

ON A COLLECTION OF MEMBRACIDS (HOMOPTERA :  
MEMBRACIDAE) FROM CALCUTTA AND  
ITS ENVIRONS

*By*

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INTRODUCTION

The membracidae constitutes one of the most distinct families in the Homoptera. These insects are chiefly distinguished by the great development of the pronotum, particularly its pronotal processes. The group may be diagnosed by its primary characters *viz.*, Ocelli placed between the eyes ; antennae inserted in front of head and between eyes ; pronotum prolonged backward into a hood or process of variable form.

The membracids, commonly known as tree hoppers, are homopteran insects which suck the plant sap from the shrubs and trees with the help of their piercing and sucking type of rostrum. They are also found in open fields on various weeds, grasses and similar perennial plants upon which they feed. The group is also economically important.

The eggs are laid in the slits of epidermis of short shoot in double rows. Nymphs live in the same colony and in the same shoot along with parents. 2-5 generations per year have been observed in India. Ananthasubramanian and Ananthakrishnan (1975) have dealt with the biology of this group.

The Indian Membracidae has received attention through the pioneering contribution of Distant (1908, 1916) and later, through the work of Evans (1948), Menon *et al* (1958), Ananthasubramanian and Ananthakrishnan (1975) and Dutta *et al.* (1978). Besides, valuable contributions were made by Funkhouser (1951), Goding (1903, 1926, 1931, 1934, 1939) from elsewhere.

Literature reveals that a little over 200 species belonging to 45 genera are known so far from the Indian subcontinent, of which, 80 species are recorded from North-east India, and 50 species from West Bengal (22 species from Calcutta).

The present paper provides the first consolidated account of 14 species belonging to 7 genera of membracids of Calcutta. It is based

on the available collections represented in the Zoological Survey of India, Calcutta.

The paper includes the generic description with original reference, synonymy, if any, and the subsequent references, diagnostic morphological features, taxonomic & biological remarks, if any, distributional records under each species and a running key to various taxa for easy identification of the insects.

#### SYSTEMATIC ACCOUNT

Subfamily OXYRHACHINAE Haupt, 1929

Tribe **Oxyrhachini** Distant, 1908

Genus **Oxyrhachis** Germer, 1835

1. *Oxyrhachis tarandus* (Fabricius)
2. *O. rufescens* Walker

Subfamily CENTROTINAE Spinola, 1850

Tribe **Leptocentrini** Distant, 1908.

Genus **Leptocentrus** Stål, 1866

3. *Leptocentrus leucaspis* Walker
4. *Leptocentrus substitutus* Walker
5. *L. taurus* Fabricius

Genus **Otinotus** Buckton, 1903

6. *Otinotus oneratus* (Walker)
7. *O. elongatus* Distant

Tribe **Tricentrini** Ahmed and Yasmeen, 1974

Genus **Tricentrus** Stål, 1866

8. *Tricentrius projectus* Distant
9. *T. subangulatus* Distant

Tribe **Gargarini** Distant, 1908

Genus **Gargara** Amyot & Serville, 1843

10. *Gargara confusa* Distant
11. *G. mixta* (Buckton)
12. *G. robusta* Distant

Tribe **Cocosterphini** Distant, 1908

Genus **Cocosterphus** Stål, 1869

13. *Cocosterphus decoloratus* Distant

14. *C. minutus* Fabricius

*Key to the subfamilies of the family MEMBRACIDAE*

Scutellum rudimentary, entirely concealed by the pronotum, propleural and metapleural processes developed	...	<i>Oxyrhachinae</i> Haupt
Scutellum well developed and more or less uncovered; propleural and metapleural processes absent	...	<i>Centrotinae</i> Spinola

Tribe **Oxyrhachini** Distant

Head wider than long; posterior pronotal process long and narrow, broad at base, extending beyond posterior angle of inner margin of tegmina; wings with 3 or 4 apical cells; tibiae dilated; sides of the pro- and mesonotum are armed with a small lobe or tooth.

