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### New Paraboloponinae from the Subhimalayan Region (*Insecta, Homoptera, Cicadelloidea, Tassidae*)

With 69 Figures

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London Bangalore

**Abstract.** Two new genera represented by six new species belonging to the subfamily Paraboloponinae are illustrated and described here. They seem to be very sparsely distributed in the subhimalayan region of Pakistan, India and Nepal, and almost exclusively confined to *Pinus* spp. In spite of being few, within two of the new species described, there are diseased as well as healthy ♂♂; the cause of the "disease" is yet unknown but seems most probably to be parasitism by other insect species. Amongst others, this "disease" might be one of the limiting factors for their low population.

#### Introduction

The following descriptions of two new genera and six new species belonging to the subfamily Paraboloponinae are based upon material from Pakistan, retained earlier for study, and later augmented by collections in India and Nepal by Dr. A. S. SOHI, of Punjab Agricultural University, Ludhiana, Dr. V. K. THAPA of the University of Agricultural Sciences, Bangalore, Dr. V. C. KAPOOR of the Punjab Agricultural University Ludhiana, and two specimens from DISTANT's collection from the Indian Museum.

Earlier, WEBB (1981) published a monographic paper on the Paraboloponinae of Asian, Australasian and Pacific regions but did not include these taxa perhaps because of the paucity of material at that time. For historical review and the definition of the subfamily the above-mentioned work should suffice. However, the following remarks should be added in the definition of the subfamily, now:

Pygofer divided into a short dorsal lobe and a much larger ventral lobe with or without a large spine.

#### *Sohipona* gen. n.

Head, facial, i. e. ventral surface flat or partly concave but base of frons convex, vertex sharply carinate, disc with surface flat, anteriorly broad, delimited by equally sharp carinae forming antennal ledges, absent in middle, ocelli located just below anterior margin of vertex but distanced from antennal ledges, on dorsal side, disc of vertex flattish, central sulcus of vertex up to only middle of vertex, ventrally, frons narrow, flattish, clypeus also narrow extended beyond lorae, both frons and clypeus almost parallel-sided, lorae clearly defined, genal surface mostly depressed, base of frons convex, scape thick, pedicel normal, flagellum very long, thicker near base becoming finer towards apex, eyes "bulging" beyond anterior margin of vertex, i. e. not in line with it, median length of vertex more than its half width; pronotum almost twice as wide as median length, anterior much less convex than usually, lateral margin non-carinate; sinuate, almost as long as median length of vertex,

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scutellum-base slightly depressed, apex a little convex; tegminal venation with five apical and three ante-apical cells, costal cell with cross veins; setal arrangement at apex of hind femur is 1+1+2, i.e. all 4 arranged as fingers of a hand.

♂ genitalia and anal tube etc. Pygofer divided into two lobes, dorsal lobes, apex in form of a "punctate globule" or process, in diseased ♂♂ process might become elongated when normal is rounded or shortened when normal is elongate; lower lobe apex with or without a sharp spine, subgenital plate short triangular, base wide, external margin more or less sinuate, in diseased ♂♂ deeply sinuate, disc with numerous macrosetae, apex and external margin with microsetae; valve wide, short or moderately long in middle; anal tube elongate; basal plate (connective) "Y"-shaped with stem shorter than arm, in diseased ♂ entire size reduced and in extreme cases stem totally reduced; paramere (style) elongate, base not very wide, median claw almost totally reduced, apical claw blunt, external margin near apex with a row of microsetae, internal margin with few macrosetae, in diseased ♂♂ sharp median external angle blunted; aedeagus with broad base, sinuate stem, apex with not much ornamentation, gonopore apical; in diseased ♂♂ parts of aedeagus reduced in thickness.

♀ VII sternum Posterior margin deeply excavated, median length  $\frac{1}{2}$  to  $\frac{1}{3}$  of total length.

Type species *Sohipona sohii* gen. et sp. n.

### ***Sohipona sohii* sp. n. (Figs. 1–10)**

Colour Light greenish yellow, shining, eyes, veins of hind wings, base of ovipostor, sulcus of vertex and of scutellum, brown.

