forelegs are used for grasping prey and for cleaning. The genus *Emesopsis* includes small species of emesine bugs with Oriental and Australasian distribution. Only *E. nubilus* Uhler, 1893 is tropicopolitan, probably because of spread by human commerce (Wygodzinsky, 1966).

So far three species of *Emesopsis* have been reported from Peninsular Malaysia: *E. gaius* McAtee & Malloch, 1926; *E. obsoletus* McAtee & Malloch, 1926 and *E. plagiatus* Miller, 1941 (McAtee & Malloch, 1926; Miller, 1941). Here we report the finding of a new species of *Emesopsis* which was detected during an ongoing study on the animal community inhabiting the hollow cavities of bamboo internodes in Peninsular Malaysia (Kovac, 1994; Kovac & Streit, in press).

Specimens examined are deposited in the Forschungsinstitut Senckenberg (SMF), Forest Research Institute of Malaysia (FRIM) and the Zoological Reference Collection (ZRC), National University of Singapore.

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SYSTEMATICS

FAMILY REDUVIIDAE
SUBFAMILY EMESINAE
TRIBE PLOIARIOLINI

Emesopsis streiti, new species
(Figs. 1-17)

Material examined. - Holotype - male (SMF), Peninsular Malaysia, Selangor Darul Ehsan, Ulu Gombak University of Malaya Field Studies Centre, decaying bamboo internode of *Gigantochloa scortechinii*, Coll. D. Kovac, 12 Sep.1991.

Paratypes. - 3 males, 4 females (ZRC), same data as holotype; 4 males, 7 females (ZRC), same data, 14 Nov.1991; 7 males, 5 females (SMF), on surface of decaying bamboo culm, 23 Aug.-16 Oct.1995; 1 males, 2 female (FRIM), 2 females (ZRC), in internodes of felled bamboo culms, 16 Oct.1995; All specimens were collected by D. Kovac, from *Gigantochloa scortechinii* at Ulu Gombak University of Malaya Field Studies Centre.

Diagnosis.- This species is separated from other *Emesopsis* by the large black spot on the base of the stigma cell, the large quadrate basal cell on the forewing. Tip of paramere beak-shaped and having long and whiplike vesica arms.

Description.- Male, holotype. Ground colour light brown, darker on sides, dark and white annuli on legs and antenna (Figs. 1, 17). A dark spot on distal third of abdomen of live specimens. Body elongated, covered with fine short and long setae. Head covered with short, dense adpressed wool-like pile, underside with some longer setae, a bare area on posterior ventral side (Fig. 11). Interocular furrow curved (Fig. 2). Anteocular region is slightly longer than postocular region, length 0.48 : 0.42 mm. Eye large, red in colour. Rostrum three-segmented (Figs. 3, 11), light brown in colour, a darker brown pigment at the base of 1st segment. All segments with short setae. First segment reaching posterior border of eye. Second segment short and swollen, 3rd segment slender. Length of the 3 segments: 0.50 : 0.22 : 0.24 mm. Antenna slender, longer than the body. All segments covered with setae. Length of antennal segments I to IV: 3.77 : 2.58 : 1.56 : 0.74 mm.

Pronotum slightly constricted before middle (Fig. 2). Ratio of fore lobe to hind lobe 0.45 : 0.61. Covered with wool-like pile, two bilobed bare areas on dorsal surface of fore lobe. The hind lobe is broader, bell-shaped, the posterior propleura are bare (Fig. 3). Scutellum normal, slightly pointed apically, covered with some hairs (Fig. 13). Metanotum bears a rather long upwardly and backwardly pointing process (Fig. 3), short hairs on posterior part of metanotum and on the metanotal process. A bare area on underside of mesonotum, anterior to the base of the 2nd leg.

