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A REVISION AND TAXOMETRIC ANALYSIS OF THE
GENUS *STEGANA* MEIGEN OF JAPAN AND
ADJACENT COUNTRIES (Diptera, Drosophilidae)

By Toyohi Okada¹

Duda (1926: 242) gave an expedient generic name *Chaetocnema* for his Steganine exclusive of the genus *Stegana* Meigen s. strict., involving in it the subgenera *Orthostegana* Hendel, *Oxyphortica* Duda, *Eostegana* Hendel (= *Stegophortica* Duda) and *Protostegana* Hendel. He did not, however, designate the type species nor the nominate subgenus, thus the name *Chaetocnema* is not acceptable nomenclaturally. He (1927: 25) selected the generic name *Orthostegana* in place of *Chaetocnema*, although he did not explicitly refer to this relation. In Wheeler's synopsis (1960: 109) of the genus *Stegana* s. lat., the names and the type species of the subgenera *Stegana* Meigen and *Steganina* Wheeler were settled, and the name *Protostegana* was discarded as a junior homonym of *Stegana* s. strict. in view of that they have one and the same type species, *curvipennis* Fallén. The genus *Ceratostylus* Enderlein (1922), characteristic in having narrowly prolonged third antennal joint, would be another subgenus of the genus *Stegana*.

In the present study, *Eostegana* is excluded from the genus *Stegana* due to its showing R₄₊₅ and M rather divergent distally contradicted to their convergence in general members of the genus, and a new subgenus is erected for *Stegana femorata* Duda and a new species. For the purpose to confirm the reliability of this new subgenus and also to find objectively the phenetic relationships of the subgenera and of the species, proximity analyses and cluster analyses are to be made by means of the methods used in numerical phenetics. As certain subgeneric key characters seemingly not used before, the shape of scutellum, whether marginally ridged or not, and the angle between front and face in profile, whether rectangular or obtuse, are proposed.

Subgenus *Steganina* Wheeler

Stegana (*Steganina*) *ornatipes* Wheeler and Takada (Figs. 1-6)

Stegana ornatipes Wheeler and Takada, 1964. Ins. Micronesia 14(6): 253 (Caro-

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line Is.); Okada, 1968. Kontyû 36: 394 (Okinawa).

Characteristic in mid and hind tibiae having black annuli subproximally and subapically. Face (Fig. 6) convergent above. Ejaculatory apodeme and egg-guide as in Figs. 2, 3 and 5. The male genitalia (Figs. 1, 4) of the specimens from Okinawa somewhat differ from that of the original.

Distribution. Caroline Is., Okinawa.

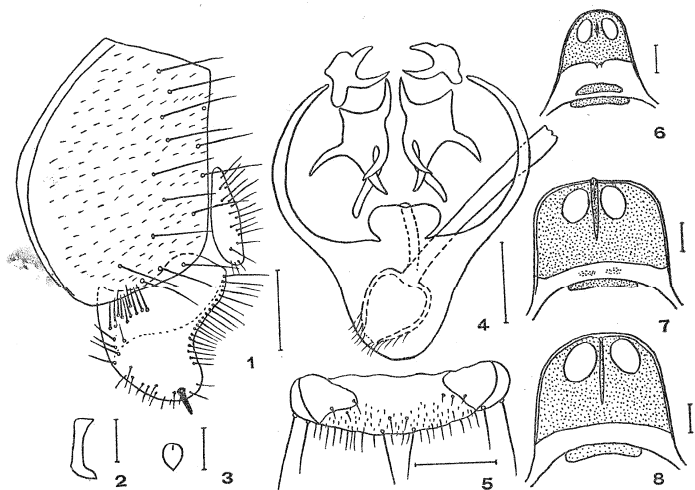
Stegana (Steganina) nigrifrons de Meijere (Figs. 7, 8)

Stegana nigrifrons de Meijere, 1911. Tijd. Ent. 54: 418 (Java); Duda, 1939. Ann. Mus. Nat. Hung. 32: 13 (Africa); Okada, 1966. Bull. Brit. Mus. NH, Suppl. 6: 15 (Nepal).*

Stegana nigrifrons var. *scutellata* Duda, 1924. Arch. Naturg. 90A3: 182 (Java).

Stegana coleopirata: Okada, 1956. Syst. Study Dros. Japan: 17 (Japan), ^{part.} nec *cf* p. 86
Scopoli, 1763, misidentified.

♂, ♀. Palpi and clypeus yellow. Face (Figs. 7, 8) quadrate, black above and white below. Carina high, narrow. Mesonotum unicolorously glossy black. Scutellum apically narrowly white. Thoracic pleura entirely pale below a broad black longitudinal stripe. Wings with crossveins clouded. Cell R_{4+5} very narrowly opened apically. Ac-index 25.0. Halteres pale yellow. Phallic and periphallic organs and egg-guide as described and figured by Okada (1956, op. cit.)



Figs. 1-6. *Stegana (Steganina) ornatipes* Wheeler and Takada. 1. Periphallic organs; 2, 3. Ejaculatory apodeme; 4. Phallic organs, ventral aspect; 5. Egg-guide; 6. Face and clypeus. Figs. 7, 8. *Stegana (Steganina) nigrifrons* de Meijere. Face and clypeus. Scale 0.1 mm.

Specimens examined. 1♂, 1♀, Asakawa, Tokyo, 30 V 1952 (Okada); 1♀, Komoro, Nagano Pref. 19 VII 1964 (Okada); 1♀, Kirishima, Kagoshima Pref. 19 VIII 1965 (Throckmorton); 1 ex. Chitau, Chia-I Country, VII 1968 (Throckmorton), preserved at the University of Chicago.

Distribution. Java, Sumatra, Nepal, Taiwan, Japan (Honshu, Kyushu), Africa.

Remarks. Scutellum apically pale and halteres yellow in the Japanese and Nepalese specimens alike as in var. *scutellata*.

***Stegana (Steganina) nigrolimbata* Duda (Figs. 11-15)**

Stegana nigrolimbata Duda, 1924. Arch. Naturg. 90A3: 181 (Taiwan); Duda, 1923. Ann. Mus. Nat. Hung. 20: 37 (Taiwan, nom. nud.)

