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A new species of Singapora Mahmood attacking Derris robusta in Assam, with a key species (Homoptera : Cicadellidae)

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Summary

A new species, **Singapora arifi**, found breeding on **Derris robusta** in Assam, India, is described here. Members of the genus **Singapora** Mahmood occur on trees rather than on herbaceous plants. A list of and a key to the species of **Singapora** is also provided. At present this small but important genus is in some confusion and needs clarification.

Introduction

Amongst the Hemiptera received from Assam, India, for identification, there were seven specimens, 2 immatures, ♀ and 4 ♂♂ of a leafhopper species of the genus *Singapora* Mahmood. These were collected from *Derris robusta*. The presence of immature individuals proved that the leafhopper was breeding on the plant on which it was found and therefore *D. robusta* is its true host plant. So far members of this genus listed below have been recorded from the following host plants and localities:-

1. *Singapora cyclops* (Kusnezov, 1932) on *Tamarix* sp. - Central Asia, Kheva and Koschkupir.

2. *Singapora shinshana* (Matsumura, 1932) from Taiwan. Also later recorded from China and North Korea (Dworakowska, 1970).

3. *Singapora nigropunctata* Mahmood (1967), on *Pterocarpus indicus*, from Singapore.

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4. *Singapora diversa* Ghauri, 1975, on *Pterocarpus macrocarpus* from Bangkok, Thailand. Later collected in large numbers from the same host plants and the type locality by Dworakowska (1983).

5. *Singapora indica* (Ramakrishnan et Menon, 1973) from Haryana. Later recorded on *Albizzia* sp. from Madhya Pradesh and described as *Singapora aquilla* by Dworakowska (1981) and later synonymised by her in 1983.

6. *Singapora viridis* Dworakowska, 1983, from 27 km N. of Biligirirangan Hill, South India. *Singapora viridis* Dworakowska, 1983, is a new name given to an earlier redescription by Viraktamath & Dworakowska (1979) given under the name of *Singapora indica* (Ramakrishnan et Menon, 1973), but that redescription is obviously based on wrong determination.

7. *Singapora fopingensis* Chou et Ma, 1981, from Fuping, Schaanxi, China. Host unknown.

8. *Singapora karnatakana* Viraktamath et Dworakowska, 1979, from Karnataka, India.

9. *Singapora shivae* Dworakowska, 1983, from Saraburi Province, Phu Khae, Thailand.

10. *Singapora arifi* species *novum*, on *Derris robusta* from Assam, India.

These species can be identified with the help of the following key which should be supplemented by the comparison of ♂ genitalia structures.

1 A large round black spot on the face (forehead), scutellum without dark spots; pronotum with yellow brownish markings .... *S. cyclops* (Kuznezov) (Central Asia)

— Pronotum without markings, or if pronotum with markings, then scutellum also maculate 2

2 Aedeagus with apical processes 3

— Aedeagus without apical processes 6

3 Anal tube process very small; ♂ head and face immaculate, ♀ vertex with a black spot continued on face; scutellum immaculate, apex of paramere with «heal» small, only about one-sixth of its total length (minus basal apodeme); aedeagus with gonopore apical, processes about half as long as length of its shaft ..... *S. diversa* Ghauri (Thailand)

— Anal tube process in form of a long spine; ♂ & ♀ head with a black spot; scutellum apex black or immaculate; apex of paramere with «heal» short or long, when long more than half as long as its total length (minus basal apodeme), aedeagus with apical processes long or short 4

4 Apex of scutellum black; apex of paramere with «heal» short, aedeagal proces short ..... *S. nigropunctata* Mahmood (Singapore)

— Scutellum immaculate, apex of paramere with «heal» long, aedeagal processes short or long 5

5 Aedeagal processes short, their length equal to one-third length of aedeagal shaft ..... *S. fopingensis* Chou et Ma (China)

— Aedeagal proceses long, their length exual to not less then half length of aedeagal shaft ..... *S. arifi* sp. n. Ghauri

6 Anal tube spine long and fine ..... *S. shinshana* (Matsumura) (Taiwan, China & North Korea)

— Anal tube spine short and robust or thin 7

7 Anal tube process short and thick; apex of shaft of aedeagus minutely «T» shaped ..... *S. shivae* Dworakowska (Thailand)

— Anal tube process short and thinner; apex of shaft of aedeagus not «T» shaped 8

8 Sides of apex of shaft of aedeagus prominently serrated, serration in form of small teeth .... *S. karnatakana* Viraktamath & Dworakowska (South India)

— Sides of apex of shaft of aedeagus minutely serrated 9

9 Apex of shaft of aedeagus truncate ... *S. viridis* Dworakowska (India)

— Apex of shaft of aedeagus rounded with serrate margin ..... *S. indica* (Ramakrishnan et Menon) (India)

Singapora Mahmood

Mahmood, 1967, 20. Type-species, *Singapora nigropunctata* Mahmood. Ibid. *Singapora arifi* sp.n. (Figs. 1-16)

Colour. ♂ & ♀ light yellowish green, a round black spot at junction of vertex and frons; eyes and claws also black; veins of tegmen and hindwing brown, part of surface of tegmen coated with wax. Ocelli greenish.