Forewing (Fig. 4) reaching beyond apex of abdomen. Transparant, iridescent, with faint spots except for larger spots on the apex of the margin. Discal cell narrowing at tip, a short stump of a vein emanating from apex of discal cell in addition to the vein that runs toward apex of wing, no bifurcate branch toward costal margin. Basal cell large, quadrate, a big black spot at base of stigma cell. Veinlike dark markings between M and CU, at base of wing and between costal margin. Hind wing (Fig. 5) about double the length of the anal lobe.

Foreleg (Fig. 6) stout, all segments covered with setae, less numerous on coxa. Coxa long, about 2/3 length of femur. Femur with 2 series of spines on ventral part (Figs. 7, 12),

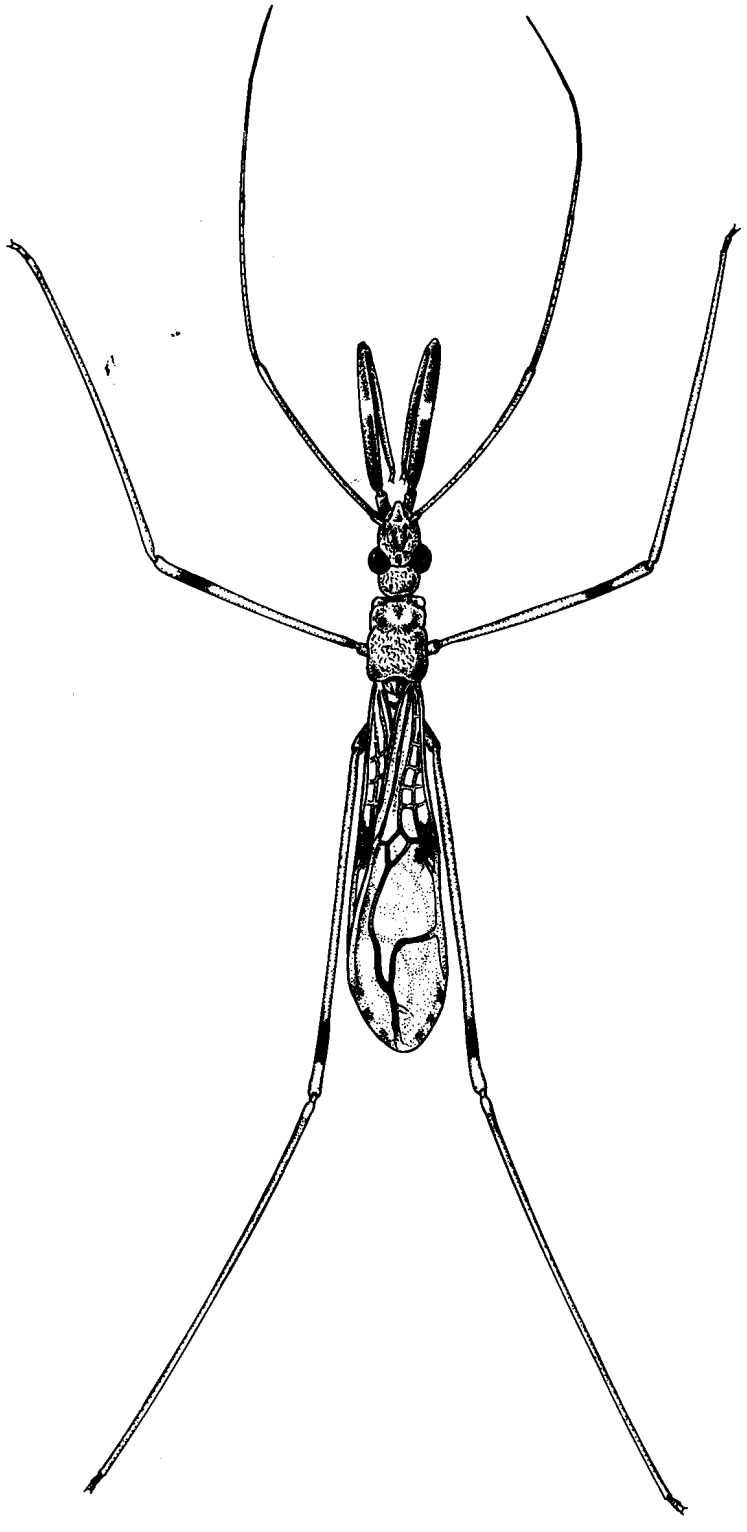


Fig. 1. *Emesopsis streiti*, new species, male paratype. Length c. 6 mm.