Genus **Oxyrhachis** Germar

Type-species : *Membracis taranda* Fabricius

1835. *Oxyrhachis* Germar, *Rev. ent. Silb.*, 3 : 232.

1903. *Polocentrus* Buckton, *Mon. Memb.*, : 254.

1905. *Ouranorthus* Buckton, *Trans. Ent. Soc. Lond.*, 9 : 322.

1908. *Oxyrhachis* : Distant, *Fauna Brit. Ind.*, 4 : 7.

1962. *Oxyrhachis* : Capener, *Repub. S. Afr. Dept. Agr. Tech. Ser. ent. Mem.*, 8 : 9.

1975. *Oxyrhachis* : Ananthasubramanian and Ananthakrishnan, *Rec. Zool. Surv. India*, 68 : 168.

1978. *Oxyrhachis* : Dutta, Ghosh and Das, *Eos*, 52 : 118.

Head wider than long; mouth a little elevated; eyes large and globate; ocelli equidistant from each other and located above the centro-ocular line; pronotum with the lateral angles more or less produced; posterior process tricarinate, long, narrow, broad at base, with or without a ventral carina or keel on apical half; wings with 3 or 4 apical cells and tegmina with 5 apical and 3 discoidal cells.

*Remark* : The genus is predominant in Oriental and Ethiopian regions.

Key to the species of *Oxyrhachis*

- |   |                           |
|---|---------------------------|
| 1. Posterior process extends beyond tips of tegmina ; ocelli equidistant from each other than from eyes ... | <i>tarandus</i> Fabricius |
| — Posterior process just reaching tips of tegmina ; ocelli nearer to each other than from eyes ...          | <i>rufescens</i> Walker   |

1. *Oxyrhachis tarandus* (Fabricius)

1798. *Membracis taranda* Fabricius, *Ent. Syst. Suppl.*, : 514.  
 1803. *Centrotus tarandus* Fabricius, *Syst. Rhyng* : 19.  
 1835. *Oxyrhachis tarandus* Germar, *Res. ent. Silb.*, 3 : 232.  
 1903. *Polocentrus rufus* Buckton, *Mon. Memb.* : 254.  
 1962. *Oxyrhachis tarandus* Capener, *Repub. S. Afr. Tech. Ser. Ent. Mem.*, 6 : 11.  
 1975. *Oxyrhachis tarandus* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 169.  
 1978. *Oxyrhachis tarandus* : Dutta, Ghosh and Das, *Eos*, 52 : 118.

Head frontally piceous, vertex of head nearly twice as wide as long, sparsely covered with hairs ; ocelli equi-distant from each other and located on centro ocular line ; pronotum with a central longitudinal carination which traverses the length of the posterior process ; Posterior process extending beyond the tips of tegmina, upwardly recurved, beneath laminately ampliate and finely serrate ; tegmina dull hyaline, the veins fuscous ; legs pilose.

*Material examined* : 3 examples INDIA : West Bengal, Calcutta, 11.xii.1965, Coll. ?

*Remark* : This is a very common species abundantly found throughout India including Calcutta where it is recorded in good numbers during September and February. This species is predominant in south India but rather rare in western India. The species can easily be recognised by its large size, dark brown colour and thickly punctate body.

2. *Oxyrhachis rufescens* Walker

1851. *Oxyrhachis rufescens* Walker, *List. Hom.*, ii : 506.  
 1851. *Oxyrhachis rudis* Walker, *List. Hom.*, ii : 509.  
 1908. *Oxyrhachis rufescens* : Distant, *Fauna Brit. India*, 6 : 146.  
 1975. *Oxyrhachis rufescens* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 171.