♂, ♀. Body 2.5 mm. Third antennal joint black. Arista with about seven upper and eight lower branches beside a fine fork. Palpi black, basally pale. Periorbits slightly brownish. Front glossy black, anteriorly somewhat narrower than length down middle. Clypeus black, laterally paler. Face (Fig. 11) yellowish white, black above and along buccal margin. Thoracic pleura with black patches below a broad black longitudinal stripe. Anterior dorsocentrals two-fifths as long as posteriors. Posterior scutellars two-thirds as long as anteriors, nearer to each other than to anteriors. Sterno-index 0.8. Legs white, mid and hind femora dark brown, mid tibia subbasally black. Wings black, caudally paler. C-index 2.0; 4V-index 1.5; 5x-index 1.0; Ac-index 8.0. C3-fringe on basal two-thirds. Halteres grey, stalk white. Abdominal tergites glossy black. Male and female genitalia as in Figs. 12-15. Genital arch broad, black; anal plate yellow; clasper large, quadrate, distally with many strong claw-like teeth. Aedeagus much complicated, distally with a few arrow-like projections; apodeme exceedingly long.

Specimens examined. 1♂, 7♀, Chitu, Taipei County, 9 VIII 1967; 5♂, 1♀, Wulai, Taipei County, 10 VIII 1967; 1♂, Chitau, Chia-I County, 16 VIII 1967; 1♀, Poli, Nan-t'ou County, 19 VIII 1967 (Throckmorton, Okada).

Distribution. Taiwan.

***Stegana (Steganina) unidentata* Takada (Figs. 9, 16, 17)**

Stegana unidentata Takada, 1968. J. Fac. General Educ. Sapporo Univ. 1: 125 (Hokkaido).

♂. Face (Fig. 9) quadrate, black above, white below with medially narrowing black cross band near buccal margin. Palpi yellow; clypeus dark brown. Third antennal joint black, inner surface broadly orange brown. Ejaculatory apodeme as in Figs. 16, 17.

Specimens examined. 2♂, Kirishima, Kagoshima Pref. 19 VIII 1965 (Throckmorton); 1♂, Hatonosu, Tokyo. 31 V 1968 (Okada).

Distribution. Japan (Hokkaido, Honshu, Kyushu).

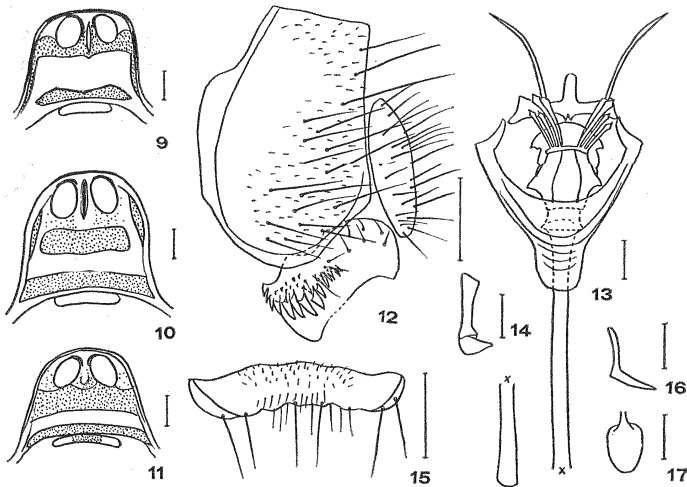


Fig. 9. *Stegana (Steganina) unidentata* Takada. Face and clypeus.
 Fig. 10. *Stegana (Steganina) shirozui* sp. n. Face and clypeus.
 Figs. 11-15. *Stegana (Steganina) nigrolimbata* Duda. 11. Face and clypeus; 12. Periphallic organs; 13. Phallic organs, ventral aspect; 14. Ejaculatory apodeme; 15. Egg-guide. Figs. 16, 17. *Stegana (Steganina) unidentata* Takada. Ejaculatory apodeme. Scale 0.1 mm.

***Stegana (Steganina) shirozui* sp. n.** (Figs. 10, 27-33)

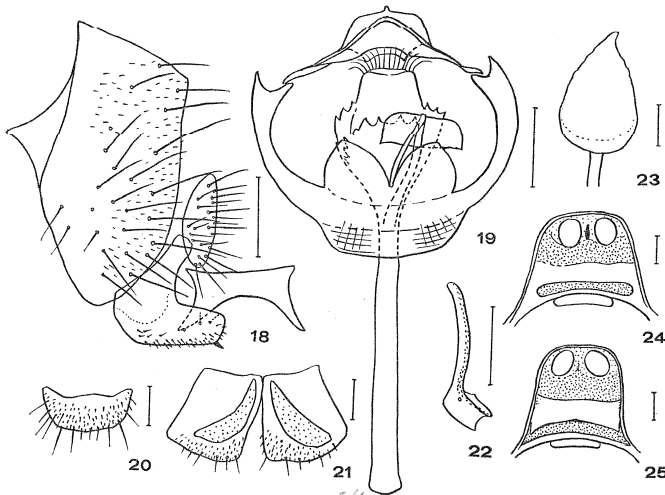
♂. Body 2.5 mm. Antenna greyish brown, arista with six upper and four lower branches beside a fine fork. Palpi yellow. Ocellar triangle black. Periorbits pollinose grey brown. Clypeus yellowish white. Front yellowish brown, medio-caudally and anteriorly with large black patches, anteriorly narrower than length down middle. Face (Fig. 10) black, medially with broad yellow cross band, buccal margin narrowly white. Anterior reclinate orbital shorter than others, twice as apart from posterior reclinate as from proclinate. Vibrissa strong, other orals fine. Mesonotum glossy dark brown, with obscure dark orange longitudinal stripes along dorsocentral lines at anterior two-thirds. Scutellum yellowish brown, laterally black, apically pale. Thoracic pleura pale yellow, without black patches below broad black longitudinal stripe. Humerals two, upper shorter. Acrostichal hairs in about eight rows. Anterior dorsocentrals half as long as posteriors. Posterior scutellars slightly shorter than anteriors, much nearer to each other than to anteriors. Legs yellowish white, knee joints of mid and hind legs black. Wings (Fig. 27) black, paler toward caudal margin, apically pale. C-index 2.0; 4V-index 1.5; 5x-index 1.5; Ac-index 8.0. C3-fringe on basal five-sixths. Halteres yellow. Abdominal tergites glossy brownish black. Periphallic organs (Fig. 28): Genital arch and clasper black, anal plate paler. Clasper globular, distally with three black and two yellow stout teeth, ultimate black

tooth largest. Phallic organs (Figs. 29-31): Aedeagus rod-shaped, apically with hair crown, laterally serrated. Ejaculatory apodeme as in Figs. 32, 33.