each row with 5-8 larger and numerous smaller spines inserted on short, wartlike bases. Proximal spines longer then the distal spines. Tibia slender, ventral part with 2 series of strong and slender curved setae, other areas covered with finer setae, setae longer and more numerous near middle and end portion. A grooming comb (Fig. 8) at the distal end of the inner surface. Tarsus 2-segmented; terminal claws simple and equal, a small tooth near the base.

Middle and hind legs long and slender, hind leg longer than middle leg, the hind femur surpassing apex of abdomen. Brownish in colour with darker annulus on femur. Coxa lighter in colour. All segments covered with numerous short and long setae, lesser on proximal portion of femur. Tarsi very small, 2 unequal segments with 2 terminal claws (Fig. 15). Length of leg segments (coxa: trochanter: femur: tibia: tarsus): Foreleg: 1.23 : 0.33 : 2.17 : 1.56: 0.26 mm; Midleg: 0.41 : 0.24 : 3.07 : 4.59 : 0.20 mm; Hindleg: 0.41 : 0.24 : 4.67 mm: 6.97 : 0.20 mm.

Abdomen only moderately narrow at base, slowly widening toward the end, widest on 5th and 6th tergite (0.81 mm). First segment convex, other segments somewhat emarginated at middle, connexival margins slightly raised. First visible segment is small, covered with wool-like pile and setae. A slender spiniform process on the anterior part of the 1st abdominal segment, which easily breaks off (not present in holotype as well). Other segments covered with microchaetae on dorsal, microchaetae and macrochaetae on lateral and ventral sides of abdomen. 7th tergite rounded behind covering the 8th tergite dorsally (Fig. 14). 8th tergite fully visible ventrally. The length of tergites 2 to 8, 10: 0.53 : 0.71 : 0.61 : 0.61 : 0.59 : 0.57 : 0.24 : 0.37 mm.

Parameres symmetrical, with beak-shaped tip (Fig. 9). The widened part bears numerous setae. The process of pygophore pointed apically and surpassing apices of parameres. The vesica arms are long and whiplike as in Fig. 10.