Size (mm) ♂ .Width of head across eyes 0.88, the same between eyes 0.50; median length of vertex 0.16; width of pronotum at base 0.85; median length of pronotum 0.47; width of scutellum at base 0.70; median length of scutellum 0.62; length of tegmen 3.26; length of tegmen at claval suture 2.00; maximum width of frons across antennal sockets 0.39, length of frons 0.75; length of clypeus 0.19; maximum width of clypeus 0.23; total length of body of ♂ 3.10; of ♀ 3.41.

Structure. Head as wide as pronotum at base, vertex rounded, sligthly produced in middle, mid-length subequal to next to eye; pronotum widening posteriorly, arcuately rounded at anterior margin, concave at base, sligthly more than twice as wide as its median length; scutellum much wider at base than its median length; frons elongate, clypeus short. Body neither robust as for example in *Thaia,* nor delicate as in *Empoasca;* tegmina partly and wings shining. Ocellus nearer to central black spot than to eye.

♂ *genitalia, anal tube and other internal structures.* Pygofers simple, with few small apical setae (fig. 5); subgenital plates gently curved upwards when viewed laterally; dorsal margin with setae - thicker ones near base getting finer near apex, and a mesal row of fine setae also present *(vide* fig. 6). Anal tube well built with hooked well developed spinous processes; basal plate (connective) a broad-based triangle with narrowed apex, base much wider than median length (*vide* fig. 7); paramere (style) long with curved apex and well developed heal, length of space from heal to apex almost two-thirds length of remaining length minus basal apodeme-apex with transverse striations, in middle of its (paramere's length a group of setae located near a «knee» structure; aedeagus very well developed - shaft short and laterally flat with a dorsal bifurcate apodeme - arms short and broad, gonopore apical at sunken apex of aedeagus, shaft viewed dorsoventrally much narrowed just before wide apex, with a pair of large spines each more than half as long as its shaft, base broad, pear-shaped; preatrial appendage very long, reaching almost beyond apex of shaft of aedeagus, more than half apical length of pretrial appendage with strong serrational striations, almost in form of a twisted horn of a gazelle, base of preatrium where preatrial appendage arises much larger, pear-shaped, than base of aedeagal shaft *(vide* fig. 9). Abdominal apodemes very well developed when normal but due to ? parasitisation or some unknown reason could be reduced in size (cf. figs. 14&16). This comparison shows that the whole of the abdomen is affected and reduced; the 1st and 2nd abdominal spiracles, in both specimens, shows the same position in relation to the ventral apodemes.

Material examined. Holotype ♂ 925/6, India, Assam, Matelli Tea Estate 17.xi.1933 *(Dooars),* on *Derris robusta,* C.I.E. A.15663. Paratypes 3 ♂♂ 1 ♀ and 2 immatures, same data as that of holotype ♂. All in BM(NH), London.

Comperative remarks. The new species (♂ & ♀) is similar in coloration to colour of ♀ of *S. diversa* Ghauri (1975) and also in the shape of aedeagus and subgenital plate, but the form of basal plate (connective), paramere (style) and anal tube spines are totally different (cf. figs. 12,13,

7 and 8 with figs. 7,9,10 and 11 Ghauri 1975). The narrow apexed triangular basal plate is similar to that of *S. indica* (Ramakrishnan & Menon), *S. karnatakana* Viraktmath & Dworakowska, *S. shivae* Dworakowska and *S. viridis* Dworakowska; the shape of paramere is also similar to that of *S. viridis* Dworakowska, *S. karnatakana* Viraktamath & Dworakowska, *S. shivae* Dworakowska and *S. indica* (Ramakrishnan & Menon) but most similar to *S. fopingensis* Chou & Ma. From all previously known species, the new species can be differentiated with reference to the given key but also by comparing its ♂ genitalia with those of all these species.

Comments. It seems that there are two major groups of species within the genus *Singapora,* one with aedeagus with a pair of apical processes *(S. nigropunctata, S. diversa, S. fopingensis* and *S. arifi* sp.n. Group I) and the other lacking these structures *(S. indica, S. karnatakana, S. viridis* and *S. shivae,* Group II). The shape of the basal plate (connective) is not necessarily common to these groups because within the I group two shapes of basal plate occur, one triangular with almost a pointed apex (e.g. *S. arifi* sp.n.) and the other with broad apex *(S. nigropunctata, S. diversa).* As regards spines or processes of anal tube, they also very within each group.

