

**A PRELIMINARY REVIEW OF THE GENUS
ISONEUOTHrips AND THE SUBGENUS THrips
(ISOThrips) (Thysanoptera : Thripidae)¹**

By K. Sakimura

PINEAPPLE RESEARCH INSTITUTE, HONOLULU, HAWAII

Abstract : The generic and subgeneric characters of *Isoneurothrips* Bagnall and *Thrips* (*Isothrips*) Priesner are redefined, and a key to 12 species of the latter is provided. The former is still monotypic. Seven changes made in nomenclature are 3 new synonymies, 3 new combinations effected by the rejected species, and also another new combination.

Studies of the type materials of all the species under consideration have further clarified in delimiting the three groups within the genus *Isoneurothrips* auct. into which about 30 different taxa have been placed during the past 50 years. Priesner (1934) first recognized heterogeneity between the type of the genus, *australis* Bagnall, and about 20 other congeners known by that time, for which he used the subgeneric name of *Thrips* (*Isoneurothrips*). Confirming the earlier view, Priesner (1940) formally delimited *Isoneurothrips* Bagnall to *australis* only, and erected *Thrips* (*Isothrips*) for all the remaining congeners. A concurrent work (Sakimura, 1967, Proc. Haw. Ent. Soc. **19**: in press) further segregated all the Hawaiian species into a new genus. Consequently, the remaining species in *Thrips* (*Isothrips*) are homogeneous, after expelling 3 species to *Thrips* s. str. Two undescribed species have also been recognized. *Thrips* (*Isothrips*) is distributed among the southeastern seaboard of Asia, Oceania, Australia, and New Zealand, excluding Hawaii; *Isoneurothrips* is still monotypic with the type species which is nearly pantropic.

Foreseeing a further delay in completing a review of the taxa, this preliminary note is devised to avoid such delay in communication, particularly, of the amended genus and subgenus concepts and the new changes in nomenclature.

Subgenus **Thrips** (**Isothrips**) Priesner

Thrips (*Isothrips*) Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54; 1949, *Ibid.* **33**: 55, 134; 1957, Zool. Anz. **159**: 166.

Thrips (*Isoneurothrips*) Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 254, 256.

Type-species by original designation: *Isoneurothrips orientalis* Bagnall.

-
1. Published with the approval of the Director of the Pineapple Research Institute of Hawaii as Technical Paper No. 320. Supported by NSF Grant GB-3145. Grateful acknowledgment for their cooperation and courtesy are made to the curators of various collections which were visited. Dedicated to Prof Dr H. Priesner, an eminent thysanopterist, in commemoration of his 75th birthday.

Head transverse, ocellar hump strongly elevated, front concave and slopes down to base of antennae; cheeks strongly swollen, striations on occiput coarse and usually strong; moderate inter- and latero-ocellar setae present but no ante-ocellar seta; 5th seta of post-ocular series long but 4th tiny; 7-segmented antennae and 3-segmented maxillary palpi normal. Prothorax with 2 long posterior angle setae and prominent median posterior marginal setae; among disc setae, 2 pairs near anterior margin and 1 each near posterior angle prominent; premarginal dorsal bulging along posterior margin usually prominent (heavier wrinkles); striations on pronotum usually strong. Striations or reticulations on meso- and metanota and metepimeron strong; median setae on mesonotum far moved cephalad from posterior margin; median setae on metanotum far moved caudad from anterior margin (exception in *setifer* group); mesospinula prominent but metaspinula absent. Forelegs unarmed. Forewings regularly spaced setal rows on fore and hind veins (1 or rarely 2 slightly wider spaces sometimes at middle or near terminal); scale with 5 setae on vein. Chaetotaxy on terga and sterna normal, no disc seta on epipleura (exception on *obscuratus*); combs on tergum VIII absent or extremely weak and short (exception on *obscuratus*). Male: On tergum IX, 2 pairs of long setae on dorsum (B1 and well-developed accessory marginal setae near and caudolaterad from B1), dorsal setae short or undeveloped (exception on *obscuratus*).

