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Chremistica ribhoi sp. n. (Hemiptera: Cicadidae) from North-East India and its mass emergence

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Abstract

The genus *Chremistica* Stål, 1870 is reported from the northeastern region of India for the first time. A new species, *Chremistica ribhoi*, is described from this region and male genitalia illustrations and scanning electron microscope photographs of the pygofer for *C. ribhoi* are presented. Observations on mass emergence of *C. ribhoi* are described.

Key words: *Chremistica* Stål, new record, *Chremistica ribhoi* sp. n., mass emergence, North-East India

Introduction

Distant (1906, 1909) recorded a total of 145 cicada species from the Indian region, with a further addition of 23 species bringing up the total number of species to 168 (Distant 1916). Sen *et al.* (1998) reported 19 species of cicadas under 12 genera with four new records from the state of Meghalaya in India. According to Yaakop *et al.* (2005) the genus *Chremistica* Stål consists of 41 species with occurrences in India, Sri Lanka, continental S.E.Asia, Taiwan, Philippines, Malayan Peninsula, Sumatra, Borneo and Java including the lesser Sunda islands with one group reported from Madagascar. Boulard (2002, 2005, 2006, 2007, 2009, 2012) further described and listed six species of *Chremistica* viz., *C. moultoni* (Boulard, 2002), *C. mussarens* (Boulard, 2005), *C. bimaculata inthanonensis* (Boulard, 2006) and *C. sibilussima* (Boulard, 2006), *C. atratula* (Boulard, 2007), and *C. phamiaangensis* (Boulard, 2009) from Thailand and a species from Vietnam, *C. sueuri* (Pham, 2013) by Pham & Constants (2013). However, only two species of *Chremistica* are reported from the Indian subcontinent: *Chremistica seminiger* (Distant, 1909) from Nilgiri Hills of South India and *Chremistica mixta* (Kirby, 1891) from Sri Lanka (Bregman, 1985). In this paper, a new species viz. *Chremistica ribhoi* from the Ri Bhoi district of Meghalaya is described. This extends the distribution of the genus *Chremistica* to the northeastern Himalayan region of India.

Material and methods

Specimens of the new species were collected from two different sites within the Ri-Bhoi district of Meghalaya, India. Collected specimens were dried for two days in an oven at 35°C and pinned and mounted later for taxonomic study. Male genitalia of two male paratypes were prepared by pulling out the male pygofer and macerating the pygofer in 10% KOH for 12 hours. The male genitalia then washed in warm water and dehydrated in acetone. The samples after air drying were secured in brass stubs (10 mm diameter x 30 mm high) and were coated in a JFC-1100 (Jeol) ion sputter coater. The coated samples were examined in a JSM-6360 (Jeol) scanning electron microscope at an accelerating voltage of 20 KeV in the secondary electron emission mode.

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The holotype is deposited in National Museum of Zoological Survey of India, New Alipore, Kolkata, India (ZSI). Paratypes are deposited in the Regional Museum of Eastern Regional Centre, Zoological Survey of India, Shillong Meghalaya, India (ERC-ZSI) and voucher specimens are in possession of the first author in the Entomology laboratory, Zoology Department, North-Eastern Hill University, Shillong, India (NEHU).

Genus History

Stål, 1870 first described *Chremistica* as a subgenus of the genus *Cicada* L. Distant (1904) described *Rihana* as a new genus. Later, however, he regarded *Rihana* as a synonym for *Chremistica* (Distant 1906a, b). Kirkaldy (1907) corrected the synonyms proposed by Distant (1906) with a remark that *Rihana* should be a junior synonym of *Chremistica*. Metcalf (1963) then raised *Chremistica* to the level of a genus.

Distant (1906b) in his catalogue of Cicadidae included 44 species in the genus *Rihana*, with 13 species from the Oriental region. In his book 'Fauna of British India', Distant (1906a) mentioned one species *Rihana mixta* Kirby 1891, from Ceylon, the present day Sri Lanka. Distant (1909) further described a new species *Rihana seminiger* under the genus *Rihana* from Nilgiri Hills, India. Bregman (1985) redescribed and placed the species *seminiger* and *mixta* from South India and Sri Lanka under the *tridentigera* group of the genus *Chremistica*. Yaakop *et al.* (2005) presented a revision of 17 species of the cicada belonging to the genus *Chremistica* occurring in Sundaland.