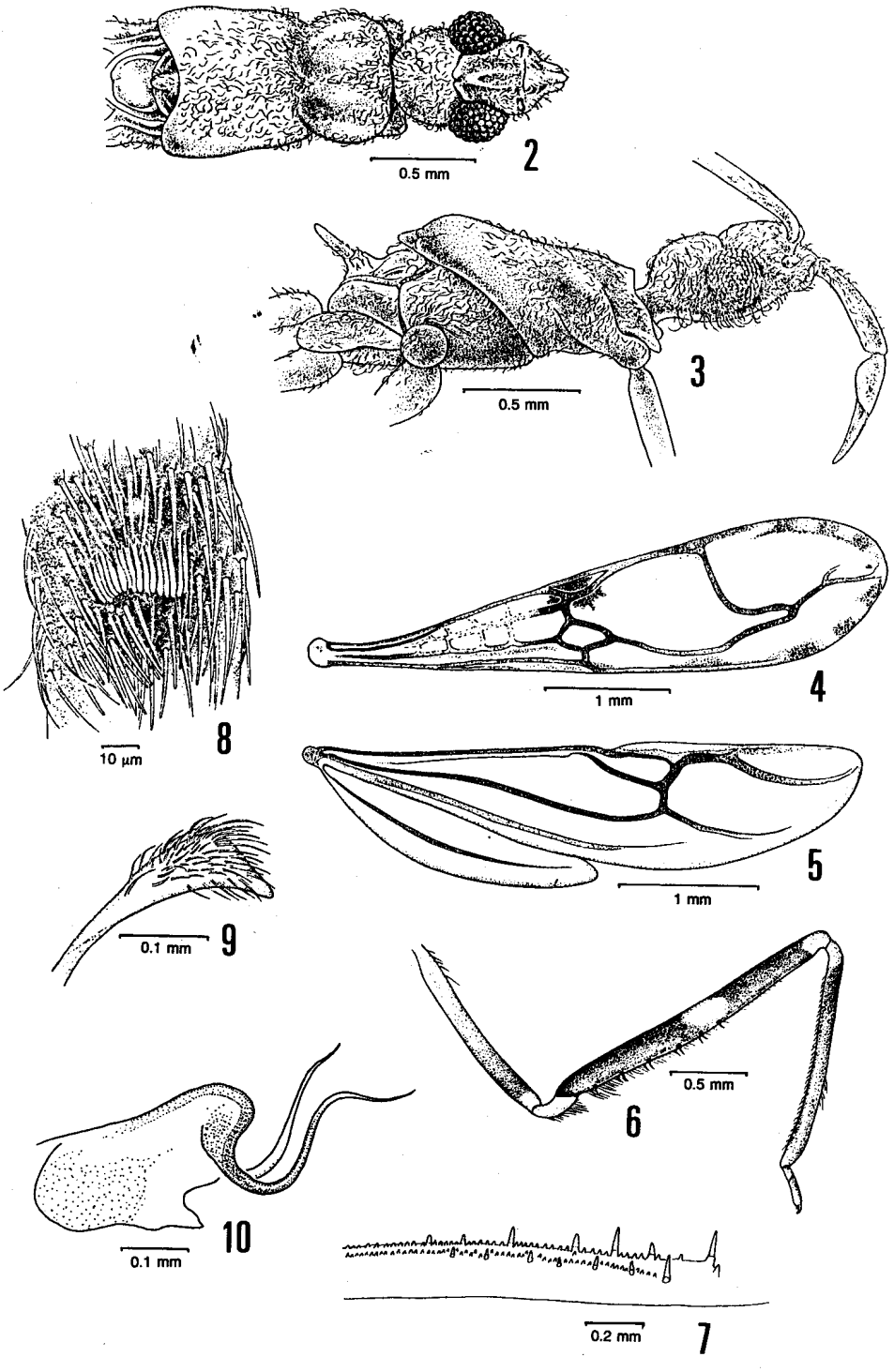
Length: 6.31 mm (holotype). Paratypes (n = 10): 5.74-6.39 mm.

Female: Colouration and other structures similar as in males. The female specimens have a broader abdomen with simple 8th and 9th tergite.
Length (paratypes, n= 12): 5.84- 6.48 mm.

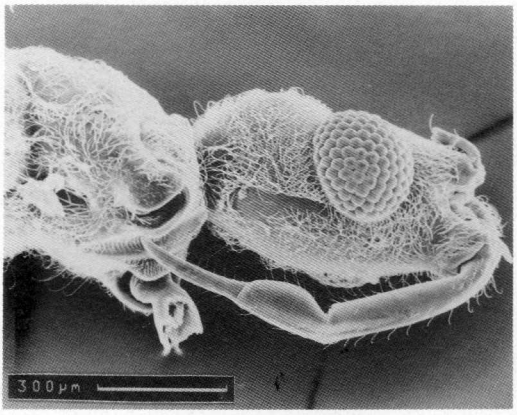
Etymology. - This species is named in honour of Prof. Bruno Streit, who secured funding during the initial phase of the project.

Biology. - *Emesopsis streiti* has so far been found only on decaying culms of the bamboo *Gigantochloa scortechinii*. The bugs were seen on the bamboo surface at night. They prefered the underside of declined decaying bamboo culms and also occurred inside the hollow internodes when access was possible (holes bored by insects, cracks in the internode wall). Our study was largely restricted to observations on animals that stayed in the internodes of felled bamboo culms. All observations were made in the field.