Head twice as broad as long ; vertex sinuate, punctate with short silvery hairs ; apical areas of posterior process slightly elevated ; ocelli convex, closer than from eyes and located above centro-ocular line ;

Pronotum thickly punctate ; anterior carina dark reddish brown ; directed outwards, then backwards ; lateral carina nearly straight ; dorso posterior carina curved forward and outwards joining anterior carina in narrow curve ; posterior process moderately laminately gibbous at base, apically upturned, just reaching tegminal apex ; legs testaceous ; abdomen dark reddish brown above, greyish tomentose below.

*Material examined* : 1 example. INDIA ; West Bengal, Calcutta, 29.i.1907, Coll. ?

*Remark* : The species is also widely distributed throughout India. In Calcutta it is recorded in the month of May.

*Key to the tribes of the subfamily CENTROTINAE*

1 (2)	Hind wings with 4 apical cells	...	Leptocentrini
2 (1)	Hind wings with 3 apical cells	...	... 3
3 (4)	Scutellum normal or exposed, hind trochanters armed with spines.	...	Tricentrini
4 (3)	Scutellum partly concealed, hind trochanters unarmed.	...	... 5
5 (6)	The terminal veins are coarsely or finely tuberculate ; scutellum abortive in the middle, pronotum usually tuberculate	...	Coccosterphini
6 (5)	The terminal veins not tuberculate ; scutellum complete in the middle ; pronotum not tuberculate	...	Gargarini

**Tribe Leptocentrini**

Scutellum fully exposed ; hind wings with 4 apical cells ; frontoclypeal lobes prominent,

*Key to the genera of Leptocentrini*

Posterior process slender, not arcuate, base of posterior process apart from scutellum	...	<i>Otinotus</i> Buckton
Posterior process rather stout, arcuate, base of posterior process very close to scutellum and tegmina	...	<i>Leptocentrus</i> Stål

**Genus *Leptocentrus* Stål**

Type-species : *Centrotus altifrons* Walker

1866. *Leptocentrus* Stål, *Hem. Afr.*, 4 : 87-90.

1903. *Rabduchus* Buckton, *Mon. Memb.*, : 270.

1968. *Leptocentrus* : Capener, *Repub. S. Afr. Dept. Agr. Tech. Ser. Ent. Mem.*, 17 : 33.

Head vertical, upper margin of vertex arcuate and sinuate ; eyes hemispherical ; ocelli closer to eyes ; pronotum with anteriorly produced transverse processes ; posterior process slender, tricarinate, well separated from the scutellum and abdomen ; scutellum triangular about as wide as long, apex emarginate ; tegmina without pterostigma, with five apical cells and two discoidal cells ; hind wing with 4 apical cells ; tibiae simple.

*Remark* : The genus is predominant in oriental and Ethiopian region and abundantly found in South and Eastern India in comparison to Western India.

### Key to the species of *Leptocentrus* Stål

- |       |  |     |     |                            |
|-------|--|-----|-----|----------------------------|
| 1 (4) | Suprahumeral robust, strongly curved ; tip of posterior process impinging on inner angles of tegmina                       | ... | ... | 2                          |
| 2 (3) | Body smaller in size ; posterior process less arched and more obliquely straight   | ... |     | <i>substitutus</i> Distant |
| 3 (2) | Body larger in size ; posterior process strongly arched, abruptly elevated from near base, passing beyond 5th apical cell. | ... |     | <i>taurus</i> Fabricius    |
| 4 (1) | Suprahumeral moderately developed, gently curved, tip of posterior process never impinging on inner margin of tegmina      | ... |     | <i>leucaspis</i> Walker    |

### 3. *Leptocentrus leucaspis* Walker

1851. *Centrotus taurus* Walker, *List. Hom.*, ii. : 602.

1858. *Leptocentrus leucaspis* Walker, *List. Hem. Suppl.*, : 158.

1975. *Leptocentrus leucaspis* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 194.