Holotype. ♂, Tompogoe, Chia-I County, 2,500 m, 2 IV 1967 (Shirozu).

Distribution. Taiwan.

Relationships. Resembles *S. unidentata* Takada in the shape of aedeagus and clasper, but differs in having antenna entirely black and clasper teeth more than one.



Figs. 18-24. *Stegana (Steganina) excavata* sp. n. 18. Periphallalic organs; 19. Phallic organs, ventral aspect; 20. Sternite covering egg-guide; 21. Egg-guide; 22. Ejaculatory apodeme; 23. Spermatheca; 24. Face and clypeus. Fig. 25. *Stegana (Steganina) longifibula* Takada. Face and clypeus. Scale 0.1 mm.

***Stegana (Steganina) longifibula* Takada (Fig. 25)**

Stegana longifibula Takada, 1968. J. Fac. General Educ. Sapporo Univ. 1: 123 (Hokkaido).

♂, ♀. Face quadrate, black above, white below with medially not narrowing black cross band near buccal margin. Clypeus and palpi yellow. Third antennal joint black. Mesonotum often without pale stripes. Egg-guide longitudinally elongated. Spermatheca oval, apically with a short pointed projection.

Specimens examined. 1♂, Masutomi, Yamanashi Pref. 12 VIII 1961 (Saigusa); 1♂, 1♀, Kitadake, Yamanashi Pref. 24 VIII 1961 (Okada, Hihara).

Distribution. Japan (Hokkaido, Honshu).

Remarks. The specimens from Sounkyo, Hokkaido, recorded by me under the name *coleoprata* Scopoli (Okada, 1956. Syst. Study Dros. Japan: 17) are referred to this species. Possibility remains, however, that the present species is conspecific with *coleoprata* Scopoli, especially with var. *mehadiae* Duda (1924), similar to the latter in having Ac-index 0.8, mesopleural black stripe broad, and postgena broader than the third antennal joint.

***Stegana (Steganina) excavata* sp. n.** (Figs. 18-24, 26)

= *Syn. of nigritorax* Strohl of Lastovka & Mäen, 1982.

♂, ♀. Body 2.5-3.5 mm. Third antennal joint black, broad, apically truncate. Arista with about six to eight upper and four to five lower branches beside a small fork. Palpi yellow. Ocellar triangle dark brownish black. Periorbits anteriorly narrowing and pale. Clypeus yellow. Front dark brown, yellowish at anterior one-third. Face (Fig. 24) black above, yellow below, with a black narrow cross band near buccal margin. Carina short. Cheek and postgena broad and white. Anterior reclinate orbital slightly shorter than others, twice as apart from posterior reclinate as from proclinate. Vibrissa strong, other orals fine. Mesonotum dark brownish black, subshining, obscurely pale orange along dorso-central lines and along mid line. Scutellum black, apically narrowly pale. Thoracic pleura white, with a broad black longitudinal stripe above, without black patches below. Only one prominent ~~oral~~ ^{humeral} ~~Posterior~~ scutellars much shorter than anteriors and close to each other. Sterno-index 0.9. Legs yellow, mid knee joint broadly black, hind knee joint somewhat fuscous. Wings (Fig. 26) black, paler toward caudal margin. C-index 2.2; 4V-index 1.8; 5x-index 1.7; Ac-index 10.0. C3-fringe on basal two-thirds. Abdominal tergites entirely glossy black. Periphallallic organs (Fig. 18): Genital arch and clasper black, anal plate pale yellow. Clasper caudally deeply excavated, thick V-shaped, finely setigerous below, ventroapically with a stout black tooth. Phallic organs (Fig. 19): Aedeagus rod-shaped, apically with hair crown, laterally and ventrally serrated. Ejaculatory apodeme as in Fig. 22. Egg-guide (Fig. 21) pale, quadrate. Spermatheca (Fig. 23) black, oval, distally with a narrow pointed process.

Holotype. ♂, Asakawa, Tokyo, 13 VIII 1968 (Okada).

Allotype. ♀, Sakisuiji, Kofu, Yamanashi Pref. 1 VI 1960 (Saigusa).

Paratypes. 1♂, 2♀, Mt. Amari, Yamanashi Pref. 7 VI 1960 (Saigusa); 3♂, 1♀, Masutomi, Yamanashi Pref. 21-22 VI 1961 (Saigusa); 1♀, Doryusan, Kanagawa Pref. 24 VI 1967 (Okada); 1♂, Kirishima, Kagoshima Pref. 19 VIII 1965 (Throckmorton); 1♂, Soul, VI 1961 (Yang).

Distribution. Japan (Honshu, Kyushu), Korea.

Relationships. Resembles *S. longifibula* Takada in having apically hairy and laterally and ventrally serrated aedeagus and deeply excavated clasper, but differs in having scutellum apically pale and clasper thick V-shaped, with ventro-apical tooth black (thin C-shaped, with ventroapical tooth yellow in *longifibula*).

(*Stegana*): cf. *wheeler*. *catalogue*

Stegana (Steganina) undulata de Meijere*

Stegana undulata de Meijere, 1911. Tijds. Ent. 54: 419 (Java); Duda, 1924. Arch. Naturg. 90A3: 182 (Java).

Distribution. Java.

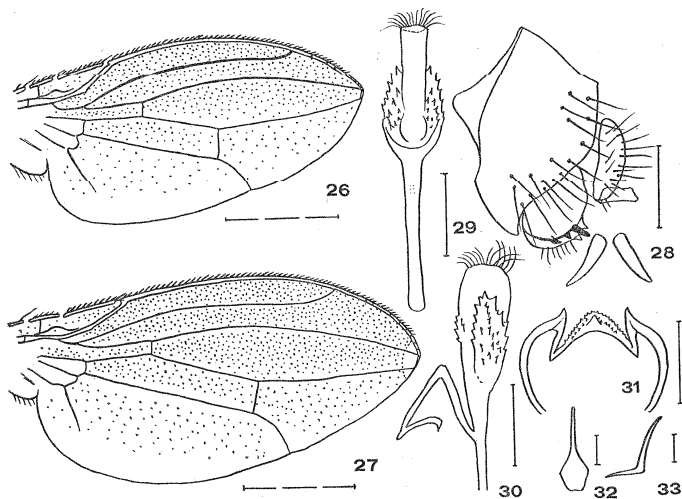


Fig. 26. *Stegana (Steganina) excavata* sp. n. Wing. Figs. 27-33. *Stegana (Steganina) shirozui* sp. n. 27. Wing; 28. Periphallallic organs; 29-31. Phallic organs; 32, 33. Ejaculatory apodeme. Scale 1 mm for Figs. 26, 27, 0.1 mm for others.