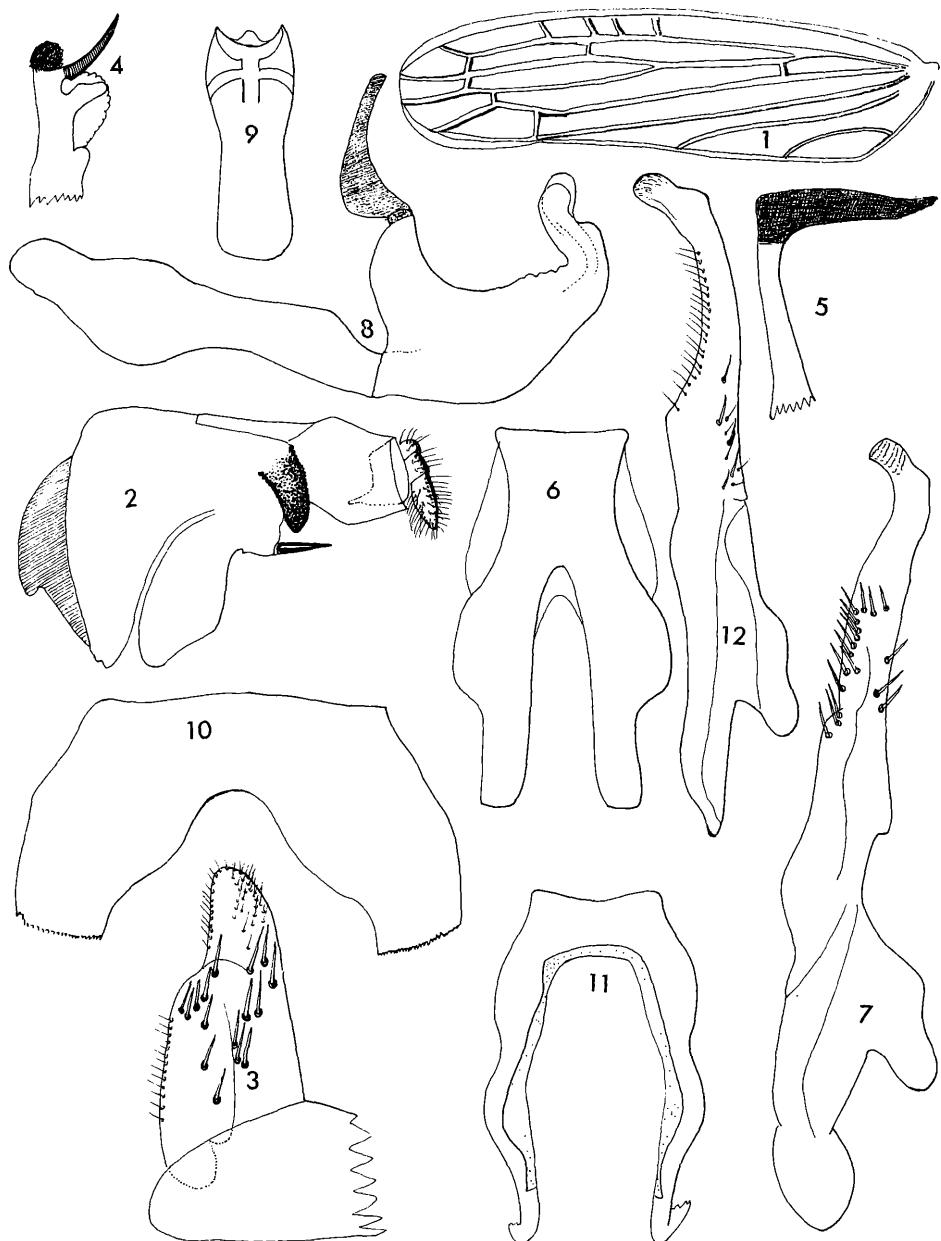
Size (mm). Maximum width across eyes, 1.64, length 6.00.

Structure Median length of vertex greater than next to eye; width of vertex between eyes twice width of one eye; median length of pronotum subequal to its half width; base of scutellum a little more than length of its lateral margin; tegmen much extended beyond tip of abdomen.

Male genitalia Mostly as described under generic definition; ♂ pygofer (Fig. 2), dorsal lobe's, process viewed laterally elongate, length of valve subequal to half its width, broadly triangular, subgenital plate external margin deeply sinuate, short triangular with wide base (Fig. 3), basal plate (connective) (Fig. 6) well developed, stem much shorter than arm, paramere (style, fig. 7) at apex curved, middle "claw" practically reduced; aedeagus (Figs. 8 & 9) short with broad base, in posterior view its apex as in fig. 9 not deeply excavated; ♀ VII sternum (Fig. 10), posterior margin deeply excavated, sides of excavation bisinuate; venation of tegmina (Fig. 1), crossveins of costal cell well defined.

Material examined Holotype ♂ India, Uttar Pradesh, Ranikhet, 8. XI. 1976 (V. C. KAPOOR). Paratypes 6 ♀♀ (one ♀ head missing), India, Himachal Pradesh, Solan, Sapron, 29. V 1975 (A. S. SOHII) ex *Pinus* sp., one ♀ same data as for Holotype ♂. Holotype ♂ and two Paratype ♀♀ in B.M. (N.H.), London; 5 ♀♀ paratypes in the University of Agricultural Sciences, Bangalore, India (U.A.S. Bangalore, India).

Comments The new genus *Sohipona* is unlike any given in the Key to Genera of Parabolponinae by WEBB (1981); the lateral margin of pronotum is not carinate but is long; setal formula of hind femur is 1+1+2; median length of vertex is only a little longer than next to eye; subgenital plate subequal or definitely longer than pygofer, the latter, divided into two lobes, the dorsal lobe being in form of a "punctate globule" or process, clypeus parallel-sided up to its greater length converging gently to its apex; face as a whole much wider than long, individual character such as the vertex is similar to that of *Oceanopona LINNAUORI*, or the ♀ VII sternum excavated somewhat like that of *Parohinta longiseta* (MELICHAR).

Figs. 1–10. *Sohipona sohii* gen. et sp. n.

1, tegmen; 2, pygofer, lateral view; 3, subgenital plate and right half of valve, ventral view; 4, apex of pygofer, ventral view; 5, spines of pygofer, different view from 5; 6, basal plate (connective), dorsal view; 7, paramere; 8, aedeagus and basal plate, lateral view 9, apex of aedeagus, posterior view 10, ♀ VIII sternum.

The generic and the specific names, *Sohipona sohii*, are given to these taxa in honour of Professor Dr. A. S. SOHI, of the Punjab Agricultural University, Ludhiana, India, who donated the specimens upon which these descriptions, as well as some others, are based. Professor SOHI has distinguished himself by his valuable contributions to the leafhopper taxonomy

***Sohipona webbi* sp. n. (Figs. 11–29)**

**Colour** Light greenish yellow, long preserved specimens becoming strawcoloured; eyes, median sulcus on vertex, transverse sulcus on scutellum and veins of hind wing dark brown.