Head about thrice as broad as long ; vertex arcuate and sinuate ; eyes black directed laterad ; suprahumeral moderately developed, gently curved ; ocelli slightly closer to eyes than to each other ; pronotum black, strongly punctate ; posterior process tricarinate, strongly, convexly recurved from near apex, achieving its maximum height above scutellum, then moderately arched, tip acute, touching the posterior end of 5th apical cell ; scutellum black, as broad as long, tip broadly emarginate ; tegmina ochraceous, black on costal margin and apical limb, hind wing with 4 apical cells ; legs with tarsi yellowish.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta, 15.x.1965, K. Roy Coll.

*Remark* : The species is widely distributed in India including Calcutta. It has been collected from Calcutta as early as 1907.

#### 4. *Leptocentrus substitutus* Walker

1851. *Centrotus substitutus* Walker, *List. Hom.*, II : 605.

1809. *Leptocentrus substitutus* : Distant, *Fauna Brit. India*, 4 : 29-30.

Head about three times wider than long ; basal margin of vertex convex ; ocelli black, nearer to eyes than to each other ; pronotum black ; posterior pronotal process slightly arched at base and more obliquely straight ; posterior process tricarinate above ; lateral transverse processes less prominently recurved and their apices less acute ; scutellum and sternal lateral margins chalky white and silky ; tibiae reddish brown.

*Material examined* : 1 example, INDIA : West Bengal, Calcutta, 18.iii.1907, Coll. ? ; 1 example, Calcutta, 15.x.1965, *K. Rai & Party* Coll. ; 1 example, Calcutta, 11.xi.1966, *M. M. G. & Party* Coll.

*Remark* : This species is abundantly found throughout India.

#### 5. *Leptocentrus taurus* Fabricius

1775. *Leptocentrus taurus* Fabricius, *Syst. Ent* , 675.

1908. *Leptocentrus taurus* : Distant, *Fauna. Brit. India*, 4 : 28-29.

1975. *Leptocentrus taurus* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 198-201.

Head three times wider than long ; basal margin of vertex, lateral margins obliquely sloping downwards, ocelli black, nearer to eyes than to each other ; suprahumeral robust, strongly curved ; pronotum black, thickly punctate ; posterior process strongly tricarinate above, abruptly elevated from near base passing beyond 5th apical cell, apex black ; tegmina pale bronzy, ochraceous, base and apical half of costal margin black, three and a half times longer than wide ; hind wing with 4 apical cells ; scutellum as broad as long, tip narrowly emarginate ; tibiae reddish brown.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta, 3.v.1910, *N. Annandale* Coll., 1 example, Calcutta, 25.ix.1912, Coll. ? 1 example, Calcutta, 15.x.1965, *S. P. Chakraborty* and *K. D. Chatterjee* Coll.

#### Genus *Otinotus* Buckton

Type-species : *Otinotus ammon* Buckton

1903. *Otinotus* Buckton, *Mon. Memb.*, 232, 269.

1927. *Convecton Funkhouser*, *Gen. Cat. Hom. Fasc.*; 1 : 348.

1975. *Otinotus* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 214.

Head wider than long ; ocelli nearly equidistant from each other and from eyes ; pronotum moderately high ; posterior process emerging dorsally, horizontally from behind disc not arcuate, slightly sinuate ; scutellum triangular, wider than long ; tegmina about three times as long as wide with 5 apical and 2 discoidal cells ; hind wings with 4 apical cells ; legs simple.

*Remark* : The genus is predominant in Ethiopian & Oriental region. It is widely distributed in Western and Southern India and also known from some parts of Northern India.

### Key to the species of *Otinotus* Buckton

- |       |   |                          |
|-------|---|--------------------------|
| 1 (2) | Lateral pronotal processes as seen from above somewhat slender, apically a little recurved ; tegmina pale testaceous hyaline, ochraceously opaque at base ; body rather subelongate ...                                   | <i>one ratus</i> Walker  |
| 2 (1) | Lateral pronotal processes as seen from above moderately broad, upwardly directed and apically strongly recurved ; tegmina semi hyaline, narrowly dull piceously opaque at base ; body distinctly elongate and compressed | <i>elongatus</i> Distant |

### 6. *Otinotus oneratus* (Walker)

1858. *Centrotus oneratus* Walker, *Ins. Sound. Hom.* : 78.
1908. *Otinotus oneratus* : Distant, *Fauna Brit. India*, 4 : 40.
1975. *Otinotus oneratus* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 214-217.