This grouping is, therefore, unsatisfactory. When the form of two structures - the shape of the basal place (connective) and that of the paramere (style) - are taken together, the grouping seems more understandable, although within each of these groups thus constituted, the shape of the aedeagus will vary. These groups are represented by Group I, *S. nigropunctata* and *S. diversa.* Both these species have a broadly apexed basal plate combined with a short «heal» of the paramere; Group II is composed of *S. shinshana, S. indica, S. viridis, S. karnatakana, S. shivae, S. arifi* and probably (we do not know the shape of basal plate) *S. fopingensis;* these species have pointedly apexed basal plates and long «healed» parameres. The four species known to have apical processes of aedeagus - *S. nigropunctata, S. diversa, S. fopingensis* and *S. arifi,* occur across the boundaries of these two groups whereas, so far as is known, there is no such inconsistency in Group I, i.e. both *S. nigropunctata* and *S. diversa* agree in all the three characters: their basal plate is broadly apexed, the «heal» of their paramere is short, the aedeagus has apical processes. In Group II, *S. fopingensis* and *S. arifi* have apical aedeagal processes while these are lacking in *S. shinshana, S. indica, S. viridis, S. karnatakana* and *S. shivae.*

Another point of interest worth noting is the host range of the species of *Singapora.* The species with known host data show that they are tree dwellers, feeding on the sap of such genera as *Pterocarpus, Derris, Tamarix* and *Albizzia.* Their distribution range covers both wet forests as well as semi-arid and arid regions.

The following four species of *Singapora:*

Singapora indica (Ramakrishnan & Menon, 1973)

Singapora viridis Dworakowska (1983)

Singapora shivae Dworakowska (1983)

Singapora karnatakana Viraktamath & Dworakowska (1979)

form a closely knit group, if one takes a charitable view; on the other hand these may be variable forms of the same species in which case *S. viridis, S. shivae* and *S. karnatakana* should be considered as synonyms of *S. indica.* The listing of differentiating characters between «*S. indica*» (Viraktamath & Dworakowska 1979) (later named *S. viridis* Dworakowska 1983) and *S. karnatakana* on page 89 (Viraktamath & Dworakowska 1979) are reminiscent of a similar list on page 174 (Dworakowska 1981) of differentiating characters between *S. aquilla* (Dworakowska 1981) and *S. indica* (Ramakrishnan & Menon). These differences were later (Dworakowska 1983) considered to be invalid and *S. aquilla* was sunk by the same author (Dworakowska 1983). The basal apodemes of the abdomen are subject to variation in size, especially, it seems, in *Singapora,* due to some, at present, unknown reasons. This can be seen in the now newly described species *S. arifi* sp.n. (compare fig. 14 & fig. 16).

A review of the literature, particularly contributions by Dworakowska (1983, 1981 & 1970), Dworakowska & Sohi (1978) and Viraktamath & Dworakowska (1979) revealed a «jungle» of confusion compounded by contrary directions taken by the author Dworakowska who did not hesitate to drag behind her, otherwise sane and able persons like Sohi and Viraktamath. Dworakowska usually indulges in «nit-picking» and condemns out-of-hand any attempt to formulate a key, the sole purpose of which activity is to facilitate routine identification of species. Every key has its limitations and is therefore always subject to revision. For, however perfect a key is at the time of its formulation, unknown species later discovered would run to or near an old species, from which the new species should be differentiated and the old key appropriately reconstructed and recast. In any case, one of the methods of discovering a new species is to run it into the existing key to test its status. Surely, this is the way to justify the publication of description of new taxa. To say that colour is or is not a reliable key character is a fallacy. Some patterns of colour are constant and form firm bases as key characters; while others are varible within a narrow or wide spectrum and should be treated and handled with care. These cautionary instructions are and should be included at the beginning or at the end of a key or inserted at appropriate places into the introductions or concluding remarks.

It is no good hiding one's phobia of constructing keys behind untenable accusations and out-of-hand condemnations of others' attempts, however feeble these may be.

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The specific name, *Singapora arifi* sp.n., is dedicated to the well-known poet and broadcaster of Urdu and Hindi, Professor Iftkhar Arif, Honorary Secretary of the Urdu Markaz, London, U.K., in recognition of his valuable contributions to the promotion of the major languages of India, both in the Indo-Pakistan subcontinent and abroad, especially in the United Kingdom, Canada and the United States of America.