**Size (mm).** Maximum width across eyes, 1.64, length 6.00.

**Structure** Median length of vertex (Fig. 13) greater than next to eye, width of vertex between eyes twice width of one eye; width of pronotum twice its median length; base of scutellum more than its lateral margin; tegmen extended beyond tip of abdomen. In addition to what has already been described under the generic definition, dorsal lobe's process of ♂ pygofers viewed laterally (Fig. 18 & 18A) is somewhat pear-shaped, in an affected ♂ this process is somewhat elongate; spine of lower lobe slightly longer than in *S. sohii* sp. width of valve (Fig. 22) twice its median length, its outline subquadrate, subgenital plate (Fig. 20) triangular, outer margin curved in healthy ♂ but deeply bisinuate in a diseased ♂ (Fig. 21); basal plate (connective) (Figs. 11 & 23) "Y"-shaped in a healthy ♂, stem much shorter than arm and "U"-shaped in a diseased ♂, stem being totally reduced, arms becoming elongate and thin; paramere (style, Figs. 12&24) elongate with "median claw" reduced to an angle, in both healthy and diseased ♂♂ not much different; aedeagus (figs. 25 & 26) base wide, apical part and basal dorsal apodeme reduced and thin in diseased ♂, in posterior view apex deeply excavated; ♀ VII sternum (Fig. 29) deeply excavated, each side of excavation with a small tooth; crossveins of costal cell poorly defined (Fig. 16).

**Material examined** Holotype ♂ (S. No. 1413) Pakistan, Thandiani, 17 VII. 1963 (Dr. GHULAMULLAH, Forest Institute, Pakistan), ex *Viburnum*. Paratypes One diseased ♂ (S. No. 1412), same data as for holotype ♂. One ♀ (No. 509), Jabbri, 26. IX. 1963 (S. M. KHAN) ex *Acacia modesta*. One ♀ (No. 567), Palla, 4. IV 1962 (C. I. B. C., Pakistan) ex *P. excelsa*. Holotype ♂ & one ♂ and one ♀ Paratype in B. M. (N. H.), London; Paratype in U. A. S., Bangalore.

**Comments** Similar to *S. sohii*, differing by the shape of dorsal lobe's process of ♂ pygofers, valve, apex of aedeagus, ♀ VII sternum and, to some extent, shape of its basal plate, as will be obvious by comparisons of the figures of these structures in the two species. The affected parts of the diseased ♂ are illustrated to avoid the possibility of such a specimen being described as a "new species"

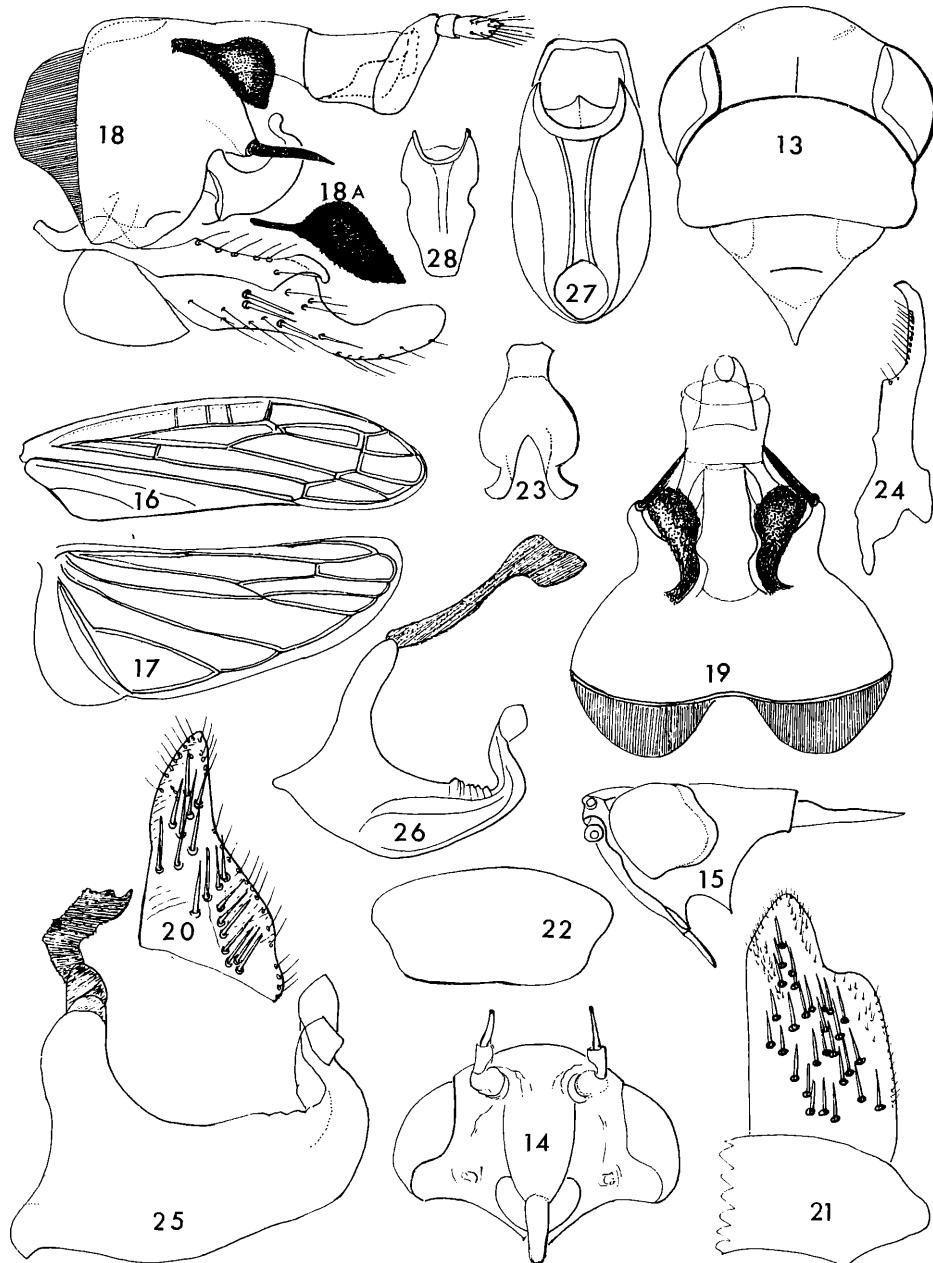
The new species *S. webbi* is named after Mr. M. D. WEBB of B. M. (N. H.) London, for his interest in this subfamily, and as a mark of our gratitude for extracting from the Museum collection some of the specimens used in this study