Head nearly thrice as wide as long across the eyes ; vertex nearly twice as wide as long, ocelli almost equidistant from each other and from eyes, pronotum dark brown, with short hairs ; posterior process slender, gradually narrowing from base to apex, tricarinate weakly sinuate, tegmina thrice as long as wide, scutellum slightly broader than wide, tip emerginate, apices acute ; abdomen dark brown, hind wings with 4 apical cells ; tibiae light brown, tarsi pale white.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta (Dhappa), 22.i.1911, *F. H. Gravely* Coll. ; 1 example, Calcutta Museum Compound, 14.viii.1914, Coll. ?

*Remark* : This is a very common species in India. It was recorded from Dhappa, Calcutta as early as in March, 1907 *F. H. Gravely*.

7. *Otinotus elongatus* Distant

1908. *Otinotus elongatus* Distant, *Fauna Brit. India*, 4 : 41-42.

1978. *Otinotus elongatus* : Dutta, Ghosh & Das, *Eos*, 52 : 114.

Body rather elongate and compressed ; head about thrice as wide as long ; vertex arcuate, eyes hemispherical, dark brown ocelli nearer to eyes than to each other and located on the centro ocular line. Pronotum very finely pilose ; lateral processes moderately broad, upwardly directed and apically strongly recurved, laterally carinate, apices subacute, in front these processes are much narrower in appearance ; posterior process long, sinuate, scarcely elevated above scutellum, its apex considerably passing posterior angle of inner margin of tegmina, tricarinate, the central carination continued through pronotum, tegmina semi hyaline, narrowly dull ; piceously opaque at base, narrowly elongate, somewhat compressed, legs piceous brown.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta (Dhappa), 22.i.1911, F. H. Gravely Coll.

*Remark* : The species was earlier recorded for the first time from Dhappa, Calcutra during January, 1911 by F. H. Gravely.

Tribe *Tricentrini* Ahmad & Yasmeen

Scutellum normal and exposed ; hind wings with three apical cells ; a distinct pterostigma may be present or absent ; frontoclypeal lobes either partially or completely fused to the frontoclypeus on their inner margins. Hind trochanters elevated into a disc inwardly, armed with spines.

Genus *Tricentrus* Stål

Type-species : *Tricentrus convergens* Walker

1856. *Tricentrus* Stål, *Hem. Afr.* 4 : 89.

1905. *Taloipa* Buckton, *Trans. Linn. Soc. Lond. Zool.* (2) 9 : 334.

1912. *Centrotus* Matsumura, *Annot. Zool. Japan*, 8 : 90.

1975. *Tricentrus* : Ananthasubramanian and Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 224.

1978. *Tricentrus* : Dutta, Ghosh & Das, 52 : 100.

Body rather ovate, head about three times wider than long, obliquely directed backwards, upper margin of vertex arcuate and sinuate, eyes subglobose ; ocelli nearer to eyes than to each other ; pronotum with posterior process longer than broad, lateral angles prominent ; posterior process moderately short, contiguous with scutellum ; tegmina with

5 apical and two discoidal cells, hind wings with 3 apical cells. Scutellum as wide as long concavely emerginate, hind trochanters elevated into a disc inwardly, armed with spines.

*Remark* : The genus is predominant in oriental and Ethiopian regions.

### Key to species of *Tricentrus* Stål

Lateral processes of pronotum longer ; apex of posterior process about reaching the posterior angle of inner margin of tegmina, scutellum with a small pale sericeous spot at each basal angle ; body shorter ...	<i>projectus</i> Distant
Lateral processes of pronotum rather short ; apex of posterior process projecting, not impinging on tegmina and not reaching the posterior angle of inner margin of tegmina ; scutellum without such spot ; body rather longer ...	<i>subangulatus</i> Distant

### 8. *Tricentrus projectus* Distant

1908. *Tricentrus projectus* Distant, *Fauna Brit. India*, 4 : 55.