At the outset of the study, ten bamboo culms were felled and wedged between neighbouring undisturbed culms at a height of 1.5 m in a horizontal position. Subsequently a total of 100 internodes were sawn into in such a way that their upper halfs formed a hinged lid which could be opened for inspection. Colonization of these internodes was possible through narrow gaps, c. 2 mm wide, at the sides of these lids. Each of the one hundred internodes was checked



Figs. 2-10. *Emesopsis streiti*, new species, male paratypes. 2, Head and thorax, dorsal view; 3, Head and thorax, lateral view, wings removed; 4, Forewing; 5, Hindwing; 6, Foreleg; 7, Fore femur with series of spines; 8, Grooming comb at the distal end of the fore tibia; 9, Paramere; 10, Phallus.



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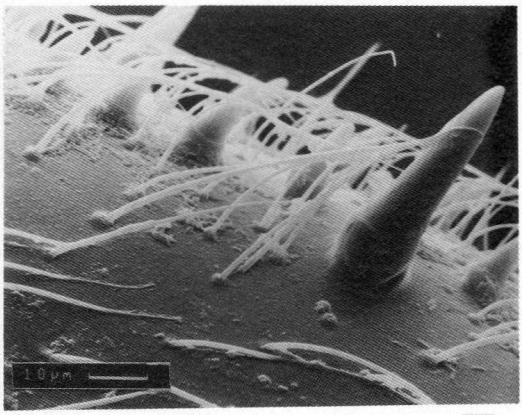

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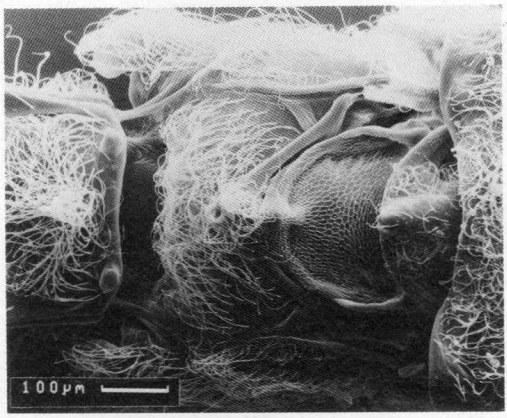

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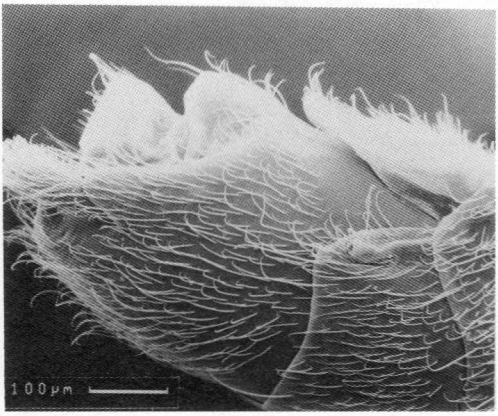

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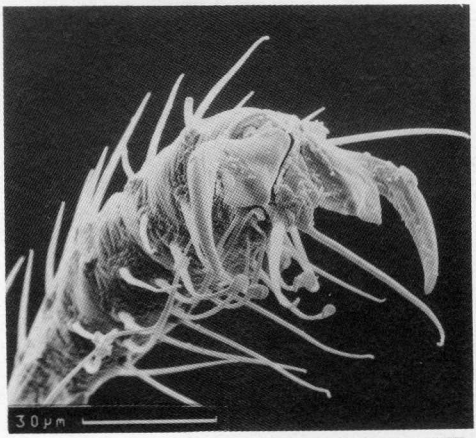

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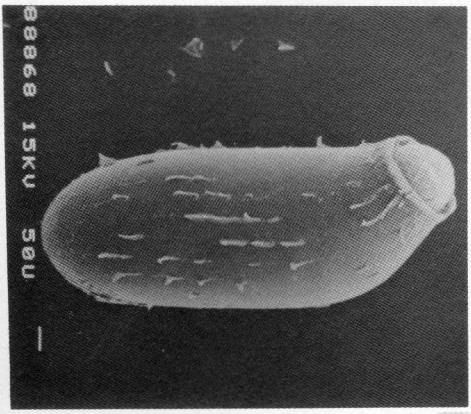