***Sohipona thapai* sp. n. (Figs. 30–41)**

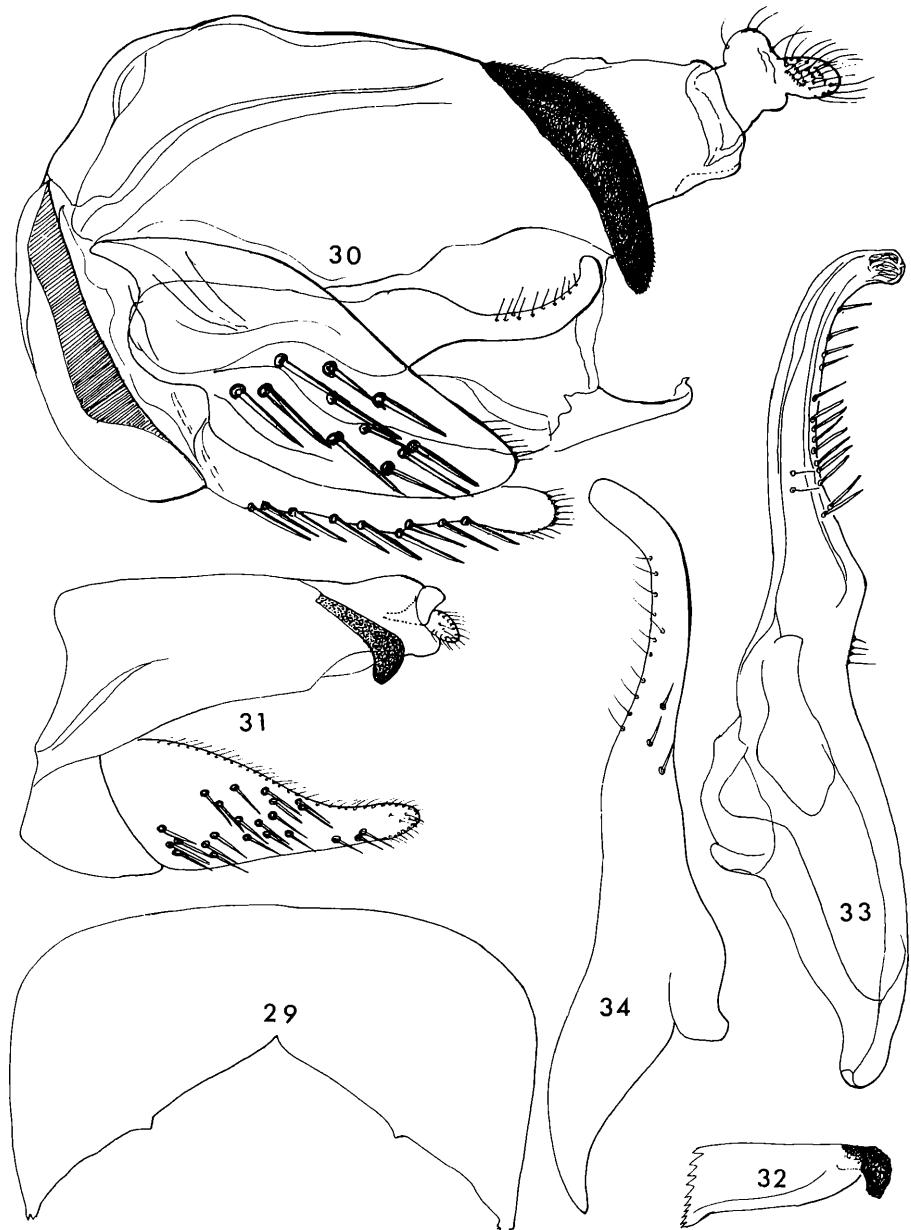
**Colour** Greenish yellow, eyes and antennal flagellum brown, other markings described as dark brown in previous species such as sulci and hind wing venation, are either not brown at all or only slightly so in *S. thapai*.

**Size (mm).** Maximum width across eyes, 1.50, length of body, 5.30.

**Structure** Median length of vertex greater than next to eye, width of vertex between eyes less than twice width of an eye, basal fascial area triangular; width of pronotum twice its median length; base of scutellum more than its lateral margin; tegmen extended beyond tip of abdomen. ♂ pygofers (Figs. 30, 31 & 32) longer than in previous species, as long as subgenital plate, dorsal lobe long and narrow; subgenital plate (Fig. 36) triangular, long, its outer margin smoothly bisinuate; valve broadly triangulate; anal tube moderately long;