Head about 3 times wider across extremities of eyes than length of vertex which is about twice as wide as long, ocelli nearer to eyes than to each other, pronotum punctate, ochraceously pilose, lateral processes straight, obliquely pored, centrally ridged ; posterior process robust, carinate, central carination continued through pronotum, closely impinging on tegmina. Each basal angle of scutellum with a small pale sericeous spot, tegmina sprinkled with pilosity, piceous and punctate at base, apical margin, a little paler and ochraceous brown, femora and claws black, apices of femora and the whole of the tibiae castaneous, tarsi ochraceous.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta (Tollygunj), 11.xi.1916, F. H. Gravely Coll.

*Remark* : This is one of the uncommon species occurring in India. The species was recorded for the first time in Calcutta by F. H. Gravely during November, 1916.

### 9. *Tricentrus subangulatus* Distant

1908. *Tricentrus subangulatus* Distant, *Fauna Brit. India*, 4 : 55.

1978. *Otaris* (= *Tricentrus*) *subangulata* ; Dutta, Ghosh & Das ; *Eos*, 52 : 102.

Head about two and a half times wider than long, upper margin of vertex arcuate and sinuate, ocelli nearer to eyes than to each other ;

pronotum black, thickly punctate ; lateral processes very short, broad, recurved, anterior margin rounded, posterior margin almost straight, apex roundly subtruncate, posterior process also short, robust, central and lateral carination fine, apex projecting, tegmina punctate on black basal area, with a pale bronzy tint, the veins piceous, legs black, somewhat longly pilose.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta, 21.v.1909, *Museum Coll.*

*Remark* : In India the species is apparently known from Calcutta.

### Tribe Gargarini distant

Scutellum partially concealed, exposed laterally at basal angles and weakly chitinised in the middle, hind wings with 3 apical cells, posterior process broad and close-fitted ; suprahumeral horns absent.

### Genus *Gargara* Amyot & Serville

1843. *Gargara* Amyot & Serville, *Hemip.* : 537.

1903. *Maerops* Buckton, *Mon. Memb.* : 268.

1975. *Gargara* : Ananthasubramanian & Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 238.

1978. *Gargara* : Dutta, Ghosh & Das, *Eos*, 52 : 106.

Type-species : *Cicada genistae* Fabricius

Head about two and a half times as wide as long, vertex nearly one and a half times wider than long ; eyes subglobose, pronotum low, posterior process broadly triangular, closely fitting against scutellum, contiguous with tegmina ; scutellum triangular deeply excavated at tip, wider than long, incompletely chitinised in middle, tegmina two and a half times longer than wide with 5 apical cells and 2 discoidal cells ; hind wings with 3 apical cells, posterior trochanters without spinules.

*Remarks* : This genus closely resembles *Tricentrus* Stål, but differs by the unarmed lateral angles of the pronotum and by the absence of spinules to the posterior trochanters.

*Distribution* : This genus is known from Palearctic, Ethiopian, Oriental, Malayan and some portions of Australasian Regions. It is commonly found in Southern India.

### *Key to the species of Gargara* Amyot & Serville

- 1 (2) Posterior process just passing apex of claval area, centrally and laterally carinate ... *robusta* Distant

2 (1)	Posterior process just reaching apex of claval area	...	3
3 (4)	Pronotum and tarsi light brown ; pronotum thickly ochraceously pilose	...	<i>mixta</i> (Buckton)
4 (3)	Pronotum black ; tarsi ochraceous ; pronotum very thickly somewhat finely punctate ...		<i>confusa</i> Distant

### 10. *Gargara confusa* Distant

1906. *Gargara confusa* Distant, *Fauna Brit. India*, 6 : 171.