Taxonomy

Genus *Chremistica* Stål, 1870

Cicada (*Chremistica*) Stål, 1870: 714 [For further references before 1980 see: Metcalf 1963; Duffels & Van der Laan 1985].
Chremistica; Hayashi 1987: 124-125; Chou *et al*. 1997; 265-273; Boulard 2001a: 114-117; Boulard 2001b: 130.

Diagnosis: Head triangular, longer than half the distance between eyes, tegmina and wings hyaline, eyes oblique, longer than broad, pronotum broader than distance between eyes. Rostrum with median black line and dark apex reaching middle or hind coxae. Apical margin of male operculum rounded and not reaching posterior margin of sternite. Abdominal segment three with prominent white spots; male pygofer with a pair of basal and a pair of lateral lobes. clasper well developed with lateral and medial lobes. Aedeagus long, basal plate convex.

Chremistica ribhoi Hajong & Yaakop, new species
(Fig. 1)

Type material: Holotype male: **North-East India**: Near Siden village, alt. 432 m a.s.l., 25˚51'37.1'N, 091˚51'16.3'E, 9.vi.2006.(ZSI, Kolkatta). **Paratypes: North-East India**: Lailad, near Nongkyllem Wildlife Sanctuary: 23 males and 7 females, alt. 416 m, 25˚ 55'09.7' N, 091˚ 46'25.0' E, 17.vi.2006.

Etymology. The species name is derived from the locality from where the type specimen was collected.

Description. *Head.* Head slightly longer than half the distance between eyes. Postclypeus moderately prominent with black transverse stripes and castaneous medial band with white pubescence in ventral grooves. Lateral part of anteclypeus black, white hirsute, medial keel dark brownish. Gena hirsute, mandibular plate black and densely hirsute. Supra antennal plate light brownish, ventral lobe black, two fuscous spots on either side of lateral ocelli. Remaining part of head black. Antennal pedicel brownish, rest of antenna pale or dark castaneous, length 3 mm. Whitish hairs behind eyes in socket margins. Rostrum castaneous, medial line black with black top, reaching middle of hind coxae.

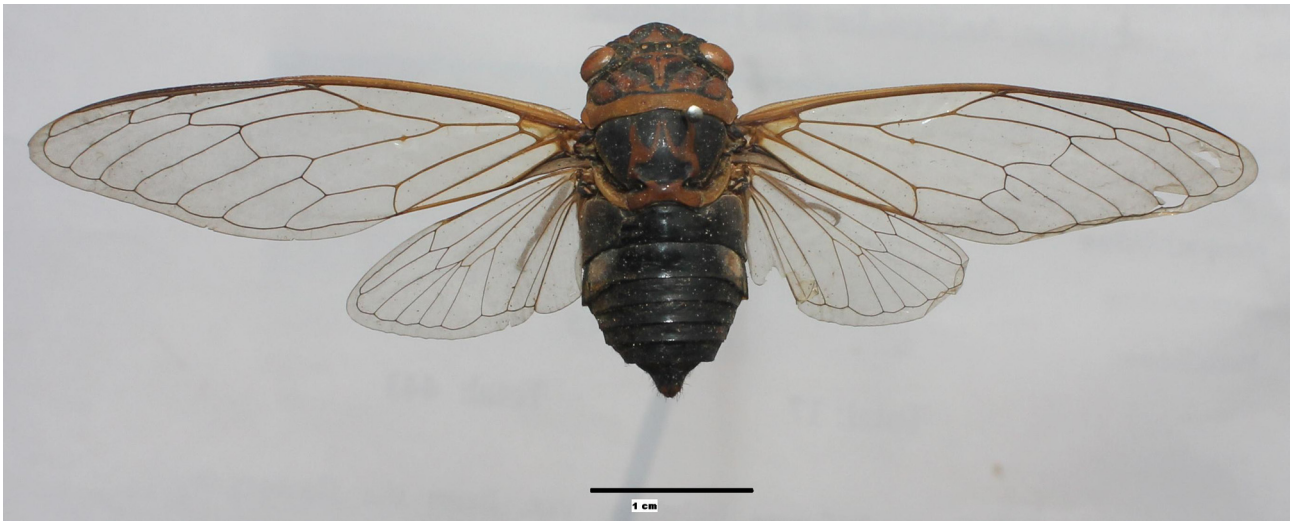


FIGURE 1. *Chremistica ribhoi* new species, male.