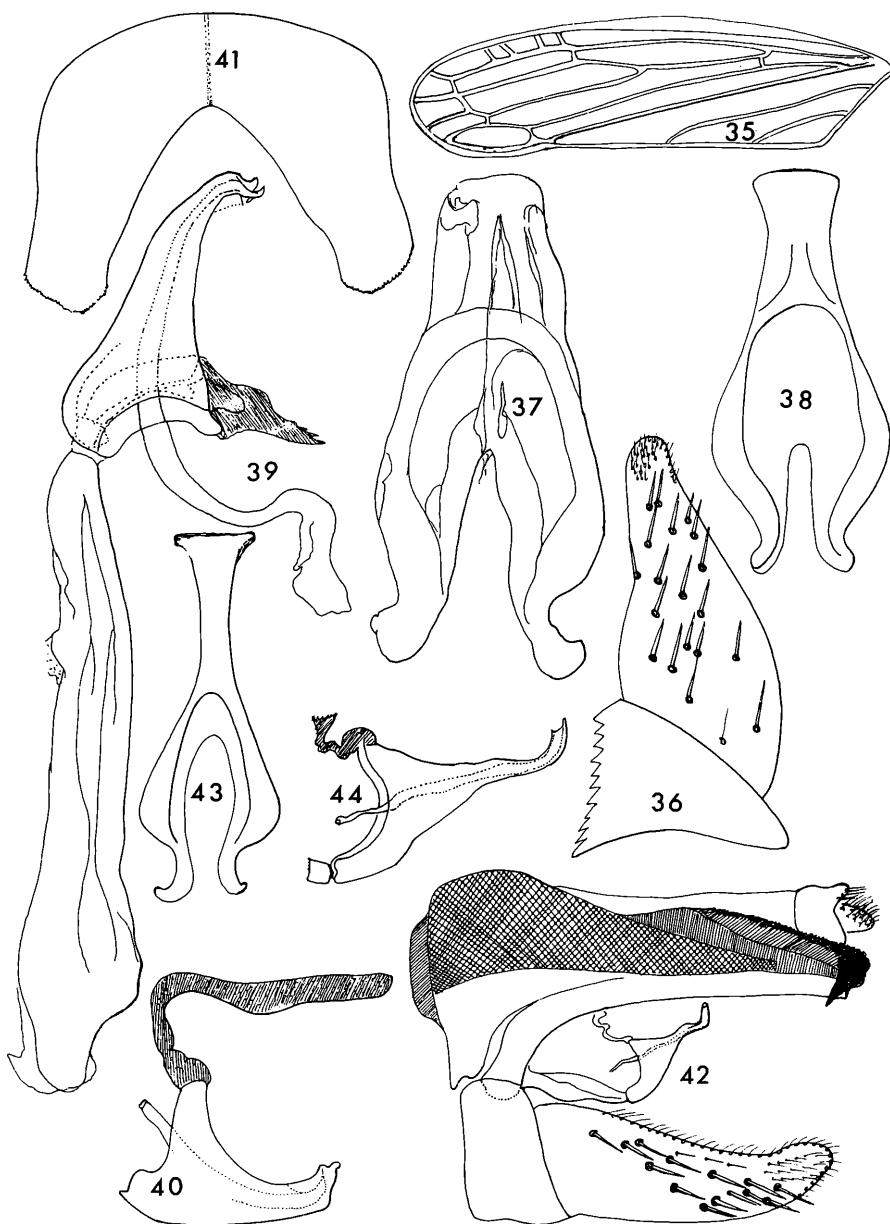
Figs. 11-29. *Sohipona webbi* gen. et sp. n.

11, basal plate of a diseased ♂, note the total disappearance of "stem" of "Y" and the reduction of thickness of "arms" of "Y"; 12, paramere of a diseased ♂, note reduction of sharp points on external margin (cf. fig. 24 with this); 13, head and thorax of ♂, dorsal view; 14, face of ♂; 15, head and thorax of ♂, lateral view; 16, tegmen; 17, hind wing; 18, pygofer, valve and subgenital plate, lateral view, of a healthy ♂; 18A showing diseased ♂'s process of dorsal lobe; 19, pygofer of healthy ♂, dorsal view; 20, subgenital plate, ventral view, of healthy ♂; 21, the same and half of valve of a diseased ♂; 22, valve of a healthy ♂; 23, basal plate (connective) of healthy ♂, on a smaller scale; 24, paramere of healthy ♂, on a smaller scale; 25, aedeagus of healthy ♂, lateral view; 26, the same of diseased ♂; 27, aedeagus of healthy ♂, posterior view (on a larger scale); 28, the same of a diseased ♂ (on a much smaller scale); 29, ♀ VIII sternum.



Figs. 30–41. *Sohipona thapai* gen. et sp. n.

30, pygofer, anal tube, subgenital plate, valve including genitalia of healthy ♂, lateral view; 31, pygofer, anal tube, subgenital plate + valve of diseased ♂, lateral view; 32, dorsal lobe of pygofer of same, lateral view; 33, paramere of healthy ♂; 34, the same of diseased ♂; 35, tegmen; 36, subgenital plate and half of valve of diseased ♂, ventral view; 37, basal plate (connective) of healthy ♂, dorsal view; 38, the same of diseased ♂; 39, aedeagus and basal plate of healthy ♂, lateral view; 40, aedeagus of diseased ♂, lateral view; 41, VII sternum of ♀.

Figs. 42–48. *Sohipona habibi* gen. et sp. n.

42, pygofer, anal tube, subgenital plate, valve, basal plate (connective), lateral view; 43, basal plate (connective), dorsal view; 44, aedeagus (much enlarged), lateral view; 45, ♂ head and thorax, showing one very long antenna characteristic of Paraboloponinae, other antenna omitted; 46, subgenital plate and valve, ventral view; 47, apex of dorsal lobe of pygofer (much enlarged), full lateral view; 48, paramere.

basal plate (connective, Figs. 37 & 38) "Y"-shaped, stem much shorter, equal to about half length of arm; paramere (style, figs. 33 & 34) long, median claw totally reduced, apex gently curved; aedeagus (Figs. 39 & 40) with short apex, broad base. ♀ VII sternum (Fig. 41) deeply excavated, each margin of excavation only very slightly sinuate, almost smooth; crossveins of costal cell well defined (Fig. 35); in a diseased ♂ paratype process of dorsal lobe of pygofer reduced in size (Fig. 31), base of aedeagus (Fig. 40), basal plate (Fig. 38) and paramere (Fig. 34) also show some reduction in size and development.

**Material examined** Holotype ♂ India, Himachal Pradesh, Solan, Saproon, 29. V. 1975 (A. S. SOHI) ex *Pinus* sp. Paratypes 1 ♂, 3 ♀♀, Nepal, Kathmandu, Kirtipur, 6. VIII., 6. IX. 1979 (V. K. THAPA) ex *Pinus* sp. Holotype ♂ and Paratype ♀, 1 Paratype ♂ (diseased) in B. M. (N. H.), London; ♀♀ Paratype in U. A. S., Bangalore, India.