Head about two and a half times wider across extremities of eyes than length of vertex ; vertex nearly one and a half times wider than long, ocelli slightly closer to eyes than to each other ; pronotum black, very thickly, somewhat finely punctate, the lateral angles subacutely prominent, finely carinate, scutellum wider than long, triangular, excavated at tip, the posterior process slender, unicolorous, only just reaching the posterior angle of the inner tegminal margin, tegmina, grayish opaque, the basal area black, the apical area much crowded with fuscous brown, femora black, tarsi ochraceous.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta, 15.vii.1907, *Mus. Coll.*, 1 example, Calcutta, i.vii.1907, *Mus. Coll.*

*Remark* : This is rather one of the uncommon species in India. The species closely resembles *G. sikhimensis* Distant but differs by the more slender and unicolorous posterior pronotal process and comparatively smaller body.

### 11. *Gargara mixta* (Buckton)

1903. *Maerops mixta* Buckton, *Mon. Memb.* : 257.

1903. *Gargara variegata* Melichar, *Hom. Fauna. Ceylon*, p. 122.

1908. *Gargara mixta* Distant, *Fauna. Brit. India*, 4 : 65.

1975. *Gargara mixta* ; Ananthasubramanian & Ananthakrishnan. *Rec. zool. Surv. India*, 68 : 240.

1978. *Gargara mixta* : Dutta, Ghosh & Das, *Eos*, 52 : 106.

Head about two and a half times wider across extremities of eyes, vertex one and a half times as wide as long, eyes reddish brown, face piceous thickly, palely pilose, ocelli slightly nearer to eyes than to each other, pronotum ochraceous brown with the lateral angles angularly prominent but not produced, the posterior process broadly triangular, robust, impinging on scutellum and tegminal, margins and about reaching the posterior angle of the inner margin of the latter. Scutellum twice as broad as long, strongly chitinised at lateral areas ; tegmina

three times longer than broad, hind wings with 3 apical cells, legs blackish upto basal half.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta, 30.vi.1911, R. Hodgart Coll.

*Remark* : This is a very common species in India.

## 12. *Gargara robusta* Distant

1908. *Gargara robusta* Distant, *Fauna, Brit. India*, 4 : 61.

1978. *Gargara robusta* ; Dutta, Ghosh & Das, *Eos*, 52 : 106.

Head black, about three times as wider as long : vertex nearly one and a half time as wide as long ; eyes brown ; ocelli slightly nearer to eyes than to each other and situated on central ocular line ; pronotum black, thickly and somewhat coarsely punctate, posterior process short and robust just passing apex of claval area, centrally and laterally carinate, the central carination continues through pronotum, tegmina subhyaline, black at base on apical margin a pale brownish transverse spot near end of clavus ; black basal area of the tegmina punctate, femora black, apices of femora, tibiae and tarsi and castaneous.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta (Eden Garden), 19.vii.1964, G. Pradhan & Party Coll.

*Remark* : The species is so far known from Calcutta and Kurseong in North East India.

## Tribe *Cocosterphini* Distant

Scutellum abortive in the middle ; pronotum tuberculate or not, tegminal veins coarsely or finely tuberculate ; distinct pterostigma may be present or absent.

## Genus *Cocosterphus* Stål

1869. *Cocosterphus* Stål, *Mem. Fabr.*, 8 : 67.

1903. *Phaerotus* Buckton, *Mon. Memb.* : 255.

1975. *Cocosterphus* ; Ananthasubramanian & Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 254.

Type-species : *Membioracis minutus* Fabricious

Head about two and a half times as wide as long ; eyes deflexed, somewhat transverse, slightly implexed beneath the eyes, front a little elevated ; ocelli nearer to eyes than to each other, and situated on centro ocular line ; pronotum moderately convex, laterally unarmed,

gradually narrowed behind the slightly dominant lateral angles and gradually passing into the posterior process, scutellum aborted in the middle, apices spine-like ; tegmina short not extending beyond abdominal apex, gradually somewhat amplified towards apex, with 5 apical cells and 2 or 3 discoidal cells, hind wings with a 3 apical cells.

