

## On the Erythroneurine genus *Salka* in Taiwan (Auchenorrhyncha, Cicadellidae, Typhlocybinae)

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**Abstract:** Seven new species related to *Salka lobata* Dworakowska (*Salka decorata*, *S. gviądzka*, *S. remanei*, *S. wiejska*, *S. mamiya*, *S. gazza*, *S. yeroboa* nov spp.) and three new species related to *S. nigricans* (Matsumura) (*Salka opta*, *S. qusa*, *S. yvona* nov. spp.), are described.

**Zusammenfassung:** Zehn neue Arten der Gattung *Salka* Dworakowska werden beschrieben. Sieben davon (*Salka decorata*, *S. gviądzka*, *S. remanei*, *S. wiejska*, *S. mamiya*, *S. gazza*, *S. yeroboa* nov spp.) sind mit *Salka lobata* Dworakowska, drei (*Salka opta*, *S. qusa*, *S. yvona* nov. spp.) mit *Salka nigricans* (Matsumura) näher verwandt.

**Key words:** Auchenorrhyncha, Cicadellidae, Typhlocybinae, *Salka*, new species, Taiwan.

### 1. Introduction.

So far 52 species of the Oriental genus *Salka* Dwor. are known (Zhang *et al.* 2009, a review) 18 of them from Taiwan. Although, to a considerable degree, this reflects a collection bias, the fauna of the island is disproportionately rich. The reason for this is the proximity to the land mass and Taiwan being on the route of typhoons from the direction of the Philippines. Dispersal of Typhlocybinae occurs by means of air transportation. The relatively high mountains of which more gently slopes face west run meridionally and are home to well preserved diverse habitats therefore they act like a wind trap for the fauna from the mainland. The winds from the south, despite making physical conditions during transportation of minute insects most unfavorable, provide a chance of successful colonization of suitable habitats on the small island because of their high frequency. The genus *Salka* in Taiwan exhibits great diversity allowing to distinguish several closer related groups of species. Two of these groups are represented among the 10 species new to science described below.

### 2. Material

The type series of newly described species are deposited in the following collections: BM – Bishop Museum, Honolulu, Hawaii, USA, MM – Moravian Museum, Brno, Czech Republic, and NMB – Museum of Natural History, Basel, Switzerland.

All species names, except when indicated otherwise, are to be treated as arbitrary combinations of letters; Nominativus Substantivum.

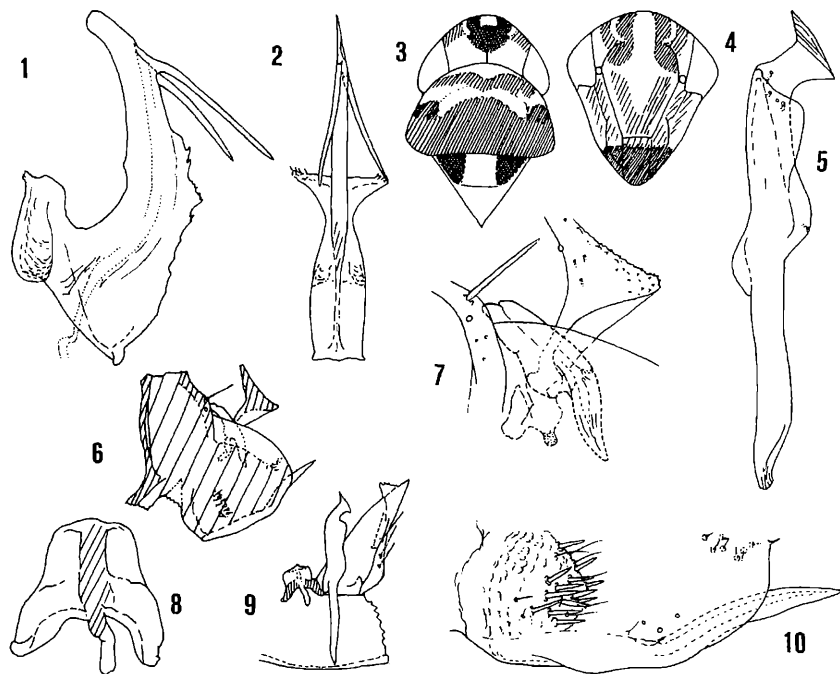
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### 3. Results

#### *Salka decorata* nov. spec. (Figs. 1 – 10)

Vertex sordid beige with large patch on anterior margin dark brown to blackish and two brown patches laterally (Fig. 3). Face dark beige to light brownish beige, with dark pattern brown apically, light brown in centre and dark brown to blackish basally (Fig. 4), pedicel dark brown. Pronotum brown, with areas in its anterior half dark beige. Scutum and scutellum sordid beige to yellowish beige, basal triangles brown. Fore wing brownish, brochosome field and area basad of it brown, margins and veins slightly infuscate except CuA and CuP pale and narrowly bordered with whitish, r and 3<sup>rd</sup> apical cell slightly darker, c cell apicad of brochosome field and 4<sup>th</sup> apical cell whitish. Length, male and female: 4.30 mm.