**Comments** *S. thapai* sp. n. is closely related to both *S. sohii* sp. n. and *S. webbi* sp. n. but could be easily differentiated by the absence of long seta on the ventral lobe of its pygofer, in addition the shape of basal plate (in both healthy and diseased ♂♂) and the apex of paramere differ as shown in respective figures.

The new species is named in honour of Dr. V. K. THAPA who has contributed greatly to the taxonomy of leafhoppers of Nepal. It is hoped that he will continue to do so in the future as well.

### ***Sohipona habibi* sp. n. (Figs. 42–48)**

**Colour** Yellow, eyes brown with reddish tinge.

**Size (mm)** Maximum width across eyes 1.50, length of body 5.90.

**Structure** Externally similar to *S. thapai* sp. n. but anterior margin of crown, i. e. vertex, slightly concave next to eye (Fig. 45), carina of vertex sharper; outline of "base of face" more triangular compared to that of previous species; ♂ pygofer very elongate, so are the anal tube and subgenital plate (Figs. 42 & 47) with smoothly bisinuate lateral margin; basal plate (connective, Fig. 43) thinly developed; aedeagus (Fig. 44) with longish apex; paramere, external margin with well defined "angle" (Fig. 48).

**Material examined** Holotype ♂ (23): India, Kumaon, Dharmoti, 9. VI. 1912 (F. W. Zull coll. [Z. S. II]) from Indian Museum, DISTANT coll. B. M. 1911–383. In B. M. (N. H.) London.

**Comments** *Sohipona habibi* sp. n. closely resembles *S. thapai* sp. n. from which it mainly differs by its elongate pygofer and spinous apex of dorsal lobe (cf. Figs. 30, 42 & 47).

The new species *Sohipona habibi* sp. n. is named in honour of Mr. HABIB HYDERABADI, a friend of one of us (M. S. K. G.'s). Mr. HYDERABADI is a well known author and a distinguished poet who has also served the community as a Justice of the Peace. He has shown a rare scientific keenness in arranging the first public library of oriental books during the early sixties in the U. K. He also published one of the first books listing several literary personalities along with their short biography and contributions on behalf of the newcomers from India and Pakistan to the cultural scene of the United Kingdom.

### ***Shivapona* gen. n.**

Head, facial, i. e. ventral surface slightly convex, area just below anterior margin of vertex shallowly concave, vertex, disc surface slightly convex and at anterior margin not clearly carinate, but with transverse minor unparallel carinations, antennal ledges in form of short, sharp carinae, absent in middle, ocelli located on border of vertex and face, on marginal carina of vertex distant from antennal ledges, central sulcus of vertex only up to middle of vertex, frons divergent towards base, slightly convex, clypeus narrow, long, almost parallel-sided, extended beyond lora, genae shallowly depressed, scape and pedicel not much different in thickness, filament very long, thicker at base, very fine at apex, eyes only slightly

bulging beyond outline of vertex; pronotum, length half than width at base, anteriorly well arched, lateral margin non-carinate, less than half median length; scutellum, disc and apex slightly depressed, lateral anterior angles slightly raised; tegminal venation similar to that of *Sohipona* except that crossveins in costal cell much less evident; setal arrangement of hind femur 2+2.

*♂ genitalia*, anal tube etc. Pygofer divided into two lobes, dorsal lobe's apex in form of a sharpish spine; ventral lobe's apex without major seta; subgenital plate short, triangular, apex blunt, external margin slightly curved, disc with numerous macrosetae, external marginal setae fine; valve wide, short; anal tube short; basal plate (connective) "Y"-shaped with stem very long, at least 1<sup>1</sup>/<sub>2</sub> times longer than arm; paramere (style) long with broad base, middle "claw" in form of definite angle, apical "claw" blunt; a group of setae near "median claw" aedeagus with wide apex, profusely ornamented with numerous teeth-like projections, base more or less as wide as apex, gonopore subapical.

*♀ VII sternum* Posterior margin deeply excavated, median length more than half total length.

Type species *Shivapona shivai* gen. et. sp. n.