Subgenus *Stegana* Meigen

Stegana (Stegana) taba sp. n. (Figs. 40-42)

Protostegana sp. from Taba, Okada, 1956. Syst. Study Dros. Japan: 16 (Japan).

Preliminary description (op. cit.) is based on a female specimen from Taba, Yamanashi Pref.

♂, ♀. Body 3-4 mm. Antenna yellowish grey, second joint with black spot above. Arista with about six upper and four lower branches beside a small fork. Palpi black. Front brownish black, with yellowish cross band at anterior one-third. Face yellowish grey, convergent above. Clypeus black. Cheek yellowish brown, black at the base of orals. Mesonotum nearly uniformly glossy brownish black. Thoracic pleura pale yellow, with a narrow black longitudinal stripe above, without black patches below. Abdominal tergites black. Periphallallic

* Specimens not examined; the same by the other species marked with an asterisk.

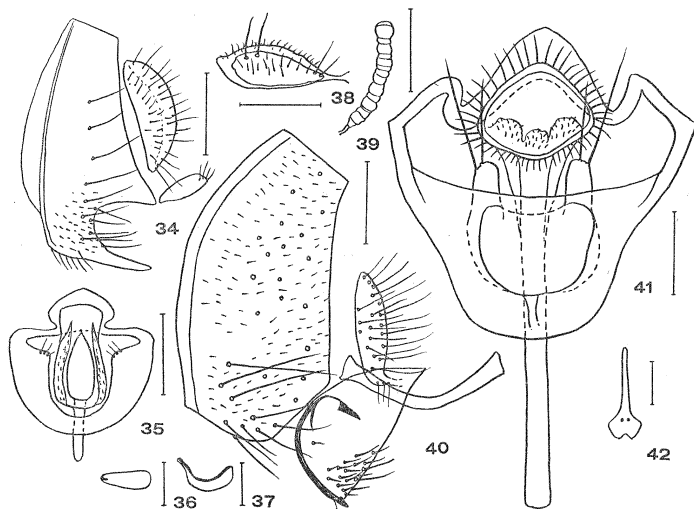
organs (Fig. 40): Genital arch and anal plate black. Clasper large, semicircular, pale, with a large black tooth proximally above and another smaller one distally below, with fine setae along lower margin. Phallic organs (Fig. 41): Aedeagus pale yellow, distally expanded and with hairy crown. Hypandrium conical, with two long bristles. Legs yellow, mid tibia with a few stout bristles proximally above. Wings black, caudally paler. C-index 1.7; 4V-index 2.0; 5x-index 1.5; Ac-index 12.0. C3-fringe on basal half. Halteres yellow. Other features as described by Okada (1956).

Holotype, ♂, and Allotype, ♀, Kitadake, Yamanashi Pref. 24-27 VII 1968 (Okada, Hihara).

Paratypes. 1 ♀, collected together with holotype: 1 ♂, Masutomi, Yamanashi Pref. 10 VIII 1961 (Saigusa); 1 ♀, Taba, Tokyo, 16 VII 1953 (Okada).

Distribution. Japan (Honshu).

Relationships. Resembles *S. curvipennis* (Fallén) (= *furta* L. teste Basden, 1961, Beitr. Ent. 11: 167) from Europe and Taiwan in having yellow antennae, black palpi, black mesonotum, scutellum and clypeus, but differs in having nearly entirely yellow legs, pale sternopleura, and much higher Ac-index. A male specimen from Masutomi has yellowish brown mesonotum and scutellum, resembling *S. lateralis* v. d. Wulp, 1897, from Java and Ceylon, which is said, however, to be conspecific with *S. brunnescens* de Meijere, 1911. The male genitalia of this specimen is identical with that of the holotype.



Figs. 34-39. *Stegana (Parastegana) femorata* Duda. 34.Periphallallic organs; 35. Phallic organs, ventral aspect; 36, 37. Ejaculatory apodeme; 38. Egg-guide lobe; 39. Spermatheca. Figs. 40-42. *Stegana (Stegana) taba* sp. n. 40.Periphallallic organs; 41. Phallic organs, ventral aspect; 42. Ejaculatory apodeme. Scale 0.1 mm.

Stegana (Stegana) lateralis* v. d. Wulp

- Stegana lateralis* v. d. Wulp, 1897. Termes. Fuzetek 20: 143 (Ceylon).
Protostegana lateralis: Duda, 1923. Ann. Mus. Nat. Hung. 20: 33 (Ceylon); Duda, 1926. Suppl. Ent. 14: 45 (Sumatra); Duda, 1929. Treubia 7: 418 (Ceylon); Duda, 1935. Die Fliegen 58g: 20.
 Syn. *Stegana brunnescens* de Meijere, 1911. Tijd. Ent. 54: 417 (Java); *Protostegana brunnescens* Duda, 1924. Arch. Naturg. 90A3: 184 (Java).
 Distribution. Ceylon, Java, Sumatra.

Stegana (Stegana) sibirica* Duda

- Protostegana sibirica* Duda, 1935. Die Fliegen 58g: 20 (Ussuri).
 Distribution. Ussuri.

***Stegana (Stegana) curvipennis* (Fallén)* = *furta* (Linné, 1766)**

- Drosophila curvipennis* Fallén, 1823. Dipt. Suec. Geomyz. 4: 1 (Europe).
Stegana curvipennis: Collin, 1911. Ent. Month. Mag. 22: 130 (Europe); Oldenberg, 1914. Arch. Naturg. 80A2: 26 (Europe); Malloch, 1924. Proc. U. S. Nat. Mus. 66: 2 (N. America, Europe); Wheeler, 1960. Proc. Ent. Soc. Wash. 62: 109 (determined as the type of the subgenus *Stegana*); Wheeler, 1965. Catalog Dipt. N. America: 760 (Europe, not Nearctic).
Protostegana curvipennis: Hendel, 1920. Wien. ent. Zeitg. 38: 33: Duda, 1924. Arch. Naturg. 90A3: 184: Duda, 1935. Die Fliegen 58g: 19 (Europe, Asia).
Stegana nigra (Fallén): Zetterstedt, 1874. Dipt. Scandinav. 6: 2577. Syn. of *Protostegana furta* (Linné): Basden, 1961. Beitr. Ent. 11: 167.
 Distribution. Europe, Ussuri.