*Remark* : The genus is characterised by its pronotum behind the lateral angles gradually passing into the posterior process which has no sinus at the base, absence of produced complete scutellum, but in having mesonotum which is armed at the apex with two very distinct spines. Distant (1908) includes 5 species from India, Of these, two species viz., *C. minutus* (Fabr.) and *C. decoloratus* Distant are reported from Calcutta.

The genus is predominant in Oriental and Ethiopian regions. It is found in Southern and Eastern India including Calcutta but it rarely occurs in Western and Northern India.

#### Key to the species of *Coccosterphus* Stål

Posterior process broadly triangular, slightly elevated behind disc, apical region laminately convexly raised and strongly tuberculate, tip acuminate ; pronotum rather concave	...	<i>minutus</i> (Fabricius)
— Posterior process concave at base and strongly produced before apex, the central ridge finely tuberculous ; pronotum moderately arched and a little depressed	...	<i>decoloratus</i> Distant

#### 13. *Coccosterphus decoloratus* Distant

1908. *Coccosterphus decoloratus* Distant, *Fauna. Brit. India*, 4 : 71.

1978. *Coccosterphus decoloratus* : Dutta, Ghosh & Das, *Eos*, 50 : 102.

Body small, obovate, black ; head about two and a half times as long ; eyes deflexed, front elevated, ocelli about twice as far apart from each other as from the eyes, pronotum strongly tuberculous, ridged and moderately arched, obtusely angulate before the base of the posterior process, concave at base and convexly, laminately produced before apex, the central ridge finely tuberculous ; tegmina more or less finely tuberculous variably coloured ; legs piceous, tarsi ochraceous.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta Maidan, 27.iv.1911, F. H. Gravely Coll.

*Remark* : The species can be recognised by its minute size and black colour. This is an uncommon species found in India. It usually

feeds on *Boerhaavia repens* (Family Nyctaginaceae). In Calcutta, it was, recorded for the first time from Maidan area in April, 1911.

#### 14. *Coccosterphus minutus* (Fabricius)

1798. *Membracis minuta* Fabricius, *Ent. Syst. Suppl.* : 514.  
 1803. *Centrotus minuta* Fabricius, *Syst. Rhyng.* : 22.  
 1851. *Scaphula* (?) *minuta* Walker, *List. Hom. Br. Mus.*, 2 : 589.  
 1869. *Coccosterphus minuta* Buckton, *Mon. Memb.* : 149.  
 1908. *Coccosterphus minutus* : Distant, *Fauna Brit. India*, 4 : 71.  
 1975. *Coccosterphus minutus* : Ananthasubramanian & Ananthakrishnan, *Rec. zool. Surv. India*, 68 : 255.

Head about two and a half times wider than long. Ocelli nearer to eyes than to each other ; pronotum black with large tubercles and granules ; posterior process broadly triangular, a little elevated behind disc, tegmina about 2.5 times longer than wide, punctate and black, veins more or less infascate, apical area tinted with reddish brown patches ; hind wing with 3 apical cells, legs moderate, tibiae prismatic ; anterior trochanters unarmed within.

*Material examined* : 1 example. INDIA : West Bengal, Calcutta, 7.viii.1914, Coll. ?

*Remark* : The species is common in South India and rather rare in West Bengal including Calcutta where it is recorded as early as 1914.

#### SUMMARY

The paper sets out to provide a first comprehensive account on the systematics of the family Membracidae from Calcutta and its environs. It incorporates 14 species under 6 genera belonging to 5 tribes distributed over 2 subfamilies. Tribal, Generic and Specific diagnoses have also been included. Besides, running keys for the subfamilies, tribes, genera and species have been provided. List of synonymies, wherever necessary and notes on the geographical distribution have also been given for the taxa. Literature relevant to the present contribution have been furnished under references.

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