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Bamboo-Inhabiting Thrips of the Family Thripidae (Thysanoptera) from Southeast Asia, II

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Abstract Three new genera and four new species of bamboo-inhabiting thrips belonging to the family Thripidae are described and illustrated. They are *Oka-jimaella clara* gen. et sp. nov. from Thailand, *O. tubercula* sp. nov. from Thailand, *Paithrips circularis* gen. et sp. nov. from West Malaysia and Thailand and *Simulo-thrips banpoti* gen. et sp. nov. from Thailand.

Key words: Thysanoptera, Thripidae, bamboo, Thailand, West Malaysia.

In this paper, the authors show three new genera and four new species which have remarkable glandular areas on the male abdominal sterna. This distinctive glandular areas variably present on each of the third to seventh abdominal sterna in males (rarely females) of the family Thripidae. According to Mound et al. (1980), the glandular areas are situated behind antecostal suture of each abdominal sternum. In most species of this family, the shape and number of the glandular areas are remarkable for certain genera and species, though the origin and function of these areas are not clear.

Descriptions

Okajimaella gen. nov.

Head (Figs. 5 & 6) wider than long; ocellar setae pair I absent, pair II and pair III present; mouth-cone short and rounded; maxillary palpi three-segmented. Antennae (Figs. 1 & 2) eight-segmented, all the segments not elongate in contrast with other related genera; segment I with middorsal apical setae; segments III and IV each with a forked sense-cone; segments III to VI each with some rows of microtrichia. Pronotum (Figs. 5 & 6) wider than long; with two pairs of long postero-angular setae; meso- and metascutum (Figs. 9 & 10) without median campaniform sensillae; metascutellum large; furcasternum incomplete; meso- and metathorax without spinula; mesopleurosternal suture present; metaepimeron with two setae. Hindvein of forewing with regular series of setae. Tarsi two-segmented. Abdominal terga II to X each with a pair of campaniform sensillae; major setae of terga IX and X (Figs. 13 & 14) stout; tergum X without dorsal split. Sterna uniformly sculptured, without accessory setae, three pairs of posteromarginal setae present.

Male abdominal tergum IX (Figs. 17 & 18) with a pair of weak horn-like process (or setae SB1, ?=drepana: Bhatti, 1978); sterna III to VII (Fig. 22) each with glandular areas in the form of irregular scattered patches.

Type species. Okajimaella clara sp. nov.

This new genus may be related to the genus *Dorcadothrips* Priesner, 1932, in having middorsal apical setae on first antennal segment, forked sense-cones of third and fourth antennal segments, similar shape of head, short mouth-cone, two pairs of well developed posteroangular setae on pronotum and two metaepimeral setae. However, it can easily be distinguished from *Dorcadothrips* by the shape of antennae, presence of mesopleurosternal suture, presence of a pair of campaniform sensillae on ninth abdominal tergum, presence of male irregular glandular areas and of weak horn-like process on male ninth abdominal tergum. It is also similar to *Trichromothrips* Priesner, 1930, in having male sternal irregular glandular areas. However, it can be distinguished by short antennae and presence of two setae on metaepimeron.

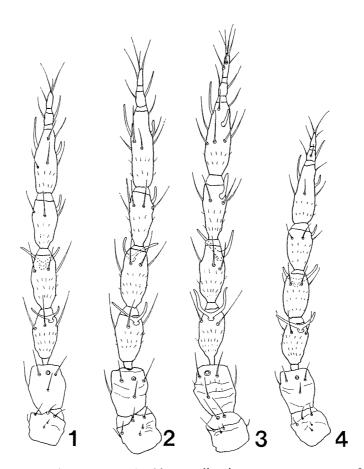
Okajimaella clara sp. nov.

(Figs. 1, 5, 9, 13, 17, 22)

Female. Body brownish yellow including legs, head somewhat darker, ocellar area brownish. Antennal segments I to IV and basal half of V yellow, apical half of V and whole of VI to VIII pale brown. Forewings uniformly shaded with pale brown; hindwings nearly hyaline.