Stegana (Stegana) annulosa* Duda

- Protostegana annulosa* Duda, 1920. Treubia 7: 417 (Buru Is.).
 Distribution. Moluccas.

Subgenus *Orthostegana* Hendel***Stegana (Orthostegana) nigripennis* Hendel**

- Orthostegana nigripennis* Hendel, 1914. Suppl. Ent. 3: 115 (Taiwan).
Stegana (Stegana) nigripennis: Okada, 1968. Kontyû 36: 304 (Okinawa, Japan).
Protostegana kanbi Okada, 1956. Syst. Study Dros. Japan: 14 (Okinawa).
Chaetocnema (Oxyphortica) poeciloptera Duda, 1926. Ann. Mus. Nat. Hung. 23: 243 (Taiwan), New synonymy.

Specimens examined, 4 ex. Heng Chung; Taitung (N. Yoshino), preserved at the Institute of Entomology, Taipei University.

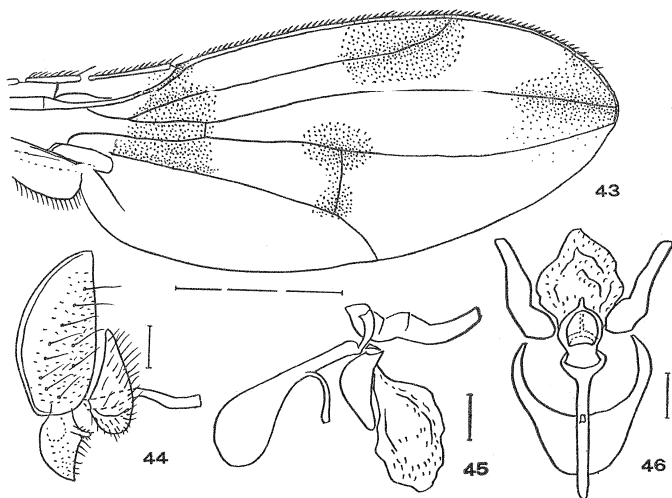
Distribution. Taiwan, Okinawa, Japan (Kyushu).

Remarks. The description and figure (wing) by Duda (op. cit.) of *Chaetocnema poeciloptera* clearly show that this species is conspecific with *nigripennis*.

Stegana (Orthostegana) curvinervis* Hendel

Orthostegana curvinervis Hendel, 1914. Suppl. Ent. 3: 115 (Taiwan).

Distribution. Taiwan.



Figs. 43-46. *Stegana (Parastegana) maculipennis* sp. n. 43. Wing; 44. Periphallallic organs; 45. Aedeagus and anterior paramere, lateral aspect; 46. Phallic organs, dorsal aspect. Scale 1 mm for Fig. 43, 0.1 mm for others.

Subgenus **Oxyphortica** Duda

***Stegana (Oxyphortica) convergens* (de Meijere) (Figs. 47-51)**

Drosophila convergens de Meijere, 1911, Tijd. Ent. 54: 400 (Java).

Orthostegana convergens: Hendel, 1914. Suppl. Ent. 3: 115 (Taiwan).

Stegana convergens: Sturtevant, 1921. Carn. Inst. Publ. 301: 135.

Oxyphortica convergens: Duda, 1924. Arch. Naturg. 90A3: 182 (Taiwan); Duda, 1923. Ann. Mus. Nat. Hung. 20: 34 (Taiwan, New Guinea, genus nom. nud.).

♂, ♀. Body 2.5-3 mm. Antenna greyish brown. Arista with six upper and four lower branches beside a small fork. Palpi yellowish grey, slender. Periorbits greyish white, narrow. Front greyish brown, anteriorly reddish and two-thirds

as broad as length down middle. Clypeus greyish yellow. Face greyish brown, narrowing above. Cheek and postgena yellowish grey, broad. Proclinate orbital longer than others, anterior reclinate nearer to proclinate than to posterior reclinate. Vibrissa rather weak, other orals half vibrissa. Mesonotum mat reddish brown, unicolorous. Scutellum dark brown, flat, marginally ridged, apically narrowly pale. Thoracic pleura yellowish white, with diffuse broad black longitudinal stripe above, without black patches below. One long humeral. Anterior dorsocentrals half as long as posteriors; scutellars equally distant. Sterno-index 0.8. Legs yellow, mid tibia with two stout black bristles dorsally above. Wings (Fig. 47) black, basally and caudally pale. C-index 3.0; 4V-index 1.8; 5x-index 1.2; Ac-index 4.0. C3-fringe on basal six-sevenths. Halteres yellow. Abdominal tergites mat greyish brown, anterolaterally pale. Periphalllic organs (Fig. 49): Genital arch dark brown, anal plate small, pale. Clasper large; quadrate, with two stout black teeth distally above. Phallic organs (Fig. 48): Aedeagus slender, distally hairy. Anterior parameres (or hypandria?) large, oblong, pale, apically with a short but stout tooth. Posterior parameres X-shaped in dorsal view, apically curved ventrally. Female genitalia (Fig. 50) dark brown, gross, heavily sclerotized. Spermatheca (Fig. 41) black, oval, apically with a small projection.

Specimens examined. 1♂, 6♀, Wulai, Taipei County; 4♂, Chitou, Chia-I County; 10♂, Pōli, Nan-t'ou County: 5-19 VIII 1967 (Throckmorton, Okada); 2♀, Taiko-Nihonmatsu, Miao Li County, 9 IV 1967 (Shirozu); 1♂, Fen-ch'i-hu, Nan-t'ou County, 11 IV 1965 (Hirashima).

Distribution. Taiwan, Java, New Guinea.

Subgenus *Parastegana* subgen. n.