Figs. 1 – 10. *Salka decorata* sp. nov. 1: penis, side view – 2: penis, posterior view – 3: head and thorax, dorsal view – 4: face – 5: paramere – 6: proportions and pigmentation of pygofer side and segment 10 – 7: caudo-dorsal region of Fig. 6 – 8: connective – 9: proportions of connective, paramere, subgenital plate and sternite 9 – 10: ventral region of pygofer.

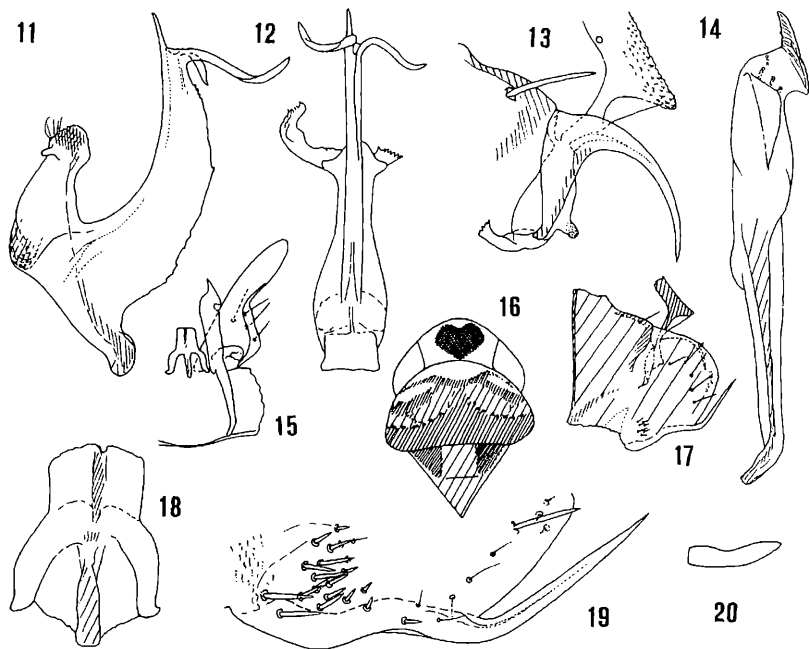
The most characteristic in male genitalia is penis stem laterally compressed, with long processes arising ventrad of gonopore, directed caudo-ventrad (Figs. 1 – 2), dorsal pygofer appendage shorter than pygofer lobe (Fig. 6), the ventral one solid, protruding caudad (Figs. 6, 10). The new species differs from *Salka lobata* Dwor. by almost symmetrical penis, short lamellate caudal part of paramere (Figs. 5, 9), long ventral pygofer appendage and distinctive colouration.

Holotype male: Central Taiwan, Sung-kang near Musha, 2044 m, 6.XII.1963, T.C. Maa (BM). Paratype female: same data as the holotype (BM).

The species name is an adjective referring to its ornate pigmented pattern.

### *Salka gviazdka* nov. spec. (Figs. 11 – 20)

Head yellowish to light ochre beige. Vertex with large patch centrally (Fig. 16) blackish brown. Pronotum anteriorly yellowish beige, branched transverse fascia brown, followed by large inverted V-shape mark beige brownish, broad transverse fascia at hind margin brown with olivaceous tint, the fascia bordered anteriorly with irregular row of blackish specks. Scutum and scutellum beige brownish, basal triangles brown to dark brown. Fore wing brownish, brochosome field and area basad of it brown, c cell apicad of brochosome field, 4<sup>th</sup> apical cell and costal part of 3<sup>rd</sup> apical cell whitish, areas mesad of the whitish streak darker brownish than remaining surface. Length, male: 3.50 mm.