Thorax. Anterior margin of pronotum castaneous, rest of head black with a median brownish fascia, a curved transverse ridge over anterior anchor spot extending to paramedian oblique fissure. Pronotal collar castaneous. Mesonotum with paramedian and lateral obconical fields and central mark black. Median point of central mark extending anteriorly far beyond mid-length of mesonotum disk and fused with inner medial margins of paramedian obconical fields. Cruciform elevation dark castaneous.

Legs. Coxae brownish with black spots on hind coxae, lightly hirsute with white hairs, femora brownish, hirsute with whitish hairs, one femoral spine on anterior and one on posterior lower margin of front femora. Ventral part of middle and hind femora with long whitish hairs. Tarsi brownish with black tarsal claws.

Wings. Fore and hind wings hyaline without infuscation. Basal cell pale yellowish. Radial vein ochraceous, subcostal vein black on apical half, light on basal half. Basal venation yellowish castaneous and apical venation dark brown.

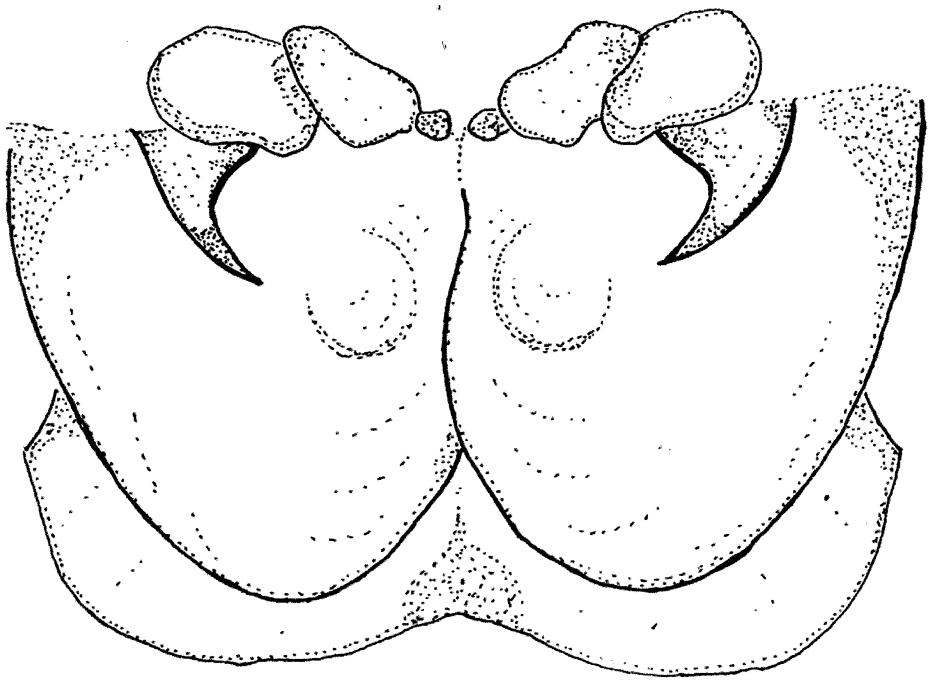
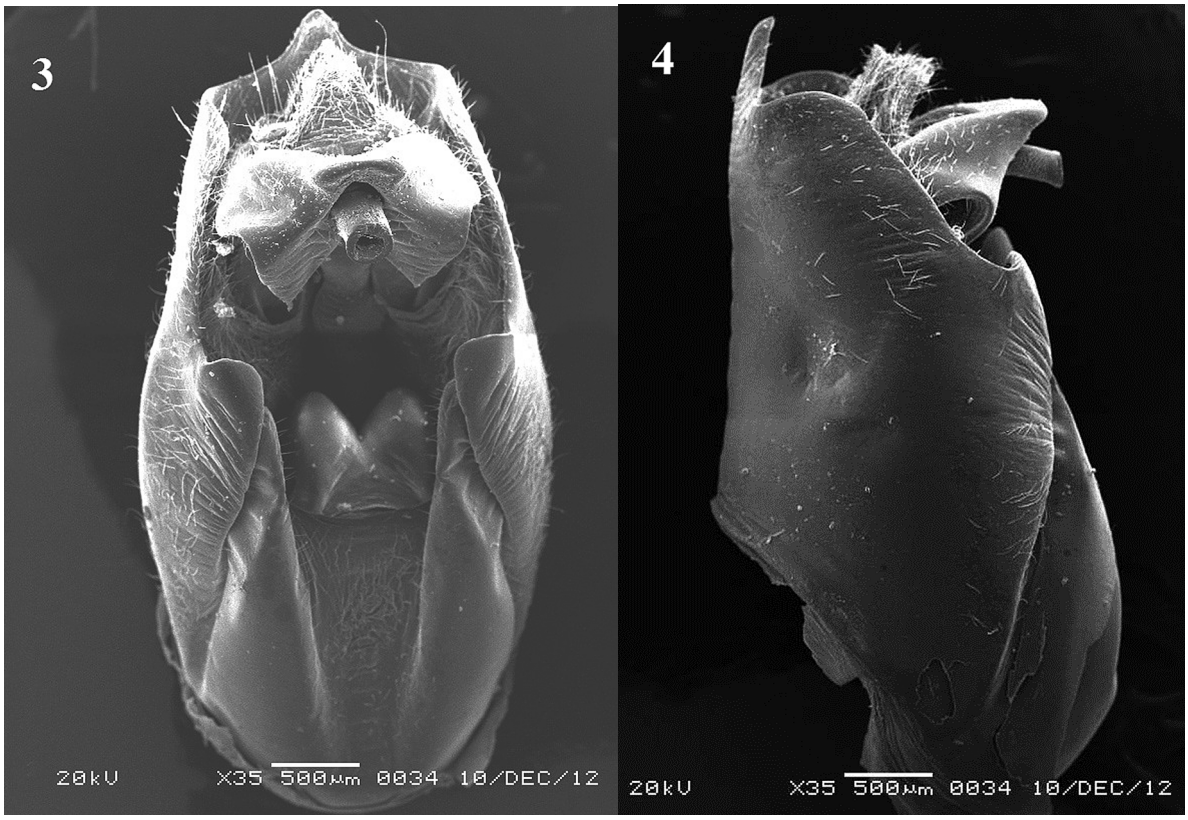


FIGURE 2. *Chremistica ribhoi* , male operculum in ventral view.