Head (Fig. 5) 1.23 times as wide as long; cheeks bulging, weakly constricted just behind eyes; dorsum with transversely anastomosing striae in posterior half; ocellar setae pair III the longest, situated on a line of posterior margin of hind ocelli; five pairs of postocular setae present. Antennal segment VI (Fig. 1) the longest, with three sense-cones, the longest one reaching apex of VII; forked sense-cone on segment III situated on dorsum, that on segment IV situated on ventrum; segments III to V each with three rows of microtrichia, segments VI with two dorsal and three ventral rows of microtrichia.

Pronotum (Fig. 5) almost as wide as long, longer than head, with some anastomosing striae near posterior margin; discal setae distinct; four pairs of anteromarginal setae present, submedian pair the longest; two pairs of posteromarginal setae subequal or inner pair longer than outer pair; four pairs of posteromarginal setae present, inner pair well developed; mesoscutum (Fig. 9) with weak transversely anastomosing striae in posterior half, without median setae; metascutum (Fig. 9) distinctly sculptured, median setae situated at anterior fourth; metascutellum smooth; furcasternum almost complete; mesosternum with 28 setae; metasternum with 14 setae. Forewings 17.73 times as long as wide, with 16–17 anterior and 41 posterior fringe hairs, posterior fringe hairs wavy; costa with 22 setae; forevein with 5–6 basal and 1–2 distal setae, hindvein with 11–12 setae. Hindwings with 53 fringe hairs.



Figs. 1-4. Antennae, females. —— 1, Okajimaella clara gen. et sp. nov.; 2, O. tubercula gen. et sp. nov.; 3, Paithrips circularis gen. et sp. nov.; 4, Simulothrips banpoti gen. et sp. nov.

Abdominal terga II to VIII sculptured with anastomosing striae; tergum IX (Fig. 13) wider than long, with SB1 setae, B1 to B3 setae thick, B3 the longest; tergum X about half the length of IX. Sterna II to VII with weak transversely anastomosing striae, respectively. Ovipositor about twice as long as pronotum, surpassing apex of X.

Measurements of holotype female in μ m, length (width): Body 1268. Head 78 (102); eye 58; ocellar setae pair II 20, pair III 30; pronotum 138 (apical 110, basal 150) posteroangular setae inner pair 52, outer pair 50; forewing 603 (34); tergum IX 106 (basal 142, apical 64), B1 62, B2 62, B3 78; tergum X 60 (basal 58, apical 32), B1 80, B2 82; ovipositor 262. Antenna 246 in total, segments I to VIII as follows: 22 (24), 30 (24), 38 (16), 40 (18), 36 (18), 46 (16), 9 (6), 14 (4).

Male. Very similar in color and structure to female; B1 setae on tergum IX (Fig. 17) short and slender, situated on posterior margin; SB2 present, a little shorter than B1; sterna III to VII (Fig. 22) each with 11–17 small scattered glandular areas.

Measurements of paratype male in μ m, length (width): Body 1208. Head 70

(100); eye 54; ocellar setae pair II 10, pair III 36; pronotum 102 (apical 110, basal 150), posteroangular setae inner pair 62, outer pair 54; forewing 568 (36); setae on tergum IX, B1 28, B2 64, B3 64, SB1 (?=drepana) 30, SB2 24. Antenna 212 in total, segments I to VIII as follows: 20 (24), 26 (24), 32 (16), 34 (16), 41 (15), 10 (6), 12 (4).

Holotype. \bigcirc , Thailand, Phuket Is., Phuket Hill, on bamboo, 9-IX-1992 (TN).

Paratypes. $3 \subsetneq 1 \circlearrowleft$, collected with holotype; $5 \subsetneq$, the same data as holotype, 22-VIII-1991 (TN & SO); $1 \subsetneq$, Phuket Is. nr. Rawai beach (on bamboo), 15-IX-1992 (SO).

Distribution. Thailand (Phuket Is.).

Okajimaella tubercula sp. nov.