The largest diameter of eye vertical to the body axis; the angle between front and face in profile obtuse. Front not setigerous. Postgena narrow. Mesonotum and scutellum dorsally convexed, the latter marginally not ridged. Mid tibia without strong bristles proximally above. Wings hyaline, with or without black spots. C extending beyond tip of R_{4+5} ; R_{2+3} prominently curved to C apically; R_{4+5} and M distally much convergent. *Prescut. undeveloped.*

Type species. *Stegana femorata* Duda, 1923.

Relationships. Having features somewhat intermediate between the genera *Stegana* and *Amiota* Loew. Wing venations as in general *Stegana*, convexed scutellum without marginal ridge and absence of strong bristles on mid tibiae proximally above as in *Amiota*. Closest to the subgenus *Orthostegana* among the genus *Stegana*, similar in having vertical eye, narrow postgena, and obtuse angle between front and face in profile, but differs in the absence of strong bristles of mid tibia and of marginal ridge of scutellum. The extension of C beyond R_{4+5} is a feature not found in the other subgenera except *Ceratosstylus* Enderlein from Brasil.

Stegana (Parastegana) femorata Duda, comb. n. (Figs. 34-39)

Protostegana femorata Duda, 1923. Ann. Mus. Nat. Hung. 20: 33 (Taiwan); Duda, 1924. Arch. Naturg. 90A3: 184 (Taiwan, ~~nom. nud.~~)

The male is recorded for the first time.

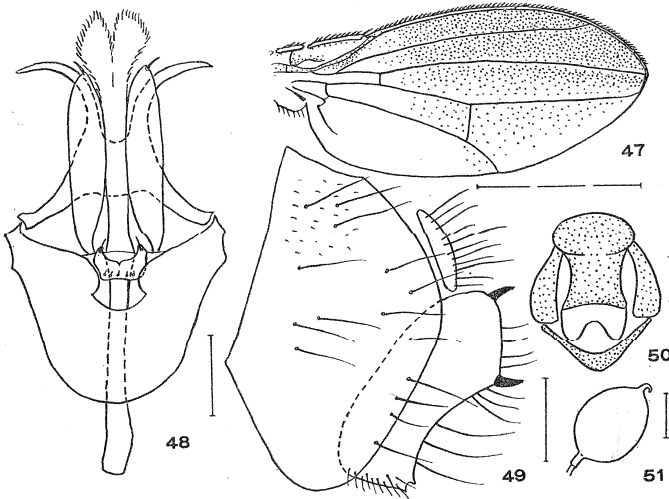
♂, ♀. Body 2.0-2.5 mm. Antenna dark brown. Arista with five upper and three lower branches beside a large fork. Palpi and clypeus black. Cheek and postgena very narrow. Face parallel-sided, glossy dark brown; carina obscure. Mesonotum and thoracic pleura uniformly glossy castaneous brown. Scutellum glossy dark brownish black. Humeral three, long. Anterior dorsocentrals slightly more than half as long as posteriors. Prescutellars thin but long, well distant from scutellum. Scutellars equally distant from each other; anteriors divergent, as long as posteriors. Legs reddish brown, fore tibia with about four stout curved black bristles distally above. Wings hyaline, without black patches; crossveins clear; C somewhat extending beyond tip of R_{4+5} . C-index 1.4; 4V-index 2.0; 5x-index 1.3; Ac-index 10.0. C3-fringe on basal three-sevenths. Halteres black. Abdominal tergites uniformly glossy black. Periphallalic organs (Fig. 34): Genital arch black, deeply excavated caudally below; toe narrowly pointed caudally. Anal plate pale. Clasper (?) very small, elliptical and apically hairy. Phallic organs (Fig. 35): Aedeagus brown, thick, bifurcated and setigerous, apically with a quadrate flap; apodeme short. Ventral fragma deeply notched. Ejaculatory apodeme as in Figs. 36, 37. Egg-guide (Fig. 38) composed of paired transverse fusiform lobes. Spermatheca (Fig. 39) black, rod-shaped, with cross depressions.

Specimens examined. 2♂, 1♀, Shihtzulu, Nan-t'ou County, 15 VIII 1967 (Throckmorton); 2♀, Chitau, Chia-I County, 16 VIII 1967 (Throckmorton).

Distribution. Taiwan.

Stegana (Parastegana) maculipennis sp. n. (Figs. 43-46)

♂. Body 4 mm. Antenna with second joint yellowish brown, third greyish black. Palpi dark brown, slender. Periorbits grey, narrow. Clypeus black. Front mat dark brown, as broad as long. Face parallel-sided, flat, greyish black, narrowly yellow along eye margin. Carina undeveloped. Cheek and postgena narrow, linear. Vibrissa strong, other orals fine. Mesonotum dark reddish brown, roundly convexed above. Scutellum mat dark brown, apically yellow. Thoracic pleura mat dark reddish brown, nearly unicolorous. Humeral one, long. Prescutellars undeveloped. Anterior dorsocentrals undeveloped. Anterior scutellars convergent, as long as posteriors, equally distant. Sterno-index 0.3. Legs yellow. Wings (Fig. 43) hyaline with large black patches below R_{2+3} , at the tips of R_{2+3} and R_{4+5} , and on the posterior crossvein. C distinctly reaching tip of M. C-index 1.3; 4V-index 2.0; 5x-index 1.0; Ac-index 14.0. C3-fringe on basal three-fourths. Halteres yellow. Abdominal tergites uniformly mat black. Periphallalic organs (Fig. 44) dark brown; clasper globular, proximally with a finger-like projection. Phallic organs (Figs. 45, 46): Aedeagus globular. Anterior



Figs. 47-51. *Stegana (Oxyphortica) convergens* (de Meijere). 47. Wing; 48. Phallic organs, ventral aspect; 49. Periphallic organs; 50. Female genitalia; 51. Spermatheca. Scale 1mm for Fig. 47, 0.1mm for others.

parameres large, rod-shaped.

Holotype. ♂, Shihtzulu, Nan-t'ou County, 15 VIII 1967 (Throckmorton).

Relationships. Resembles the foregoing species in having nearly unicolorously reddish brown thorax, but differs in much larger body and conspicuous wing markings.

Distribution. Taiwan.