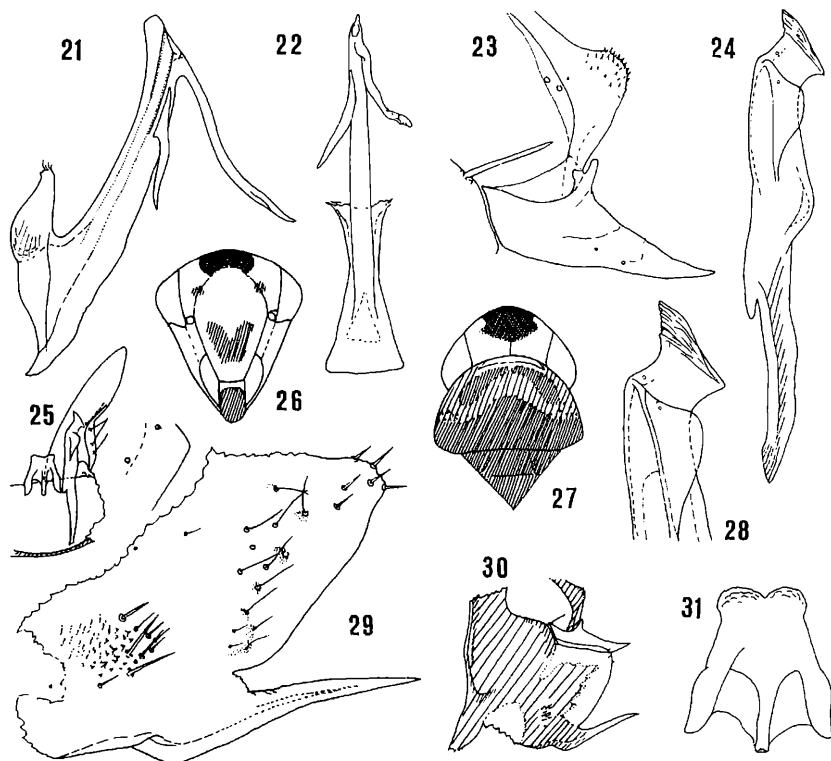
Figs 11 – 20: *Salka gviazdka* sp. nov. 20: outline of subgenital plate in intact terminalia, free hand drawing; other explanations as in *S. decorata*.

Male genitalia differ from *S. decorata* mainly by subapical penis processes irregularly twisted (Figs. 11, 12) and directed to sides, caudal part of paramere broader (Fig. 14), dorsal pygofer appendage thin, arcuate (Fig. 17), almost as long as dorsal margin of pygofer (Fig. 17) and ventral pygofer appendage slender (Figs. 17, 19). Colouration of the new species is distinctive.

Holotype male: Taiwan, Pihu, 49 km E of Taipei (Hwy 9 to Ilan), 18.II.1972, T.C. Maa (BM).

***Salka remanei* nov. spec. (Figs. 21 – 31)**

Vertex sordid yellowish, with large patch (Fig. 27) blackish. Face yellowish apically, with the blackish patch at apex. Almost whole anteclypeus, elongate bilobe patch in middle of frontoclypeus and two small roundish patches between bases of antennae and extremities of the blackish patch (Fig. 26), brown.



Figs. 21 – 31: *Salka remanei* sp. nov. 28: apical third of paramere – 29: pygofer, cephalic and dorsal parts of the lobe severed.

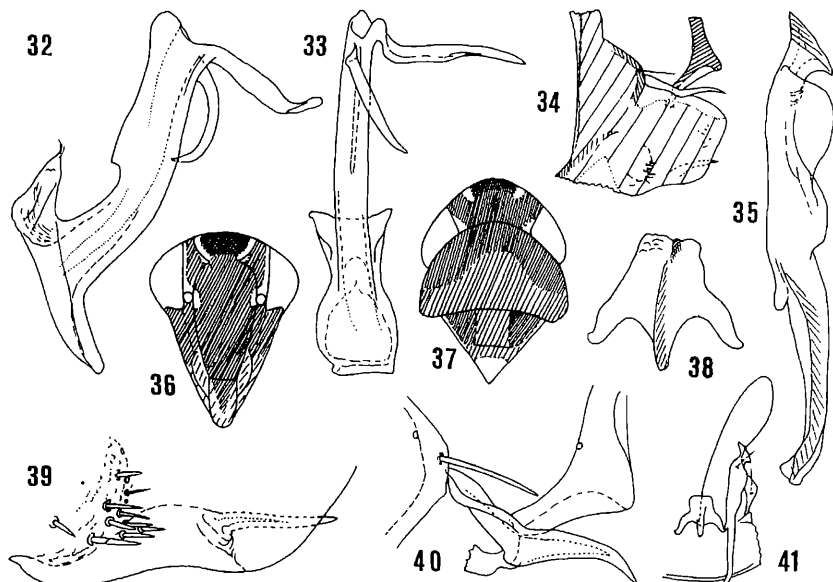
Pronotum, scutum and scutellum sordid dark brown. A small arcuate patch at anterior margin of pronotum light beige and sinuate transverse fascia at about its midlength sordid light brownish with dark brown specks laterally; scutum and scutellum lighter. Fore wing sordid dark brown, clavus and brochosome field darker. Costal cell caudad of brochosome field, 4<sup>th</sup> apical and costal half of 3<sup>rd</sup> apical cell light beige to whitish. In female the light areas larger and lighter than in male and hind margin of pronotum narrowly bordered with white. Female 7<sup>th</sup> sternite triangularly abruptly narrowed caudad, sordid dark brown basally, apical quarter beige, very apex brown. Legs beige to yellowish, anterior tibiae and tarsi sordid brown. Length, male 3.40 – 3.50; female 3.15 – 3.50 mm.