#### **Shivapona shivai sp. n. (Figs. 49–60)**

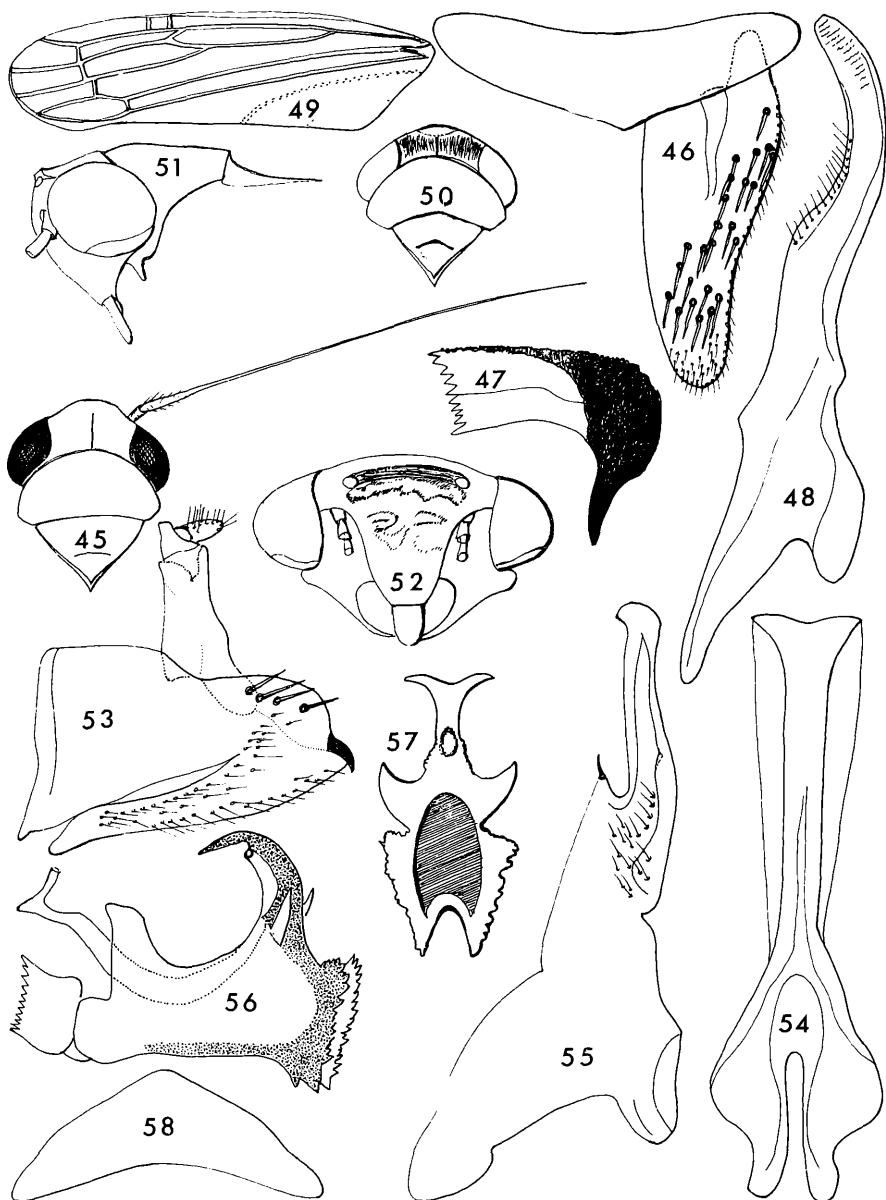
**Colour** Straw yellow with reddish brown eyes; vertex along with base of frons with fine brown longitudinal streaks; ocelli yellow tip of rostrum and claws brown; pronotum with light brown faded markings, scutellar cross-sulcus brown.

**Size (mm).** Maximum width across eyes, 1.50; length, 5.00.

**Structure** Median length of vertex less than half width of vertex, anterior and posterior margins of vertex almost parallel; ocelli partially visible in dorsal view, nearer to margin of eye than mid-line of vertex; median length of pronotum subequal to half its width, its posterior or basal margin concave (Fig. 50); base of frons, especially just under marginal ridges of vertex deeply depressed (Figs. 51 & 52) (as against swollen in all species of *Sohipona*); antennal ridges sharp, antennal pits deep; clypeus at base wide, gently becoming parallel-sided towards its apex; pygofer (Fig. 53) long, dorsal lobe ending in a long sharp claw-like spine, anal tube moderately long; subgenital plate short, bluntly triangular (Fig. 59), valve widely triangular (Fig. 58); basal plate (connective, Fig. 54) elongate "Y"-shaped, "stem" almost twice as long as length of its arm; paramere (Fig. 55) with very wide base, external "middle angle" very well developed, almost pointed; aedeagus (Figs. 56 & 57) very elaborate, extreme apex with a row of teeth, dorsally with a pair of "spikes" gonopore under these dorsal spikes; ♀ VII sternum (Fig. 60) with a deep and wide emargination.

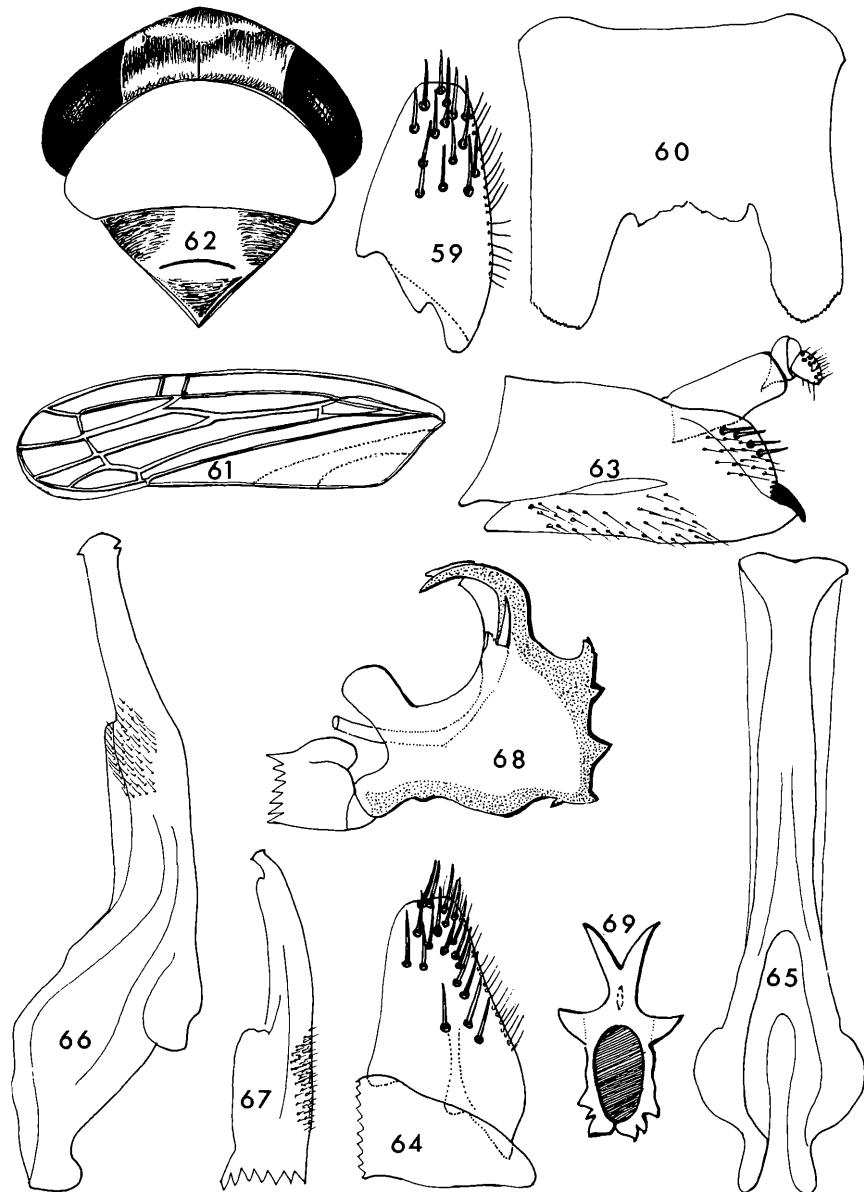
**Material examined** Holotype ♂: India, Solan; Saproon; 29. V 1975 (R. S. SOHI coll.) ex *Pinus*. Paratypes 1 ♀, 2 ♂♂, same data as Holotype ♂. Holotype ♂ & 1 ♀ paratype in B. M. (N. H.), London; 2 ♂♂ paratypes in U. A. S., Bangalore, India.