Key to subgenera and species

- 1. The largest diameter of eye oblique to the body axis; front and face make a rectangle in profile; postgena broad.....Subgenus *Steganina*.....5.
- The largest diameter of eye rectangular to body axis; front and face make an obtuse angle in profile.....2.
- 2. Postgena broad; wings curved down in resting position. Subgenus *Stegana*.....13.
- Postgena linear and narrow; wings not curved down in resting position.....3.
- 3. Mid tibia with a few strong black bristles proximally above; scutellum flat and with marginal ridge. *Prescut. developed*.....4.
- Mid tibia without strong bristles proximally above; scutellum convexed and without marginal ridge. *Prescut. undeveloped*.....Subgenus *Parastegana*.....18.

② ? melanite orbital near onto post. recd. from to etc.

Oxyphortica combined into *Orthostegana* in the Catalogue.

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4. Front setigerous; M distally strongly curved forward. Subgenus *Orthostegana*16.
— Front nearly bare; M distally weakly curved forward. Subgenus *Oxyphortica*17.

Subgenus *Steganina* Wheeler

5. Palpi black.6.
— Palpi yellowish white.8.
6. Face black above, white below, without black band near buccal margin. ^{but clypeus} ^{moderately black} *undulata* ^{in Steganina} ^(Stegana) ^{Wheeler 1981}7.
— Face black above, white below, with black band near or at buccal margin. ^{also in Mat. (coll.) 1901 USA}7.
7. Mid and hind tibiae with black annuli subproximally and subapically; face much convergent above (Fig. 6); buccal margin white. *ornatipes*7.
— Mid and hind tibiae black only at proximal half; face parallel-sided, buccal margin black. *nigrolimbata*7.
8. Face black above, white below, without black band near buccal margin; Ac-index about 20.0; aedeagus apically not hairy.9.
— Face black above, white below, with black band near buccal margin; Ac-index about 10.0; aedeagus apically hairy.10.
9. Clypeus black; scutellum apically pale. *nigrifrons* (Japan, Nepal)11.
— Clypeus yellow; scutellum apically not pale. *nigrifrons* (original)11.
10. Clasper globular, not exceedingly excavated distally.11.
— Clasper deeply excavated distally.12.
11. Clasper ventroapically with a single black tooth; third antennal joint black, orange brown inside. *unidentata*12.
— Clasper ventrally with two yellow and three black teeth; third antennal joint entirely black. *shirozui* ^(Stegana) ^{Not in Wheeler}12.
12. Clasper thick V-shaped, apically with a black tooth. *excavata* ^{nigrithorax}12.
— Clasper thin C-shaped, apically with a yellow tooth. *longifibula* ^(Stegana)12.

Subgenus *Stegana* Meigen

13. Mesonotum and scutellum yellow.14.
— Mesonotum and scutellum black, sometimes yellowish or reddish brown.15.
14. Thoracic pleura with black patches below a broad black longitudinal stripe. *lateralis*15.
— Thoracic pleura without black patches below a broad black longitudinal stripe. *sibirica*15.
15. Mid and hind femora black; Ac-index about 5.0; sternopleura with black patches. *curvipennis*15.
— Mid and hind femora yellowish white; Ac-index about 12.0; sternopleura yellowish white. *taba* ^{furta (L.)}15.
— Mid and hind femora each with two black annuli; thoracic pleura with two black longitudinal stripes. *annulosa*15.

Subgenus *Orthostegana* Hendel

16. Mesonotum and scutellum with pale longitudinal stripes; sternopleura without black patches. *nigripennis*
 — Mesonotum and scutellum without pale longitudinal stripes; sternopleura with black patches. *curvinervis*
- (Oxyphortica)*
by Whalen

Subgenus *Oxyphortica* Duda

17. *convergens*

Subgenus *Parastegana* Okada

18. Wings with large black spots; genital arch simply truncate below; toe not pointed; clasper large. *maculipennis*
 — Wings without black markings; genital arch deeply excavated caudally below; toe narrowly pointed; clasper very small. *femorata*

Proximity and cluster analyses

To find the phenetic relationships of the subgenera and of the species, the proximity analysis (Carmichael and Sneath, 1969) by means of MCD (Mean Character Difference) and the cluster analyses by WPGA and UPGA (Weighted and Unweighted Pair-group Methods using average linkage) are made. The characters used are chosen from the diagnostic characters of the subgenera and species, each coded in two states (0 and 1). The first analysis is concerning the species of the subgenus *Steganina*, including a few species not directly examined but cited from literature. The second is regarding the species of the five subgenera directly observed.

1. The species of the subgenus *Steganina*

The following thirteen diagnostic characters (A-M) each coded in two states for ten items (OTU's) are used to obtain a data matrix. Among ten items treated, three with asterisks shown in the data matrix 1 (Table 1) are cited from literature.

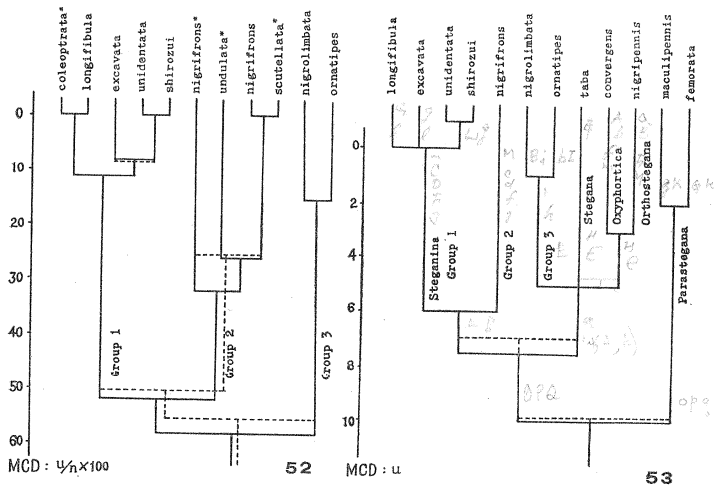
- A. Palpus yellowish (0) or blackish (1).
 B. Face parallel-sided (0) or convergent above (1).
 C. Face with conspicuous black cross band below (0) or without such band (1).
 D. Carina short and low (0) or long and high (1).
 E. Clypeus black (0) or yellow (1).
 F. Mesonotum often striped (0) or always non-striped (1).
 G. Scutellum unicolorous (0) or apically or laterally pale (1).
 H. Sternopleura without black patches (0) or with such patches (1).

Table 1. Data matrix 1.