*Salka remanei* sp. nov. resembles the two other species described above differing from them by penis stem only slightly laterally compressed, with its processes sinuate, base of one of them shifted basad (Figs. 21, 22), caudal part of paramere broader (Fig. 24), dorsal pygofer appendage solid (Fig. 23), straight, longer than dorsal margin of pygofer lobe (Fig. 30), ventral pygofer appendage of medium size (Figs. 29, 30) and by distinctive colouration.

Holotype male: Taiwan, Chitou, 1200m, 28.VIII.1990, I. Dworakowska (MM). Paratypes 2 males, 3 females: same data as the holotype (MM, NMB).

The new species is named in honour of Adolf Remane, well known educator whose writings greatly contributed to refining morphological phylogenetic methods.

***Salka wiejska* nov. spec. (Figs. 32 – 41)**



Figs. 32 – 41: *Salka wiejska* sp. nov., explanations as in previous illustrations.

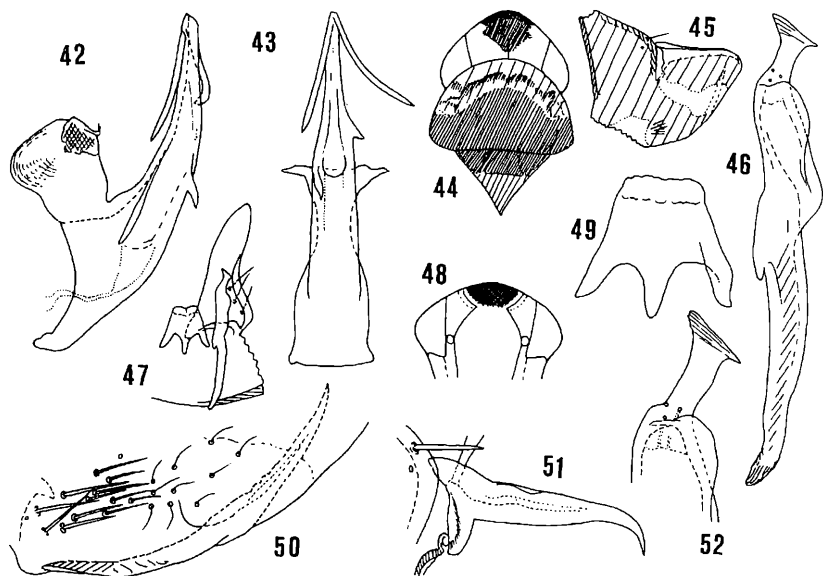
Vertex with large sordid brown patch covering most of its surface, the light areas in Fig. 37, brownish. Face brown to dark brown with small areas (light in Fig. 36) beige brownish. Lorae, anteclypeus and outer parts of genae basally brownish. Anterior part of pronotum and basal triangles sordid brown, posterior part of pronotum, centre of scutum and anterior part of scutellum light sordid brown, posterior part of scutellum sordid brownish. Fore wing brown with clavus, brochosome field and area basad of it darker, costal part of c cell apicad of brochosome field, costal parts of 4<sup>th</sup> and 3<sup>rd</sup> apical cells whitish, apical half of costal margin reddish. Length, male: 2.90 mm.

Male genitalia resemble *S. remanei* sp. nov. by places of origin of penis processes and their shape (Figs 32, 33). The new species differs from the previous one by caudal part of paramere narrower (Fig. 35), dorsal pygofer appendage slender (Figs 34, 40), ventral pygofer appendage shorter (Figs. 34, 39) and by distinctive colouration.