Setifer and another species, both from Queensland, are deviated elements. Their elongated head, elongated reticulation on metanotum, and median metanotal setae on the anterior margin make them atypical. Another deviated element is *obscuratus* from New Zealand and its aberrant form with 8-segmented antenna which appears typical of *Isochaetothrips*. The spined epipleura which resemble *Isoneurothrips*, the well-developed combs on tergum VIII which resemble *Isochaetothrips*, and the chaetotaxy of male tergum IX which resembles *Isoneurothrips* and *Isochaetothrips*, make it different from the rest. The fourth deviated element is *brevicornis* from the Marquesas. The special shape of antenna and atypical metanotal reticulation set it apart from the rest.

Thrips (*Isothrips*) is readily separable from *Thrips* s. str. primarily by the regularly spaced setal rows on fore and hind veins of the forewings. On the forevein of *Thrips* s. str., a wide gap separates the basal-medial setal groups from the distal setal group in which setae are spaced irregularly and variably. Additional differences are absence or near absence of combs on tergum VIII, whereas there are usually well-developed combs on *Thrips* s. str. and undeveloped dorsal setae of male tergum IX (2 pairs of prominent setae on dorsum; B1 and accessory marginal setae), whereas there are usually well-developed dorsal setae on *Thrips* s. str. (3 pairs of prominent setae on dorsum; B1, accessory marginal, and dorsal setae).

A new genus embracing the Hawaiian species is also readily separable from *Thrips* (*Isothrips*) by the chaetotaxy on head and abdomen, by combs on tergum VIII, and by chaetotaxy on male tergum IX. (For further details, see the concurrent paper). *Isoneurothrips* is also readily separable as to be mentioned under its heading below.

Among *Thrips* (*Isothrips*), 3 different types of sculpture are present on the metanotum; namely, (1) wholly reticulated, (2) elongately reticulated, and (3) finely striated. The first type is among the species present in the western range of distribution from India to New Guinea and to Queensland; the second and third types in the eastern range of distribution from New Zealand and Queensland, to Fiji and the Marquesas. Metepimeron is

uniformly reticulated on every species, and this character is useless for separating the different species.

KEY TO SPECIES OF THRIPS (ISOTHRIPS)

1. Metanotum reticulated..... 2
Metanotum finely striated practically over whole area 10
- 2 (1). Metanotum reticulated practically over whole area.....3
Metanotum reticulated only mesiad, but elongately reticulated on cephalic and lateral areas; or elongately reticulated mesiad, as well as on cephalic and lateral areas..... 8
- 3 (2). Accessory setae on sterna 4
No accessory setae on sterna..... 7
- 4 (3). Antenna very short, about 2.0× as long as head, segments strongly swollen ventrally..... cf. **brevicornis** (couplet 8)
Antenna longer, at least 2.4× as long as head, segments normal..... 5
- 5 (4). Antenna long, 2.7× as long as head, III definitely longer than VI; accessory setae on sternum IV about 5 pairs; forewing brown with basal 1/3 nearly clear (Siam, Sumatra, Krakatao and Sebesi—2 islets in Sunda Strait, Java, New Guinea, Queensland) 3. **parvispinus** (Karny)
Antenna short, 2.4–2.5× as long as head 6
- 6 (5). Antenna III subequal to VI; accessory setae on sternum IV 4 pairs; forewing brown with basal 1/3 nearly clear (Formosa).....4. **taiwanus** (Takahashi)
Antenna III definitely longer than VI; accessory setae on sternum IV 2 pairs or sometimes absent; forewing uniformly brown (S. India, N. India, Malaya, Borneo, Java, S. China, and Hawaii—introduced recently)
..... 1. **orientalis** (Bagnall)
- 7 (3). Antenna long, 3× as long as head (Sumatra, Java, New Guinea)
.....7. **malloti** (Priesner)
Antenna short, 2.5× as long as head. (Okinawa, Formosa, Philippines, Caroline) 6. **addendus** (Priesner)
- 8 (2). Metanotum reticulated mesiad; accessory setae on sterna; head 1.4× as wide as long; antenna 2.0× as long as head, segments ventrally swollen (Marquesas) 5. **brevicornis** (Moulton & Steinweden)
Metanotum elongately reticulated mesiad; no accessory setae on sterna; head nearly as wide as long; antenna at least 2.4× as long as head 9
- 9 (8). Forewing uniformly clear; body setae yellow (Queensland) 11. a species
Forewing brown with basal 1/4 clear; body setae brown (Queensland)
.....2. **setifer** (Karny)
- 10 (1). Accessory setae on sterna (New Zealand)9. **obscuratus** (Crawford)*
No accessory setae on sterna 11
- 11 (10). Pronotum smooth; antenna short, 2.4× as long as head (Rapa).....
..... 8. **rapaensis** (Moulton)
Pronotum strongly striated.....12