Male operculum (Fig. 2). Pale brown, apices broadly convex, not reaching posterior margin of second abdominal sternite. Lateral margin curled down. Lateral part whitish tomentose. Medial margins of opercula overlapping.



FIGURES 3–4. *Chremistica ribhoi*, scanning electron micrographs of male pygofer. 3, ventral view; 4, lateral view.

Male abdomen. Blackish dorsally with a pair of oblique white spots on the third abdominal tergite and a pair of whitish tomentose spots on the eighth tergite, all tergites with scattered brownish pubescence which is denser on lateral sides. Sternites brown with whitish pubescence.

Male genitalia (Figs 3&4). Description of pygofer is based on Yaakop *et al.* (2005). Pygofer oval. Lateral pygofer lobe short, dark apices thickened and bent inwards, basal pygofer lobe small. Uncus medium-sized, slightly curved downward, apex square shaped, median clasper lobes darkened, triangular, and well developed with pointed apices. Aedeagus curved ventrally at tip. Basal plate convex, inner margin of pygofer lobe with rows of paired hairs. Apex of uncus hirsute.

Female operculum (Fig. 5). Pale castaneous, posterior margin concave almost reaching second sternite margin, laterodistal corner blunt, surface covered with whitish pilosity, anterior area of operculum raised and posterior marginal area flat. Meracanthus blunt and crossing posterior margin of second sternite.