Character \ Species	A	B	C	D	E	F	G	H	I	J	K	L	M
<i>coleoprata</i> *	0	0	0	0	1	0	0	0	0	0	0	NC	1
<i>longifibula</i>	0	0	0	0	1	0	0	0	0	0	0	1	1
<i>excavata</i>	0	0	0	0	1	0	1	0	0	0	0	1	1
<i>unidentata</i>	0	0	0	0	1	0	1	0	0	0	0	0	1
<i>shirozui</i>	0	0	0	0	1	0	1	0	0	0	0	0	1
<i>nigrifrons</i> *	0	0	1	1	1	1	0	0	0	1	1	NC	NC
<i>nigrifrons</i> (Japan)	0	0	1	1	0	1	1	0	0	1	0	0	0
<i>n. var. scutellata</i> *	0	NC	1	NC	NC	1	1	0	0	1	0	NC	NC
<i>nigrolimbata</i>	1	0	0	0	0	1	0	1	1	0	0	0	0
<i>ornatipes</i>	1	1	0	0	0	1	0	1	0	0	0	0	0

* Informations cited from literature.

*undulata** 1 NC 1 NC 0 1 0 0 0 0 NC 0 1 NC
 0 0 0



Figs. 52, 53. Phenograms based on MCD proximity analysis and WPGA and UPGA (dotted line) cluster analyses. n. number of characters; u. sum of unmatched. 52. Clustering the species of the subgenus *Steganina* including those (with asterisks) not directly examined but cited from literature. CPCC: +0.839 (WPGA), +0.794 (UPGA). 53. Clustering the examined species of the five subgenera, *Steganina*, *Stegana*, *Oxyphortica*, *Orthostegana*, and *Parastegana*. MCD is represented by u, as no NC is involved in the original data matrix (Table 2). CPCC: +0.494 (WPGA), +0.476 (UPGA).

- I. Mid and hind tibiae at most proximally black (0) or with proximal and distal black annuli (1).
- J. Ac-index about 10.0 or less (0) or 20.0 or more (1).
- K. Halteres yellow (0) or brownish black (1).
- L. Clasper globular, distally not deeply excavated (0) or distally deeply excavated (1).
- M. Aedeagus apically not hairy (0) or with hair crown (1).

The result of the cluster analysis is shown in Fig. 52. The phenogram shows that the species of the subgenus *Steganina* can be divided into three groups.

- Group 1. *coleoprata*, *longifibula*, *excavata*, *unidentata*, *shirozui*. *aedeagus with hair crown*
- Group 2. *nigrifrons*, n. var. *scutellata*, *undulata*. *face without black band*
- Group 3. *nigrolimbata*, *ornatipes*. *sternites with black patches*

The hair crown of aedeagus is often found in the species of the genus *Stegana* by Oldenberg (1914) and Takada (1968), but is restricted to the first group, so far as the subgenus *Steganina* is concerned. *S. longifibula* shows the closest relation to *coleoprata*. The CPCC (Cophenetic Correlation Coefficient) between phenogram and corresponding original proximity matrix is higher in WPGA (+0.839) than in UPGA (+0.794), different from ordinary cases of numerical phenetics.

2. The examined species of the five subgenera

In addition to the thirteen characters used in the first analysis, eight more (N-U) mostly of subgeneric diagnostic characters are put into the second analysis. It is aimed at finding phenetic relationships between the five subgenera and reliability of the newly established subgenus, *Parastegana*.

- N. Face with black and white bands (0) or nearly unicolorous (1).
- O. Scutellum nearly flat and marginally ridged (0) or dorsally convexed and marginally not ridged (1).
- P. Mid tibia with strong bristles proximally above (0) or without such bristles (1).
- Q. Prescutellars well developed (0) or undeveloped (1).
- R. Wings largely black (0) or hyaline and with or without black patches (1).
- S. Postgena broad (0) or narrow and linear (1).
- T. Front and face in profile make a rectangle (0) or an obtuse angle (1).
- U. Wings curved down in resting position (0) or not curved down (1).

The result of cluster analysis (Fig. 53) shows that the subgenera *Stegana*, *Oxyphortica*, and *Orthostegana* are clustered together with Group 3 of the subgenus *Steganina*, and that the new subgenus, *Parastegana*, is distinct from other subgenera, suggesting its establishment reasonable. In view of CPCC, however, the phenograms are not highly reliable, as the value of CPCC is low in WPGA (+0.494) and still lower in UPGA (+0.476).

Table 2. Data matrix 2.

Character	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
<i>longifibula</i>	0	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
<i>excavata</i>	0	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
<i>unidentata</i>	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>shirozui</i>	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
<i>nigrifrons</i>	0	0	1	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
<i>nigrolimbata</i>	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>ornatipes</i>	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>taba</i>	1	1	1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0
<i>nigripennis</i>	1	0	1	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0	1	1	1
<i>convergens</i>	0	1	1	0	1	1	1	0	0	0	0	0	1	1	0	0	0	0	1	1	1
<i>maculipennis</i>	1	0	1	0	0	1	1	0	0	0	0	0	0	1	1	1	1	1	1	1	1
<i>femorata</i>	1	0	1	0	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1
<i>remostegma</i>	1	0	1	0	1	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1	1

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Maca 山崎 黒川 日原 鈴木 渡辺 野崎 山崎 佐野 野村
 伊水 野村 高野 三枝 朝比奈 野口 高橋 高橋
 岡崎 内田 市川 徳永 加崎 小野 大田 小村
 高田 野川 岡田 永高 橋本 石橋 伊藤 高橋
 加納 高橋 三枝 源永 大森 多田 内田 Lin 橋崎
 高橋 Bode Wheeler Hardy Kawachis Ruyano Carson
 Tsacas Fryderby. Berle Brander Haekema Gupta
 R. Chandhuri Harrison Heed. Throckmorton Prevost
 Ziska. Charab Krishnamurthy Michener Wirth
 Miller Hennig Parshad (Dip) Steyvers Sabrosky
 Kromboni Motow 中根 多田 内田 相田 Bickel 高橋 Pite
 木元 宮城 森脇 大島 Lee Choo 天羽 中根 中根
 中根 高橋 三枝 高橋 高橋 高橋
 Chung Wada Lakovare Matsuda popkin Buzatti
 Laslovka Herskovitz Grewitt Egan Sherman
 Papp Cavallee 西治 高橋 柳田 高橋 高橋
 酒井清 高橋 LaChaise Hoeningberg 高橋 Rechersky
 Hootle 高橋 Le Grimaldi Ding Ceianu

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