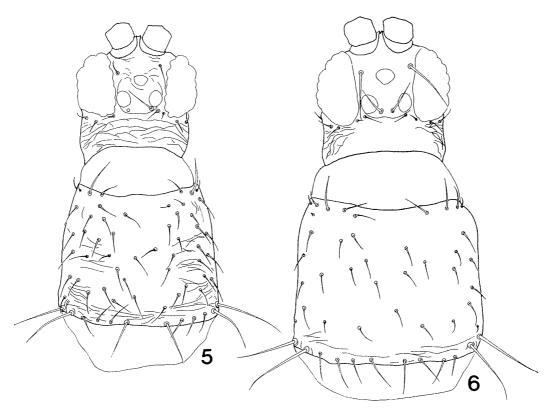
(Figs. 2, 6, 10, 14, 18, 23)

Female. Head brownish yellow, ocellar area and median portion of vertex brown; thorax and abdominal segments yellowish brown, gradually darkened toward segment IX. Antennal segments I and II pale brown, V to VIII brown, III, IV and base of V yellow. Legs brownish yellow. Forewings uniformly pale brown, basal fourth paler; hindwings hyaline, veins brown.

Head (Fig. 6) 1.28 times as wide as long, with some transversely striae on lateral portions; cheeks slightly bulging posteriorly; ocellar setae pair II the longest, almost as long as eyes, pair III about half the length of eyes, situated on a line of posterior margin of hind ocelli; five pairs of postocular setae present, pair II reduced. Forked sense-cones on antennal segments III and IV (Fig. 2) situated on dorsum and ventrum, respectively; segment IV a little wider than VI; segment VI the longest, longest sense-cone reaching base of VII; segment III with three rows of microtrichia, IV with three dorsal and two ventral rows, segments V and VI with two rows of microtrichia.

Pronotum (Fig. 6) about 1.2 times as wide as long, longer than head, almost smooth; discal setae distinct, slender; four pairs of anteromarginal setae present, submedian pair the longest; two pairs of posteroangular setae subequal in length, with four or three pairs of posteromarginal setae; mesoscutum (Fig. 10) weakly sculptured on lateral portion; metascutum (Fig. 10) distinctly sculptured, median setae situated near anterior margin; metascutellum wide and smooth; mesosternum with 32 setae; metasternum with 19 setae. Forewings 18.4 times as long as wide, with 21 anterior and 64 posterior fringe hairs, posterior fringe hairs wavy; costa with 29–30 setae; forevein with 6 basal and 2 distal setae, hindvein with 15–17 setae. Hindwings with 71 fringe hairs. Foretibiae (Fig. 23) each with a large spur on inner apex.

Abdominal terga II to VIII each sculptured with anastomosing striae on anterior half; terga II to VIII each with three pairs of setae laterally; tergum IX (Fig. 14)



Figs. 5-6. Head and pronotum, females. — 5, *Okajimaella clara* gen. et sp. nov.; *O. tubercula* gen. et sp. nov.

wider than long, with SB1 and SB2 setae, B1 to B3 setae thick, B2 the longest; tergum X about half the length of IX, B1 and B2 setae thick. Sterna II to VII with transversely anastomosing striae, respectively; sterna V and VI each with 1–4 irregular glandular areas. Ovipositor about twice as long as pronotum, surpassing apex of X.

Measurements of holotype female in μ m, length (width): Body 1528. Head 94 (120); eye 70; ocellar setae pair II 52, pair III 33; pronotum 152 (apical 142, basal 182), posteroangular setae inner pair 66, outer pair 62; forewing 732 (40); tergum IX 124 (basal 156, apical 92), B1 92, B2 102, B3 76; tergum X 66 (basal 80, apical 40), B1 102, B2 100; ovipositor 318. Antenna 268 in total, segments I to VIII as follows: 26 (28), 32 (28), 44 (20), 42 (19), 40 (16), 56 (16), 10 (8), 14 (6).

Male. Very similar in color and structure to female. Foretibial apical spur smaller; B1 on tergum IX (Fig. 18) short and slender, situated just behind campaniform sensillae; SB1 (?=drepana) distinctly longer than B1, SB2 short; sterna III to VII each with 9–17 scattered glandular areas.

Measurements of paratype male in μ m, length (width): Body 1300. Head 80 (104); eye 58; ocellar setae pair II 36, pair III 28; pronotum 120 (apical 120, basal 154), posteroangular setae inner pair 52, outer pair 50; forewing 530 (38); setae on

tergum IX, B1 20, B2 58, B3 62, SB1 (?=drepana) 40, SB2 16. Antenna 224 in total, segments I to VIII as follows: 20 (26), 30 (26), 34 (16), 34 (18), 32 (15), 44 (14), 10 (8), 12 (6).

Holotype. ♀, Thailand, nr. Chiang Mai, Doi Suthep, on bamboo, 1–IX–1991 (TN & SO).