* An 8-segmented aberrant form with completely or partly sutured style is present; should not be confused with *Isochaetothrips* spp.

- 12 (11). Head setae all minute; antenna short, 2.4× as long as head (Samoa)
 10. **modicus** Bianchi
 Head setae short (20–30 μ long), but not minute; antenna long, 2.5–2.6× as
 long as head (Fiji, Tonga) 12. a species

1. **Thrips (Isothrips) orientalis** (Bagnall)

Isoneurothrips orientalis Bagnall, 1915, Ann. Mag. Nat. Hist. ser. 8, **15**: 593.—Karny, 1926, Mem. Dept. Agr. India **9**: 197, figs.—Mukerji, 1955, Ind. J. Ent. **17**: 66, fig.

Thrips (Isoneurothrips) orientalis: Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 258.

Thrips (Isothrips) orientalis: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

Thrips setipennis Steinweden & Moulton, 1930, Proc. Fukien Christian Univ. Nat. Hist. Soc. **3**: 26. **New Synonymy.**

A female syntype, mounted together with a male (Matang, Sarawak, 300 m, 20.XII.1913, G. E. Bryant), which is herewith designated as lectotype, was examined at the British Museum. Both lectotype and another female syntype were partly macerated. Holotype of *setipennis* in the California Academy of Sciences collection was compared.

2. **Thrips (Isothrips) setifer** (Karny)

Isoneurothrips setifer Karny, 1920, Acta Soc. Ent. Czecho. **17**: 38; 1923, Treubia **3**: 334; 1924, Arkiv Zool. **17** (2): 16, figs.

Thrips (Isothrips) setifer: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

A syntype (Mt Tambourine, Qd., Mjoberg No. 25, 190–65) which is herewith designated as lectotype, on loan from the Riksmuseum, Stockholm, at the British Museum, and another syntype in the Priesner collection were examined. Both specimens were found partly macerated and no complete antenna was under mount (Karny 1923). No male is known.

3. **Thrips (Isothrips) parvispinus** (Karny)

Isoneurothrips parvispinus Karny, 1922, J. Siam Soc. **16**: 106; 1925, Bull. Deli Proefstat. **23**: 9, fig.

Thrips (Isoneurothrips) parvispinus: Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 259.

Thrips (Isothrips) parvispinus: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

Thrips sp. Jensen, 1921, Proefstat. Vorstenl. Tabak. Meded. **40**: 140, figs. Pl.

Isoneurothrips jenseni Karny, 1925, Bull. Deli Proefstat. **23**: 7, figs.

A female syntype (Bangkok, Siam, 9.X.20, No. 52, coll. DVL) which is herewith designated as lectotype, and another male syntype in the Priesner collection were examined. Antennae of lectotype were not found under mount. A syntype of *jenseni* (Medan, S.O. K.L., Fulmek, 22-V-22) in the Priesner collection was compared, and the synonymy by Priesner (1934) was reconfirmed.

4. **Thrips (Isothrips) taiwanus** (Takahashi)

Isoneurothrips pallipes Moulton, 1928, Trans. Nat. Hist. Soc. Formosa **18**: 296.—Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 285.

Thrips (Isoneurothrips) taiwanus Takahashi, 1936, Phil. J. Sci. **60**: 440.