Holotype male: Taiwan, Hengchun, Pingtung Hsien, malaise trap in drainage gutter, 4.IV.1965, C.M. Yoshimoto (BM).

### *Salka mamiya* nov. spec. (Figs. 42 – 52)

Vertex dark sordid beige, with large patch (Fig. 44) dark brown. Face beige, darker in midline and apically, with large blackish brown patch occupying whole frons (Fig. 48). Pronotum mostly sordid brown, anteriorly light brownish beige with arcuate transverse fascia sordid dark brown. Scutum sordid dark brown. Scutellum sordid brownish. Fore wing brown, with veins darker and medial streak (in m and 2<sup>nd</sup> apical cell) and costal area caudad of brochosome field light beige, very commissural margin of clavus whitish. Length, male: almost 2.9 mm.



Figs. 42 – 52: *Salka mamiya* sp. nov., explanations as in previous illustrations.

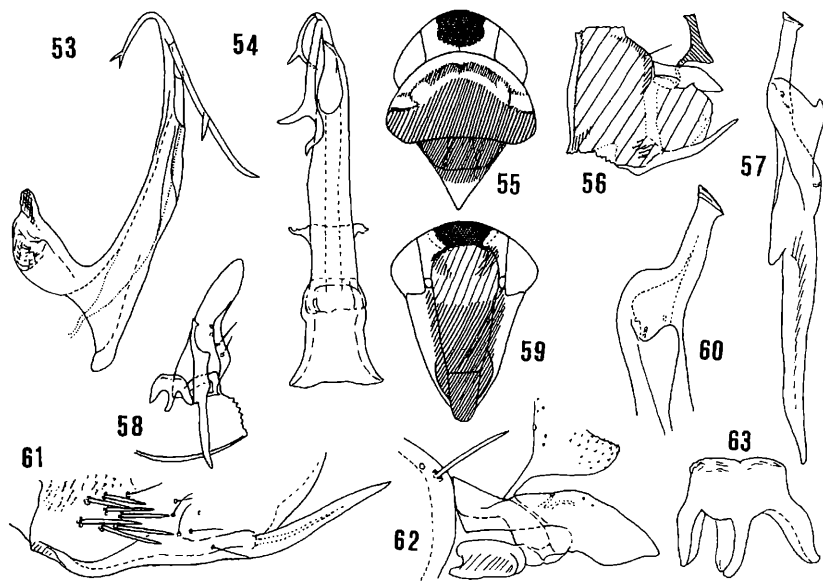
Male genitalia resembling *S. lobata* Dwor. by two short protrusions on penis stem but there are also two smoothly curved apical processes directed laterad (Figs. 42, 43); caudal part of paramere (Figs. 46, 52) elongate as in *S. lobata* but dorsal pygofer appendage in the new species is elongate, tapering and hooked apically (Figs. 45, 51) and ventral pygofer appendage straight and slender (Figs. 45, 51).

Holotype male: Taiwan, Wulai, Taipei Hsien, 150 m, 17.IV.1965, C.M. Yoshimoto (BM).

***Salka gaza* nov. spec. (Figs. 53 – 63)**

Vertex sordid beige with large patch (Fig. 55) blackish. Face (Fig. 59) laterally sordid beige, centrally brownish. Anteclypeus, lower 2/3 of frontoclypeus, pedicel and large patches between bases of antennae and apical blackish patch (joining it) sordid brown. Pronotum mostly sordid brown, a sinuate transverse fascia in its anterior part, scutum and anterior part of scutellum sordid dark brown, an arcuate patch along anterior margin of pronotum and posterior half of scutellum sordid beige with brownish suffusion. Fore wing sordid brownish with brochosome field brown, costal margin dark brown and a narrow stripe mesad of costal margin and caudad of brochosome field lighter. Length, male: 3.60 mm.

Male genitalia resemble *S. mamiya* sp. nov. but the two processes on apical protrusion in penis bifurcate (Figs. 53, 54), caudal part of paramere slimmer (Figs. 57, 60) and dorsal pygofer appendage lamellate in its caudal half (Figs. 56, 62).