Distribution. Thailand (Chiang Mai District).

Comments. This species can easily be distinguished from clara described above by presence of foretibial apical spur, well developed ocellar setae pair II and presence of glandualr areas on the fifth and sixth abdominal sterna in female.

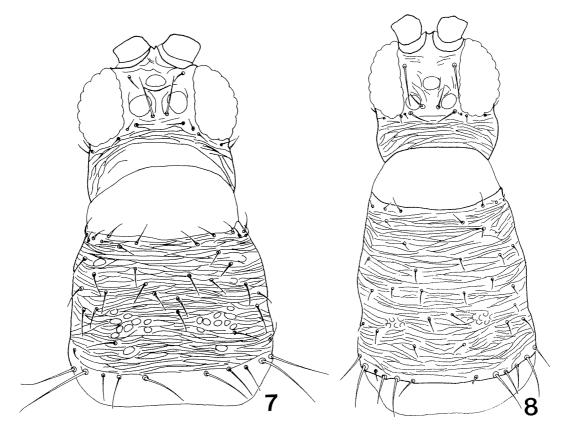
Paithrips gen. nov.

Head (Fig. 7) wider than long; ocellar setae pair I absent, pair II and pair III present; mouth-cone short and rounded; maxillary palpi three-segmented. Antennae (Fig. 3) eight-segmented, all the segments not elongate; segment I with middorsal apical setae; segments III and IV each with a forked sense-cone; segments III to VI with some rows of microtrichia, respectively. Pronotum (Fig. 7) a little wider than long, distinctly sculptured; two pairs of posteroangular setae present; discal setae distinct; mesoscutum (Fig. 11) without median campaniform sensillae; metascutum (Fig. 11) distinctly reticulated, but without campaniform sensillae; metascutellum large; furcasternum incomplete; meso- and metathorax without spinula; mesopleurosternal suture present; metaepimeron with two setae. Hindvein of forewings with regular series of setae. Tarsi two-segmented. Abdominal terga II to X each with a pair of campaniform sensillae; terga II to VIII each with three pairs of seate laterally; tergum X (Fig. 15) without dorsal split. Sterna uniformly sculptured, without accessory setae, all primary setae on II to VII situated at posterior margin. Male abdominal tergum IX (Fig. 19) with a pair of stout horn-like process (drepana); sterna III to VII (Fig. 21) with glandular areas in the form of irregular small scattered patches.

Type species. Paithrips circularis sp. nov.

This new genus may be closely related to the genus *Okajimaella* described above in having forked sense-cones on third and fourth antennal segments, two-segmented tarsi, reticulated metascutum and irregular glandular areas of male abdominal sterna. However, it can easily be distinguished from *Okajimaella* by the distinctly sculptured pronotum and the stout hron-like process (drepana) of male ninth abdominal tergum.

The generic name is derived from the Thai "pai", meaning bamboo.



Figs. 7-8. Head and pronotum, females — 7, *Paithrips circularis* gen. et sp. nov.; 8, *Simulothrips banpoti* gen. et sp. nov.

Paithrips circularis sp. nov.

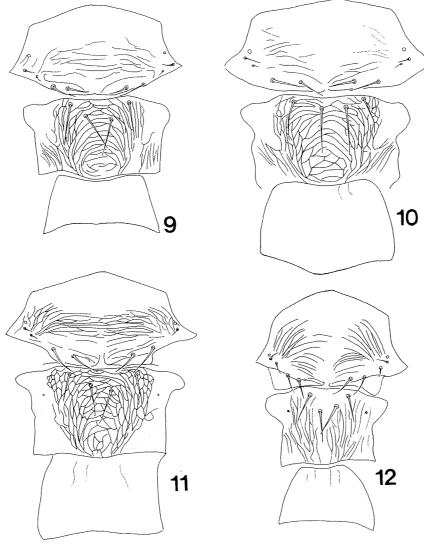
(Figs. 3, 7, 11, 15, 19, 21)

Female. Body yellow including legs, but head is pale brown; antennal segments II–III, basal half of IV and base of V yellow, the remainings brown. Forewings pale brown, with three pale areas.