Female abdomen : Dorsal surface black, golden pubescence on lateral part of tergites, transverse wrinkled line on 3rd ,4th , 5th and 6th tergites with a break on the middorsal area of each tergite. Tergite 8 brown with a medial black band. Tergite 8 and 9 with golden hirsute on posterior margins. Ventral surface brown, lateral margin of sternite with white pubescence.

Measurements. Male (n=5): length of body: 25-28 mm; width of head: 11 mm; length of tegmen: 36-40 mm. Female (n=5): length of body: 25-26 mm; width of head: 11 mm; length of tegmen: 36-37 mm.

Distribution (Fig. 6): Ri Bhoi district in Meghalaya, North-East India.

Discussion. Only two species of *Chremistica* are recorded from the Indian subcontinent (Bregman, 1985), they belong to the *Chremistica tridentigera* species group. The species of *Chremistica* are tentatively grouped into four species groups viz, the *martini, coronata, tridentigera* and *pontianaka* species groups. Bregman (1985) redescribed four species of the *tridentigera* group: *C. seminiger* (Distant, 1909), *C. mixta* (Kirby, 1891), *C. umbrosa* (Distant, 1904) and *C. tridentigera* (Breddin, 1905), and described three new species viz., *C. minor, C. biloba* and *C. siamensis* .

The *tridentigera* group is represented in India by only one species, *Chremistica seminiger* from Nilgiri Hills in Western Ghats of south India. The other species viz *C. mixta* (Kirby, 1891) is reported further south from Sri

Lanka. *C. seminiger* is recognized by the presence of a pair of white spots on the third and the eighth abdominal segments and in the male genitalia by the lateral inner lobe which is more than 3 times as long as wide. Based on the genital structure of *Chremistica ribhoi* sp. nov which has a little broader and shorter lateral pygofer lobe, the new species can be placed in the *pontianaka* group.

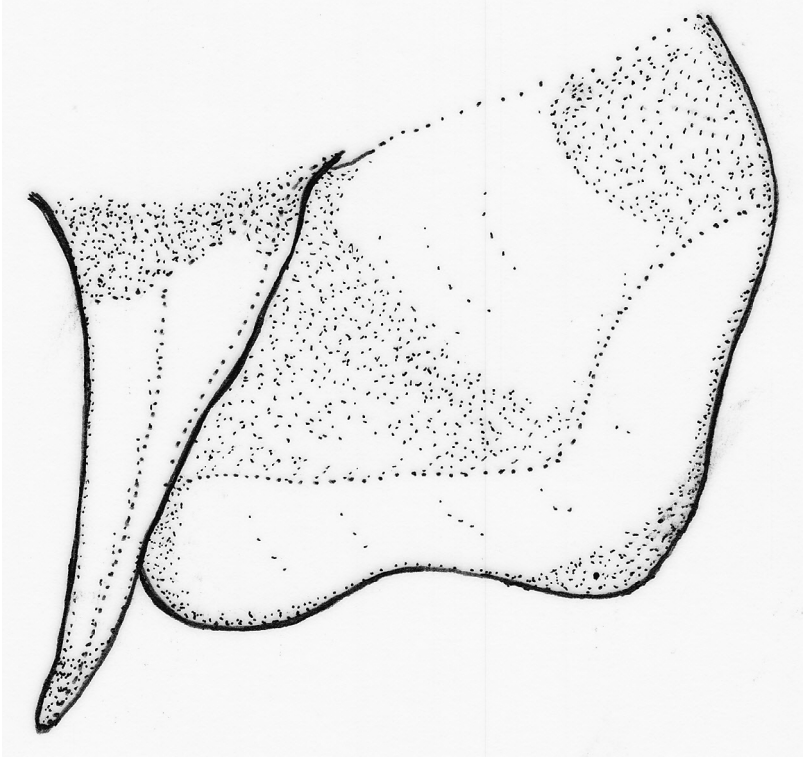


FIGURE 5. *Chremistica ribhoi,* female operculum in ventral view.