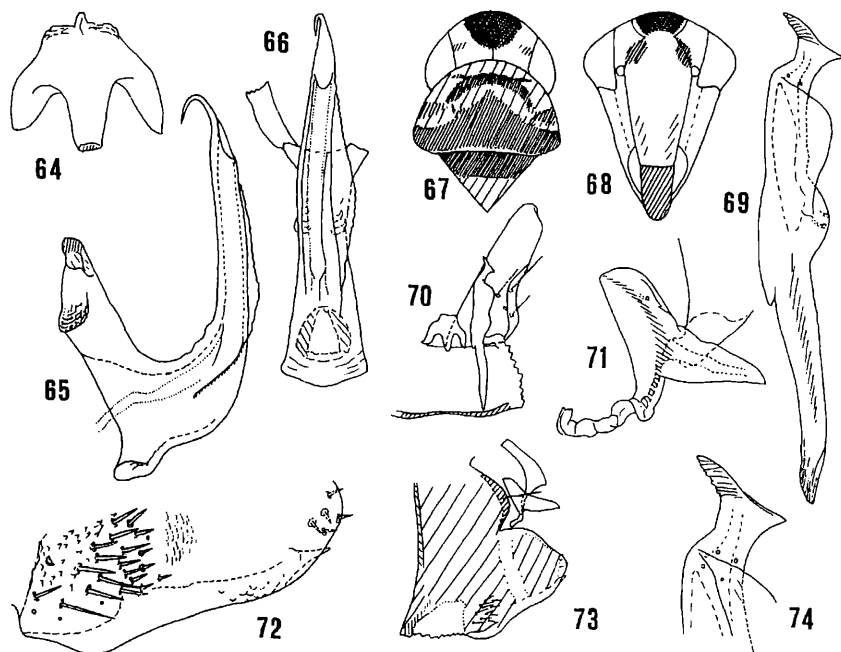


Figs. 53 – 63: *Salka gaza* sp. nov., explanations as in previous illustrations.

Holotype male: Taiwan, Fencihu [Fenkihu on label], Chiayi Hsien, 1370 m, 10.12.IV.1965, C.M. Yoshimoto and B.D. Perkins (BM). Paratypes. 1 male: Taiwan, Tsyr-feng, 2500 m, 17.VIII.1990, I. Dworakowska (MM); 1 male Chitou, 1200 m, 27.VIII.1990, I. Dworakowska (NMB).

***Salka yeroboa* nov. spec. (Figs. 64 – 74)**

Vertex light beige, with large apical patch (Fig. 67) dark brown to blackish-brown and two small brownish patches at sides. Face (Fig. 68) yellowish beige with blackish brown patch on frons and small elongate lateral patches between bases of antennae and the apical patch brown, short streaks of diffused margins laterally and basally on frontoclypeus as well as whole anteclypeus light brownish. Pronotum posteriorly mostly brown, anteriorly brownish beige, with arcuate or omega-shape fascia parallel to the anterior margin, dark brown, hind margin narrowly bordered with beige. Scutum dark brown. Scutellum brownish beige. Fore wing mostly dark brown, a longitudinal streak in m, cua and corresponding apical cells brownish, costal area apicad of brochosome field in c cell, 4<sup>th</sup>, and costal part of 3<sup>rd</sup> apical cell and commissural margin of clavus light beige to whitish, costal margin with reddish tint. Length, male: 3.30 and 3.40 mm.



Figs. 64 – 74: *Salka yeroboa* sp. nov., explanations as in previous illustrations.