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Figs. 11-16. *Emesopsis streiti*, new species, male paratypes (SEM-photographs). 11, Head and pronotum, lateral view, legs removed, note the stridulatory groove touched by the tip of the rostrum; 12, Spines of the fore femur; 13, posterior part of thorax, wings removed, dorsal view; 14, Apical portion of male abdomen with a paramere, lateral view: 15; Praetarsus of middle leg; 16, Egg.

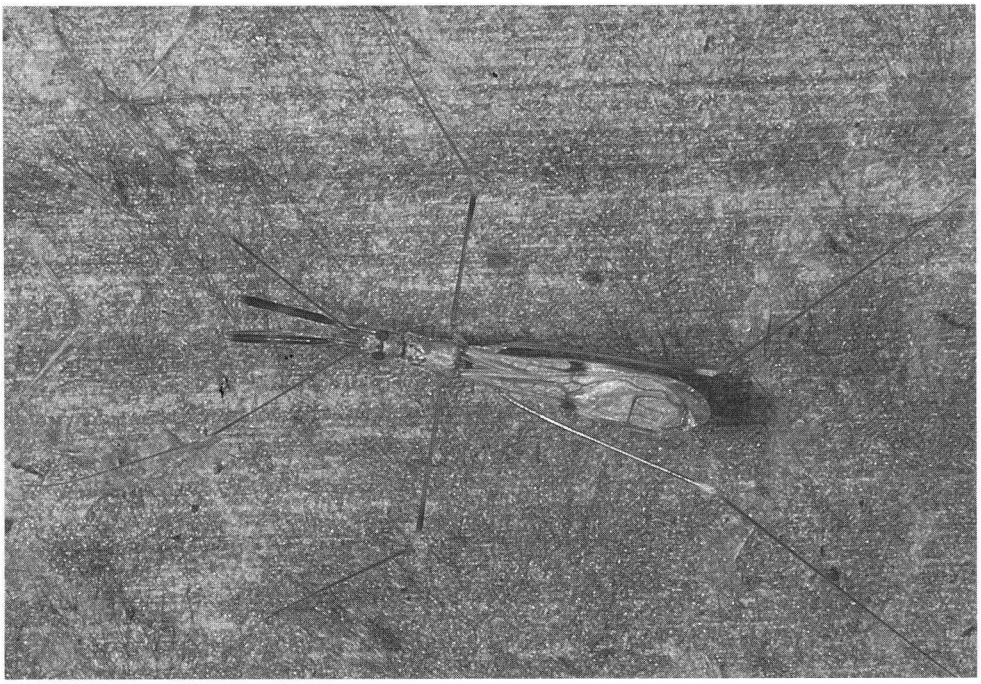

Fig. 17. A male lying in wait for prey in the hollow interior of a decaying internode of the bamboo *Gigantochloa scortechinii*.

daily over a period of 6 months to investigate, among other things, the life cycles and the feeding habits of the internode inhabitants.

During the first substantial rain the internodes filled with water and were soon colonized by both aquatic and terrestrial organisms, e. g. mosquito larvae, ants, etc. (Kovac, 1994, Kovac & Streit in press). *Emesopsis* made its first appearance in one of the internodes only after 61 days when the bamboo culms were already considerably decayed. New internodes were colonized by both adults and nymphs. The number of *Emesopsis*-inhabited internodes rose steadily, reached a value of 31 colonized internodes after 25 weeks and then decreased slightly (Fig. 18).

The females lay their eggs singly in the terrestrial zone of the internode cavity. The eggs are elongate and c. 0.8 mm long. They are cemented to the substate in the position as shown in Fig. 16. The chorion possesses broken longitudinal ridges. The rim of the corium is narrowly shaped and simple. The operculum is short and subglobular in shape and the surface of the operculum is reticulate.