The male of *Chremistica ribhoi* sp. nov. is distinguished from *Chremistica seminiger* by the smaller size of the body (25-28 mm) as compared to 40-42 mm in *C. seminiger*. The white spots on the third abdominal segment are prominent but the spots on the 8th abdominal segments are very pale. In the male genitalia, *C. seminiger* also totally differs from *C. ribhoi* by having a very long lateral inner pygofer lobe, a large, long and slightly downwardly curved uncus lacking a median furrow and with a broadly rounded apex and by the claspers which are strongly developed, triangular, flat, ochraceous to brownish black with some brownish hair (Bregman, 1985).

C. ribhoi has short lateral pygofer lobes with dark, thickened and inwardly bent apices. Basal pygofer lobes are small and uncus is medium-sized, slightly curved downward, apex square shaped. The claspers are well developed and triangular in shape (Fig. 3). The blunt ochraceous process present at both the lateral clasper margins as described for the Nilgiri specimen is totally lacking in this species. The genitalia of *C. ribhoi* also differs from *C. mixta*, which has a large broad uncus and and a weakly developed claspers.

Another species belonging to *Chremistica* viz. *C. germana* was reported from Burma (Distant, 1888). Metcalf, (1963) in his catalogue of Homoptera, Cicadidae, mentioned the distribution of *C. germana* as South E. Asia including India, however no actual report on the occurrence of *Chremistica germana* in India is available, although there is the possibility of a westward extension of this species from Southeast Asia including Burma and Thailand to India via the 'Assam Gateway'. A comparison of the genitalia of *C. ribhoi* with the genitalia of *C. germana* described by Salmah *et al.* (2004) shows them to be different altogether.

The new species of *Chremistica* described from Thailand by Boulard (2002, 2005, 2006, 2007, 2009, 2012) viz. *C. moultoni* (Boulard, 2002), *M. mussarens* (Boulard, 2005), *C. bimaculata inthanonensis* (Boulard, 2006) and *C. sibilussima* (Boulard, 2006), *C. atratula* (Boulard, 2007), and *C. phamiaangensis* (Boulard, 2009) have not been reported so far from areas other than Thailand including Burma and India and therefore probably might be endemic to Thailand. Further *C. ribhoi* can also be separated from these species in terms of differences in genital structure, body size and coloration. In *C. bimaculata*, the uncus is longer than in *C. ribhoi*. In *C. moultoni*, the

uncus is smaller and the aedeagus is elongated and bended compared to *C. ribhoi.* It differs from *C. sibilussima*, which has a greenish body coloration. Similarly, compared to *C. atratula*, it has a shorter pygofer. It also differs from the new species *C. sueuri* described by Pham (2013), which has a bifurcate uncus while the pygofer lobes are elongated and acute apically.