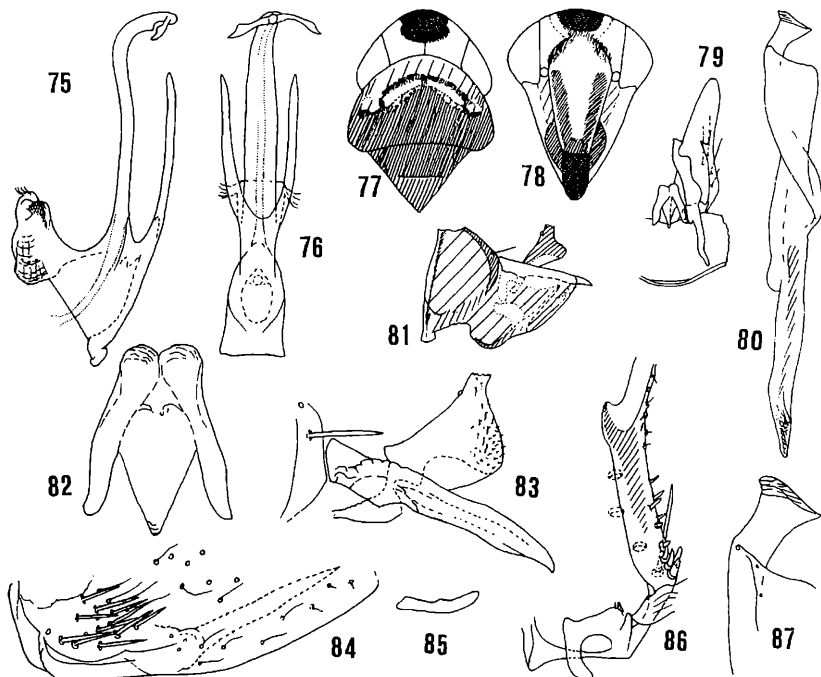


Male genitalia resemble *S. mamiya* sp. nov. but here there is only single small apical process in penis and penis stem is helically twisted bearing a longitudinal crista (Figs. 65, 66), caudal part of paramere shorter and broader (Fig. 69, 74), dorsal pygofer appendage solid (Fig. 71) and short (Fig. 73) and ventral pygofer appendage minute (Figs. 72, 73) Colouration in the new species is distinctive.

Holotype male: Taiwan, Kwantzing, Tainan Hsien, 250 m, 6 – 7.IV.1965, C. Yoshimoto (BM). Paratype male, same data as the holotype (BM).

***Salka opta* nov. spec. (Figs. 75 – 87)**

Vertex (Fig. 77) beige, with a patch on its anterior margin, blackish brown. Face (Fig. 78) sordid beige, with blackish patch apically, anteclypeus sordid dark brown, streaks at sides and patches above on frontoclypeus sordid brown, inner parts of genae brownish. Pronotum mainly brown, anterior third brownish beige followed by omega-shape fascia sordid dark brown and an inverted V-mark whitish. Scutum brown. Scutellum lighter brown. Fore wing brown, with brochosome field and clavus darker and m cell with adjacent apical cells lighter; very narrow light streak along costal margin apical of brochosome field. Length, male: 3.00 mm.



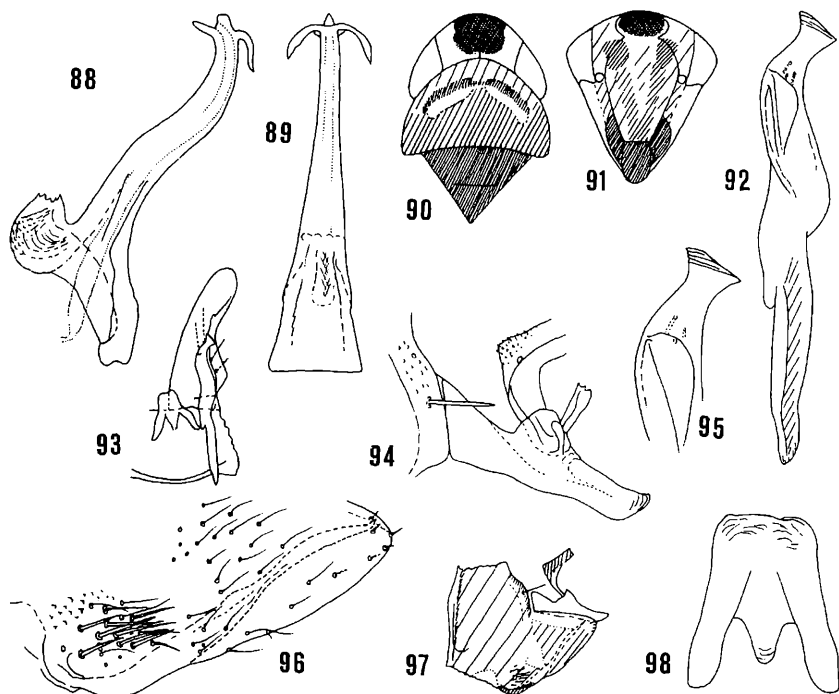
Figs. 75 – 87: *Salka opta* sp. nov. 85: outline of subgenital plate in intact terminalia, free hand drawing – 86: latero-basal region of subgenital plate, dorsal view; other explanations as in previous illustrations.

In male genitalia characteristic is penis stem thin when viewed from side (Fig. 75) terminated with short processes directed laterad and two ventral processes fused with each other basally (Fig. 76). Other parts (Figs. 79 – 87) resemble *S. nigricans* (Mats.) very much differing from this species only slightly.

Holotype male: Taiwan, Fencihu [Fenkihu on label], Chayi Hsien, 1370 m, 10 – 12.IV.1965, C.M. Yoshimoto and B.D. Perkins (BM). Paratype 1 male: same data as the holotype (BM).