Head (Fig. 7) 1.33 times as wide as long, with transversely anastomosing striae in posterior half; cheeks bulging, constricted just behind eyes; ocellar setae pair III the longest, situated on the level of posterior margin of hind ocelli; five pairs of post-ocular setae present. Antennal segments III and IV (Fig. 3) with a dorsal and a ventral sense-cones, respectively; segment VI the longest, with three sense-cones, the longest one reaching base of VII; segments III and IV each with four rows of microtrichia, segment V with three rows and VI with two rows of microtrichia.

Pronotum (Fig. 7) 1.53 times as wide as long, longer than head; distinctly sculptured, uniformly covered with transverse striae and some circular striae in posterior third; posteroangular setae well developed, inner pair longer than outer pair; three or four pairs of posteromarginal setae present, inner pair the longest;

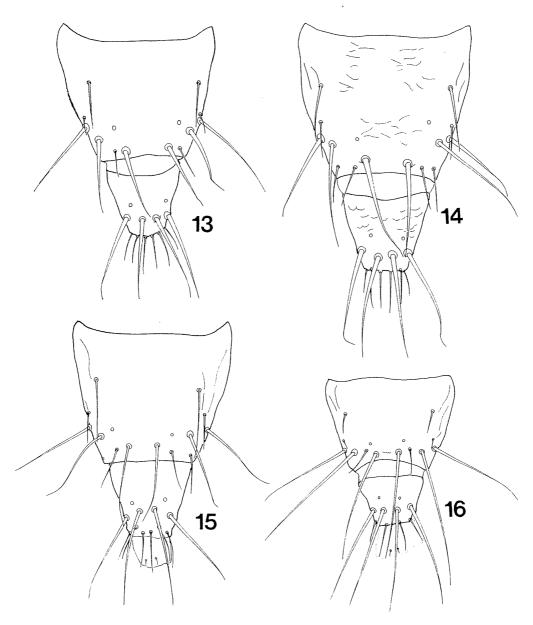




Figs. 9-12. Meso- and metascutum, females. —— 9, Okajimaella clara gen. et sp. nov.; 10, O. tubercula gen. et sp. nov.; 11, Paithrips circularis gen. et sp. nov.; 12, Simulothrips banpoti gen. et sp. nov.

mesoscutum (Fig. 11) with weak transverse striae in posterior half; metascutum (Fig. 11) distinctly reticulated, median setae situated at anterior fourth; metascutellum almost smooth; furcasternum divided; mesosternum with 24 setae; metasternum with 10 setae. Forewings 18.33 times as long as wide, with 15 anterior and 41 posterior fringe hairs, posterior ones wavy; costa with 24 setae; forevein with 7 basal and 2–3 distal setae, hindvein with 12–13 setae. Hindwings with 50 fringe heirs.

Abdominal terga II to VIII weakly sculptured with anastomosing striae anteriorly; tergum IX (Fig. 15) wider than long, with SB1 and SB2 setae, B3 the longest; tergum X 1.67 times as long as IX. Sterna II to VII each covered with weak transverse striae. Ovipostor about three times as long as pronotum, surpassing apex



Figs. 13-16. Abdominal terga IX and X, females. —— 13, Okajimaella clara gen. et sp. nov.; 14, O. tubercula gen. et sp. nov.; 15, Paithrips circularis gen. et sp. nov.; 16, Simulothrips banpoti gen. et sp. nov.

of X.

Measurements of holotype female in μ m, length (width): Body 1352. Head 90 (120); eye 64; ocellar setae pair II 6, pair III 34; pronotum 110 (169), posteroangular setae inner pair 64, outer pair 44; forewing 660 (36); tergum IX 124 (basal 154, apical 80), B1 70, B2 76, B3 82; tergum X 58 (basal 70, apical 36), B1 104, B2 98; ovipositor 300. Antenna 304 in total, segments I to VIII as follows: 24 (30), 38 (28), 50 (20), 46 (20), 46 (18), 60 (18), 12 (8), 16 (6).

Male. Very similar in color and structure to female; VI to VIII of abdominal terga and sterna shaded with brown; B1 on tergum IX (Fig. 19) short, situated in front of campaniform sensillae, middorsal setae distinctly longer than B1, SB2 present, shorter than middorsal setae; sterna III to VII (Fig. 21) each with 18–26 small scattered glandular areas (including two rounded glandular areas on either side along lateral margins).