**Comments** The genus *Shivapona* is distinct from *Sohipona* by the shape of its vertex (surface) disc of which is slightly convex and is subparallel-sided as against that of the latter which is much longer in middle than next to eye (cf. figs. 50, 13 & 45) and whose disc is flat; upper margin of face, i. e. base of frons in *Shivapona* is on the whole concave whereas in *Sohipona* the same is convex; the terminal lobe of dorsal half of pygofer in *Shivapona* is replaced by a claw-like slim process, also in both species so far described under this genus, the long seta on the ventral lobe of pygofer is absent; this may be present or absent in *Sohipona*; basal plate (connective) is much more elongate, the stem being at least twice longer than its arm, than in *Sohipona* in which both parts are more or less of the same length; the aedeagus of *Shivapona* is much more elaborate with wide apex than a simpler structure in *Sohipona*. The convex surface of the vertex in *Shivapona* reminds one of the same in *Exitianus*, whereas in *Sohipona* that of the genus *Nephrotettix*, being flat.



Figs. 49–60. *Shivapona shivai* gen. et sp. n.

49, tegmen; 50, ♂ head and thorax, dorsal view; 51, the same, lateral view; 52, face; 53, pygofer and anal tube, lateral view; 54, basal plate (connective), dorsal view; 55, paramere; 56, aedeagus, lateral view; 57, apex of same, posterior view; 58, valve, ventral view; 59, subgenital plate, ventral view 60, VII sternum of ♀.

Figs. 61–69. *Shivapona shabnami* gen. et sp. n.

61, tegmen; 62, head and thorax; 63, pygofer and anal tube, lateral view; 64, subgenital plate and half of valve, ventral view; 65, basal plate (connective), dorsal view; 66, paramere; 67, apex of same; 68, aedeagus, lateral view; 69, apex of same, posterior view.

**Shivapona shabnami sp. n. (Figs. 61–69)**

**Colour** Similar to *S. shivai* except that brown pigmentation on head and face slightly with more emphasis, tegmen with yellow and light red patches.

**Size (mm).** Maximum width across eyes, 1.50; length 5.10.

**Structure** Median length of vertex (Fig. 62) much shorter than half width of vertex, and only slightly more than next to eye; other external features as in the previous species; pygofer (Fig. 63) slightly narrower and longer than in *S. shivai*; apex of subgenital plate (Fig. 64) blunter than in *S. shivai*; basal plate (connective) (Fig. 65), stem proportionately much longer than in *S. shivai*; paramere (Figs. 66 & 67) external median "angle" less prominent than in *S. shivai*; aedeagus (Figs. 68 & 69) with at "apex" fewer but larger teeth than in *S. shivai* sp. n.

**Material examined** Holotype ♂ India, Kumaon, Airadeo, 9. VI. 1912 (for Zull coll. ?Z. S. I.) from Indian Museum, DISTANT coll. BM. 1911–383. In B. M. (N. H.), London.

**Comments** *Shivapona shabnami* sp. n. is very closely related to *S. shivai* but mainly differs in shape of head, basal plate (connective) and aedeagus, as related under its description.

The new species *Shivapona shabnami* sp. n. is named in honour of Mrs. SIDDIQA SHABNAM HYDERABADI, President of Anjuman-e-Hyderabad and wife of Mr. HABID HYDERABADI. Mrs. SHABNAM HYDERABADI not only assisted her husband in all of his literary activities and shared achievements, but also is a distinguished poetess in her own right.

#### General remarks

The new genera *Sohipona* and *Shivapona* are distributed in the Subhimalayan region, Thandiani and Jabbri (Pakistan) in the West through Saproon, Solan (Himachal Pradesh, India) and Ranikhet (Uttar Pradesh, India), Dharmoti and Airadeo (Kumaon, Uttar Pradesh, India) to Kirtipur, Khatmandu (Nepal) in the East. The host plants are mostly *Pinus* spp. such as *Pinus excelsa*, and *Acacia modesta*.

In a comparatively small collection of 23 specimens representing two genera and six species it was surprising to find diseased ♂♂ amongst two of the new species. Unless one is careful, the diseased ♂ could be considered as a different species from their healthy representative. The different structures which are identifiably affected are pygofer, basal plate (connective), paramere and aedeagus, as detailed and illustrated under appropriate descriptions.

The head, particularly the shape of disc of vertex, is reminiscent of the genus *Exitianus* in *Shivapona* being slightly convex, and of the genus *Nephrotettix* in *Sohipona*, where it is flat.

The scarcity of specimens as a whole, as well as in each species, could be attributed to the activities of natural enemies of this group, apart from the cooler climate of the region.

#### Reference

WEBB, M. D., 1981 The Asian, Australasian and Pacific Paraboloponinae (Homoptera Cicadellidae). A taxonomic revision with a key to all the known genera of the subfamily – Bull. Br. Mus. nat. Hist. (Ent.) (2) 43 39–76.

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