Some females stayed in their internode for up to one month; many others stayed for a few days only or just a few hours, so that in several cases only newly deposited eggs but no females were registered despite the daily checks. The number of eggs deposited per internode was 1-17 (n = 17; M = 5); possibly more than one female laid eggs in the internodes with large egg numbers. Some of the collected females were gravid with one to three eggs.

Egg development in the field took about 3 weeks (19-25 days, M = 21 days, n = 7). Four

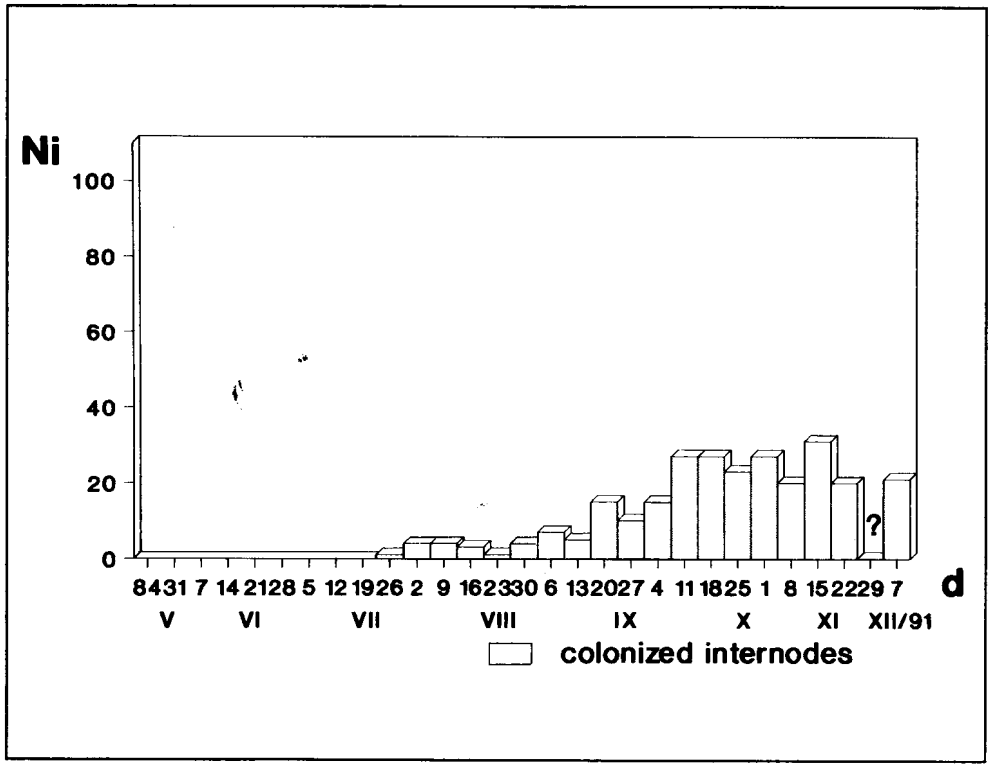

Fig. 18. Number of internodes (out of hundred) accepted by *E. streiti* during a period of c. six months. Ni = Number of inhabited internodes, d = date, the Latin numbers symbolizing the months.

nymphs that stayed inside their respective internodes throughout the observation period required about 7 weeks after hatching until they molted into the imago (44; 48; 51; 52 days). Many larvae did not complete their whole development in one internode; most of them left the internode and some were caught by predators. Therefore, despite the large number of eggs per internode found in some cases (see above), the number of nymphs per internode never exceeded five (n = 21, M = 2).

Like in the remaining Emesinae (Gillet, 1957; Wygodzyinsky, 1966), prey is seized with the raptorial forelegs, pierced with the beak, and carried along. Sucking-out of the prey sometimes required more than half an hour. A total of 51 prey objects were retrieved from *E. streiti* specimens inhabiting the bamboo internodes (26 objects from adults of *E. streiti*, 25 from nymphs, see Fig. 19). The bulk of the prey were small, soft-bodied insects, especially adult biting midges (Ceratopogonidae). The prey spectra of nymphs and adults were approximately the same, although the nymphs preferred smaller prey on the whole, especially springtails (Collembola) and bugs of the family Ceratocombidae.