***Salka qusa* nov. spec. (Figs. 88 – 98)**

Vertex (Fig. 90) brownish beige, with central patch blackish brown. Face (Fig. 91) mostly brownish, apical patch blackish brown, lateral patches in upper part of frontoclypeus and anteocular areas brown, anteclypeus and lorae dark brown, outer parts of genae whitish. Dorsal side of thorax mostly sordid brown, anterior part of pronotum sordid beige, with dark brown transverse fascia bordering a small inverted V-mark which is sordid beige to whitish. Scutum and scutellum dark brown. Fore wing brownish, with veins darker, brochosome field and area basad of it dark brown, longitudinal streak in middle of corium, distal part of c cell, 4<sup>th</sup> apical cell and costal part of 3<sup>rd</sup> apical cell light beige to whitish. Length, male: 3.10 to 3.20 mm.



Figs. 88 – 98: *Salka qusa* sp. nov., explanations as in previous illustrations.

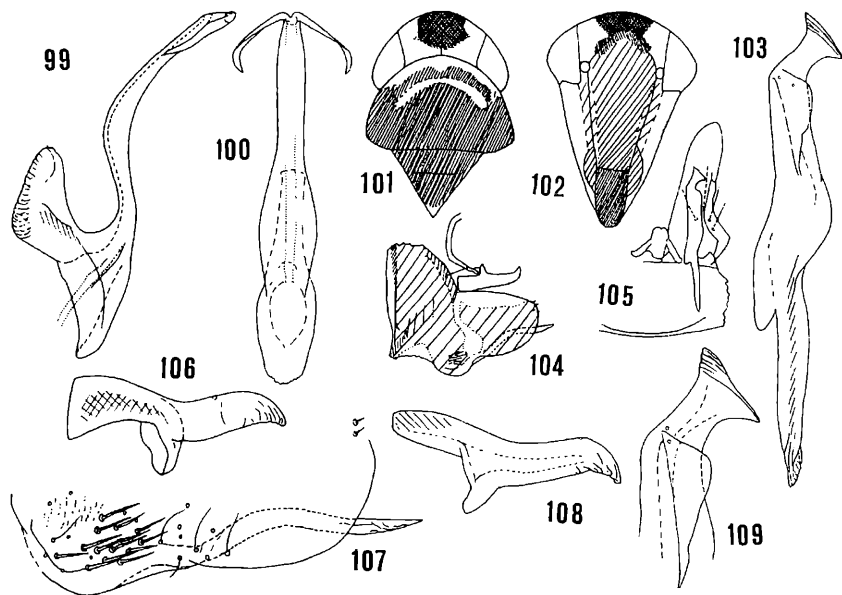
In male genitalia characteristic is single dorsal protrusion at gonopore (Fig. 88) and paired subapical short processes arcuately curved to sides (Fig. 89). Paramere (Figs. 92, 95) and pygofer appendages very similar to these of *S. nigricans* (Mats.) but the dorsal pygofer appendage in the new species is more solid (Figs. 94, 97) and the ventral one slender and arcuate (Figs. 96, 97).

Holotype male: Taiwan, Fencihu [Fenkihu on label], Chiayi Hsien, 17.VI.1965, T. Maa and K.S. Lin (BM).

### *Salka yvona* nov. spec. (Figs. 99 – 109)

Externally very similar to *S. nigricans* (Mats.) but the blackish patch on vertex larger and face darker, with lateral patches in upper part of frontoclypeus dark brown and remaining parts of frontoclypeus, lorae and inner parts of genae brown. In some specimens frontoclypeus may be lighter in the midline. Apex of scutellum light. Fore wing brownish, costal and commissural margins dark brown, brochosome field and area basad of it brown, large part of c cell, 4<sup>th</sup> apical cell and a narrow stripe at costal margin of 3<sup>rd</sup> apical cell sordid whitish. Length, male: 2.25 – 3.40 mm.

Male genitalia resemble *S. nigricans* but penis stem (Fig. 99) more sinuate and its apical lateral processes, in posterior view, directed ventrad (Fig. 100) while in *S. nigricans* they are directed dorsad, dorsal pygofer appendage slender (Figs. 104, 106, 108) and the ventral one thin and sinuate (Figs. 104, 107), unlike *S. nigricans* where it is relatively broad and almost straight.



Figs. 99 – 109. *Salka yvona* sp. nov., explanations as in previous illustrations.

Holotype male: Taiwan, Fencihu [Fenkihu on label], Chiayi Hsien, 1370 m, 10 – 12.IV. 1965, C.M. Yoshimoto and B.D. Perkins (BM). Paratypes. 6 males, same data as the holotype (BM); one male paratype: Taiwan, Shihtzulu, 1600 m, 7.IX.1990, I. Dworakowska (MM).

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