Özet

Assam'da **Derris robusta**'da zarar yapan **Singapora** Mahmood cinsine bağlı yeni bir tür ve aynı cinse bağlı diğer türlerle ilgili teşhis anahtarı (Homoptera: Cicadellidae)

Yeni bir tür olan **Singapora arifi** Assam'da (Hindistan) **Derris robusta** üzerinde beslenmektedir. **Singapora** cinsine bağlı türlerin konukçuları otumsu bitkilerden çok ağaçlardır. Bu makalede halen küçük fakat ekonomik bakımdan önemli olan **Singapora** cinsi ele alınarak buna bağlı türlerin bir listesiyle teşhis anahtarı verilmiş ve yeni bulunan bir türün de tanıtılması yapılmıştır.

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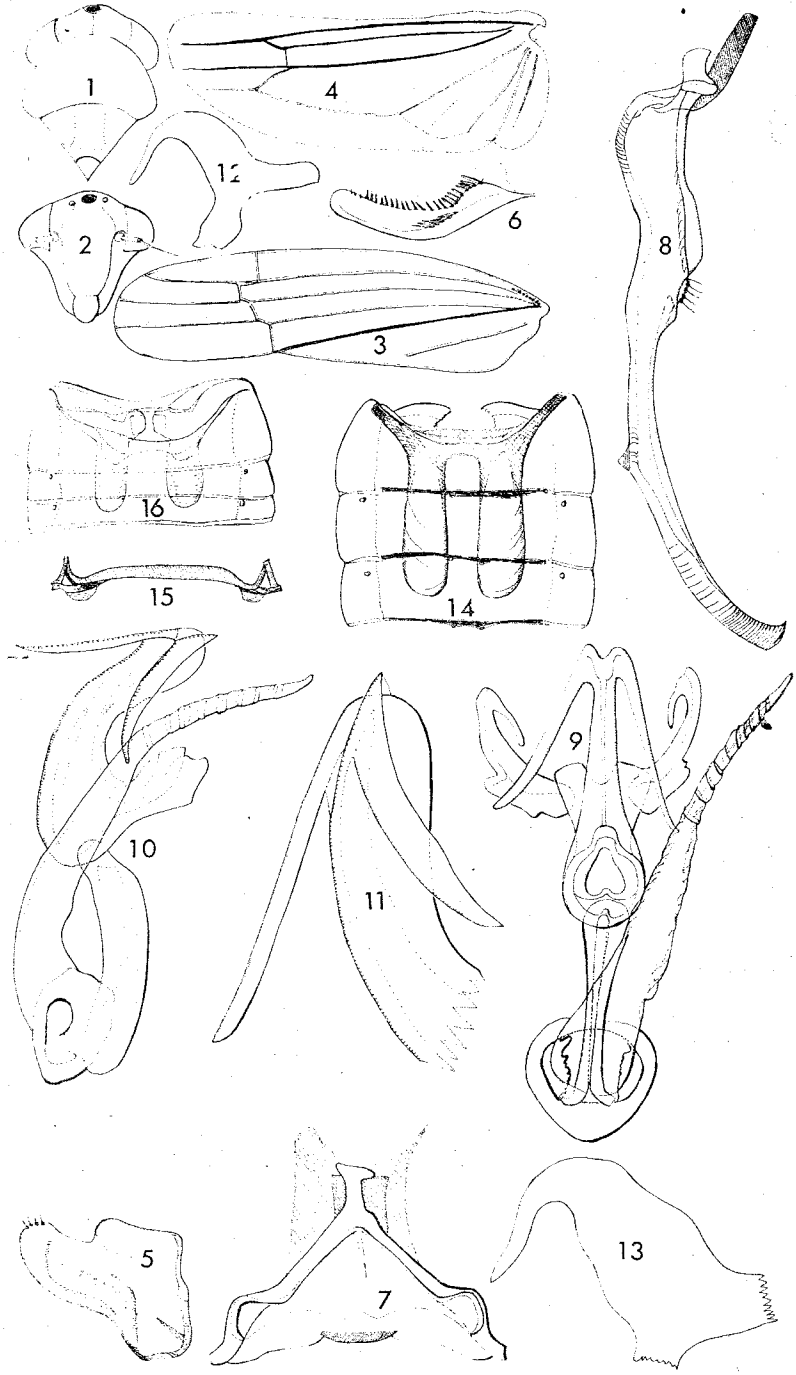
Explanation of figures

Singapora arifi sp.n. (♂) Figs. 1 - 16.

1. Head and thorax, dorsal view; 2. face; 3. tegmen, 4. hindwing; 5. pygofer, anal tube not shown; 6. subgenital plate, lateral view; 7 basal plate; 8. paramere, dorsal view; 9. aedeagus, ventral view along with anal tube processes; 10. the same lateral view, without anal tube processes; 11. apex of shaft of aedeagus, lateral view, much enlarged; 12. anal tube process, lateral view; 13. the same, apex only, slightly different view, much enlarged; 14. base of abdomen, normal, showing healthy ventral apodemes; 15. dorsal apodeme of same; 16. base of abdomen, abnormal, showing reduced ventral and dorsal apodemes.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