The following insect taxa were preyed upon by both adults and nymphs of *E. streiti*: Diptera: Ceratopogonidae (13 adults and 1 pupa), Culicidae (5 adults); Collembola (9 specimens); Hemiptera: Ceratocombidae and Miridae (8 specimens, mostly nymphs); Coleoptera: Staphylinidae (8 larvae); Lepidoptera (1 tiny adult moth). Furthermore, 4 spider specimens and two unidentified prey items were collected.

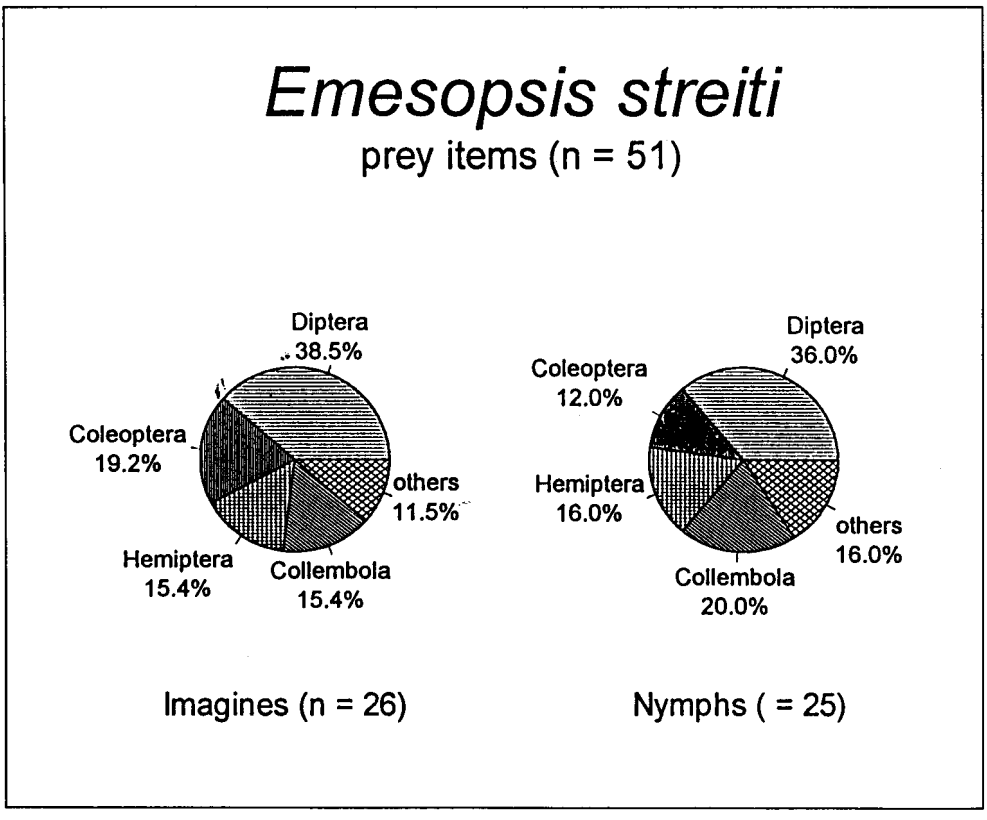

Fig. 19. Prey items of the adults and nymphs of *E. streiti* taken in the field. See text for further explanations.

The only internode inhabitants witnessed to prey upon *Emesopsis* were web-building spiders. On six occasions adults and nymphs of *E. streiti* were found in the webs of theridiids. In one case an adult *E. streiti* was attacked by a jumping spider (Salticidae) of the subfamily Spartaeinae while sucking on a mosquito. The spider snatched the prey away from the bug. The bug assumed a threat/defensive posture raising the forelegs and was not again attacked by the spider.

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