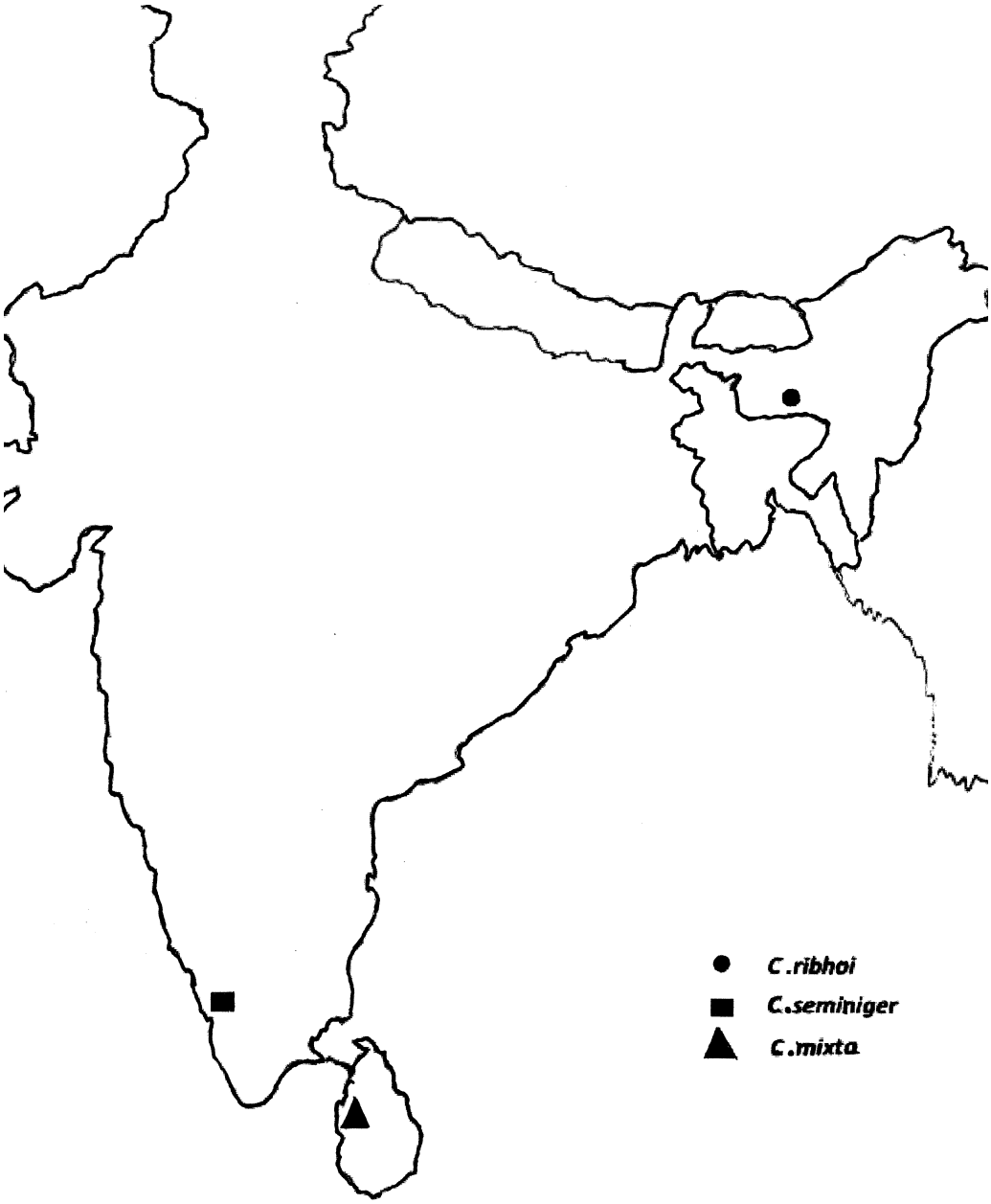


FIGURE 6. Distribution of *Chremistica* species in the Indian subcontinent.

Mass emergence.

Phenomena of mass emergence in *Chremistica* are scanty. Salmah and Zaidi (2002) and Gogala and Trilar (2004), described mass emergence of *C. guamusangensis*. Leong *et al.* (2011) also described mass emergence of *Chremistica umbrosa* in Singapore. Mass emergence of *C. ribhoi* was observed in the Ri-Bhoi district of Meghalaya, India. Observations of mass emergence were made after dusk from 7.00 pm to 11.00 pm at night near a undisturbed forest habitat (Altitude: 432 m a.s.l., 25◦ 51'37.1"N, 091◦ 51'16.3"E). This mass emergence phenomenon starts only after dusk and is reported to occur every four years and is well known among villagers

inhabiting this area. This mass emergence occurred during the month of May 2006 and again in May 2010. In the local Khasi language it is referred by the name 'Niangtaser'. The word 'Niang' is a generic word and used by the 'Khasi language', which refers to all insects, and the word 'taser' is believed to be derived from the name of the village 'Iewsier' and the forest areas around it from where this mass emergence phenomenon is observed. Hence, 'Niangtaser' refers to this particular cicada which shows a four year mass emergence cycle and appears only in that area. During this periodic event of mass emergence villagers collected the young emerged pre-imago, that are used for food and as fish baits. At this stage the pre-imago is pale greenish in color. The pre-imago phases were collected by hand and put in hollow bamboo tubes and killed with a stick, then cooked and relished as a local delicacy.

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