Measurements of paratype male in μ m, length (width): Body 1360. Head 90 (114); eye 64; ocellar setae pair II 15, pair III 32; pronotum 106 (164), postero-angular setae inner pair 66, outer pair 52; forewing 612 (40); setae on tergum IX; B1 15, B2 70, B3 70, drepana 42, SB2 30. Antenna 260 in total, segments I to VIII as follows: 22 (28), 34 (26), 46 (20), 40 (18), 40 (18), 48 (18), 12 (8), 12 (6).

Holotype. Q, West Malaysia, Tapah, on bamboo, 17-IX-1990 (TN & SO).

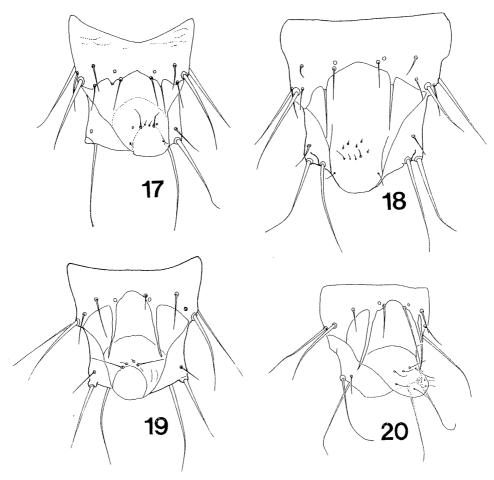
Distribution. West Malaysia (Tapha), Thailand (Chiang Mai District, Phuket Is.).

Simulothrips gen. nov.

Head (Fig. 8) wider than long; ocellar setae pair I absent, pair II and pair III present; mouth-cone short and rounded; maxillary palpi three-segmented. Antennae (Fig. 4) eitht-segmented, all the segments not elongate; segment I with middorsal apical setae; segments III and IV each with a forked sense-cone; segments III to VI with some rows of microtrichia. Pronotum (Fig. 8) trapezoidal, with numerous striae; two pairs of posteroangular setae short; discal setae slender and short; mesoscutum (Fig. 12) without median median campanisform sensillae; metascutum (Fig. 12) sculptured with longitudinal striae, without campaniform sensillae; metascutellum large; furcasternum incomplete; meso- and metathorax without spinula; mesopleurosternal suture present; metaepimeron with two setae. Hindvein of forewings with regular series of setae. Tarsi two-segmented. Abdominal terga II to X each with a pair of campaniform sensillae; major setae of terga IX and X (Fig. 16) long and slender; tergum X without dorsal split. Sterna uniformly sculptured, without accessory setae, all primary setae on sterna II to VII situated at respective posterior margins. Male abdominal tergum IX (Fig. 20) with a pair of stout horn-like process (drepana); sterna III to VII with glandular areas in the form of irregular small scattered patches.

Type species. Simulothrips banpoti sp. nov.

This new genus is similar to the new genus *Paithrips* described above. However, it can easily be distinguished from *Paithrips* by the trapezoidal pronotum, the short pronotal posteroangular setae, the smooth metascutum and the slender setae



Figs. 17–20. Abdominal terga IX and X, males. —— 17, Okajimaella clara gen. et sp. nov.; 18, O. tubercula gen. et sp. nov.; 19, Paithrips circularis gen. et sp. nov.; 20, Simulothrips banpoti gen. et sp. nov.

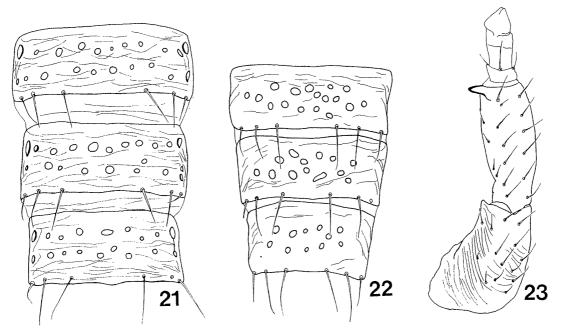
on terga IX and X.

Simulothrips banpoti sp. nov.

(Figs. 4, 8, 12, 16, 20)

Female. Body brownish yellow including legs, head darker, ocellar area brown. Antennal segments I to IV yellow, V to VIII pale brown. Forewings uniformly shaded with pale brown; hindwings almost hyaline, veins brown.

Head (Fig. 8) 1.18 times as wide as long, with many transversely anastomosing striae on posterior half; cheeks bulging, constricted behind eyes; ocellar setae pair II the longest, pair III about half the length of pair III, situated between hind ocelli; five pairs of postocular setae present, pair I the longest, almost as long as ocellar setae pair III. Antennal segments III and IV (Fig. 4) with a dorsal and a ventral forked sense-cones, respectively; segment VI the longest; segment III with four or



Figs. 21–23. —— 21–22. Abdominal sterna V–VII, males. —— 21, *Paithrips circularis* gen. et sp. nov.; 22, *Okajimaella clara* gen. et. sp. nov. —— 23, Foreleg, female, *O. tubercula* gen. et sp. nov.

five rows of microtrichia, segments IV and V each with three dorsal rows and two ventral rows, segment VI with two rows of microtrichia.

Pronotum (Fig. 8) almost as long as basal width, uniformly covered with transversely anastomosing striae; inner pair of posteroangular setae longer than outer pair; four pairs of posteromarginal setae present, outer pair reduced; mesoscutum (Fig. 12) weakly sculptured; metascutum (Fig. 12) sculptured with longitudinal striae, but the median portion is weakly striated, median pair of setae situated at anterior fourth; spinasternum slender; mesosternum with 22 setae; metasternum with 14 setae. Forewings 18.22 times as long as wide, with 21 anterior and 51 posterior fringe hairs, posterior fringe hairs wavy; costa with 25 setae; forevein with 6 basal and 2 distal setae, hindvein with 11–12 setae. Hindwings with 64 fringe hairs.

Abdominal terga II to VIII each uniformly sculptured with anastomosing striae; tergum IX (Fig. 16) wider than long, with SB1 setae, B2 the longest; tergum X about half the length of IX. Sterna II to VII with transversely anastomosing striae, respectively. Ovipositor longer than pronotum.

Measurements of holotype female in μ m, length (width): Body 1368. Head 85 (100); eye 62; ocellar setae pair II 36, pair III 20; pronotum 146 (apical 114, basal 150), posteroangular setae inner pair 38, outer pair 30; forewing 656 (34); tergum IX 76 (basal 118, apical 72), B1 100, B2 122, B3 88; tergum X 42 (basal 58, apical 34), B1 96, B2 96; ovipositor 178. Antenna 226 in total, segments I to VIII as

follows: 24 (24), 30 (26), 36 (18), 36 (18), 28 (18), 44 (16), 8 (7), 12 (5).

Male. Very similar in color and structure to female; B1 setae on tergum IX (Fig. 20) of paratype asymmetrical in size, right one well developed and left one short and slender, situated on posterior margin; SB2 absent; middorsal setae shorter than B1; sterna III to VII each with 6–10 small scattered glandular areas.

Measurements of paratype male in μ m, length (width): Body 1180. Head 80 (90); eye 52; ocellar setae pair II 30, pari III 16; pronotum 140 (apical 100, basal 140), posteroangular setae inner pair 40, outer pair 26; forewing 596 (28); setae on tergum IX, B1 54 in right, 30 in left, B2 56, B3 62, drepana 52. Antenna 208 in total, segments I to VIII as follows: 19 (24), 30 (23), 32(16), 30 (16), 30 (16), 40 (15), 8 (7), 10 (5).

Holotype. \circlearrowleft , Thailand, between Chiang Mai and Mae Sa, on bamboo, 3–IX–1991 (TN).

Paratypes. $5 \, \circlearrowleft$, collected with holotype; $1 \, \circlearrowleft$, nr. Chiang Mai, Mae Sa, on bamboo, 3–IX–1991 (TN & SO); $3 \, \circlearrowleft$, nr. Chiang Mai, Doi Suthep, on bamboo, 1–IX–1991 (TN & SO); $1 \, \circlearrowleft$, Doi Suthep, on grass, 1–IX–1991 (TN); $1 \, \circlearrowleft$, nr. Kanchanaburi, on bamboo, 30–VIII–1991 (SO & TN).

Distribution. Thailand (Chiang Mai District, Kanchanaburi).

Comment. The specific name is given after Dr. Banpot NAPOMPETH of Thailand for his kindness in various ways.

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