Thrips (Isothrips) taiwanus: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

Holotype of *pallipes* in the CAS collection was examined. *Taiwanus* was a new name designated for rectifying a secondary homonymy. *Pallipes* from New Guinea (Moulton, 1940, Occ. Pap. Bishop Mus. **15**: 252) is a misidentification of *parvispinus*. No male is known.

5. **Thrips (Isothrips) brevicornis** (Moulton and Steinweden)

Isoneurothrips brevicornis Moulton & Steinweden, 1932, Bishop Mus. Bull. **98**: 165, figs.

Thrips (Isothrips) brevicornis: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

Holotype in the Bishop collection was examined.

6. **Thrips (Isothrips) addendus** (Priesner)

Thrips (Isoneurothrips) addendus Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 270.

Thrips (Isothrips) addendus: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

Isoneurothrips rosaceae Moulton, 1936, Phil. J. Agr. **7**: 272. **New Synonymy.**

Holotype of *addendus* in the Priesner collection was examined; holotype of *rosaceae* in the CAS collection was compared.

7. **Thrips (Isothrips) malloti** (Priesner)

Thrips (Isoneurothrips) malloti Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 269.

Thrips (Isothrips) malloti: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

A paratype (Semarang, Java, 26.I.1913, coll. DVL) in the Priesner collection was examined. *Malloti* from Fiji (Moulton, 1944, Occ. Pap. Bishop Mus. **17**: 270) is a misidentification of a species (couplet 12).

8. **Thrips (Isothrips) rapaensis** (Moulton)

Isoneurothrips rapaensis Moulton, 1939, Occ. Pap. Bishop Mus. **15**: 142.

Thrips (Isothrips) rapaensis: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

Holotype in the Bishop collection was examined. *Rapaensis* from Fiji (Moulton, 1944, Occ. Pap. Bishop Mus. **17**: 270) is a misidentification of a species (couplet 12). No male is known.

9. **Thrips (Isothrips) obscuratus** (Crawford), new combination

Isoneurothrips obscuratus Crawford, 1941, Proc. Ent. Soc. Wash. **43**: 63.

Holotype in the USNM collection was examined. An aberrant 8-segmented antenna form with completely or partly sutured style was found rather common among a long series of specimens in the collection. Both 7- and 8-segmented forms were often mixed in a single collection; different forms were sometimes present on a single specimen. This situation of aberrant antenna resembles the cases of *Thrips hawaiiensis* (Morgan) (Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 266) and *Thrips thalictri* Hood (Hood, 1931, Bull. Brooklyn Ent. Soc. **26**: 154).

10. **Thrips (Isothrips) modicus** Bianchi

Thrips (Isothrips) modicus Bianchi, 1953, Proc. Haw. Ent. Soc. **15**: 96, fig.

Holotype in the HSPA collection was examined.

11 and 12. **Thrips (Isothrips) spp.**

The 2 undescribed species recognized are: 1 from Queensland (couplet 9) which was found in the CAS collection and the other from Fiji and Tonga (couplet 12). The latter was, in part, misidentified as *rapaensis* or *malloti*, and was found plentiful in the CAS, BM, USNM, Illinois Nat. Hist. Survey, and Bishop collections.

Genus **Thrips** s. str. Linnaeus

The following 3 species are more appropriately placed in *Thrips* s. str. On these species, spacings of wing setae on forevein are not uniform. The well-defined distal group in which setae are irregularly and variably spaced, is separated from the medial group by a wide gap. The distal setae are 3 to 4 and rarely 5 on *sumatrensis*, and 4 to 5 and rarely 3 on *setipennis*, and both follow the medial group of 4 to 5 setae. The distal setae are 2 on *cinchonae* and they follow the medial group of 8 to 10 setae.

1. **Thrips setipennis** (Moulton), new combination

Isoneurothrips setipennis Moulton, 1928, Trans. Nat. Hist. Soc. Formosa **18**: 297, fig.—Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 285, 288.

Thrips (Isoneurothrips) setipennis: Takahashi, 1936, Phil. J. Sci. **60**: 440.

Thrips (Isothrips) setipennis: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

Thrips (Isoneurothrips) sumatrensis var. *wedeliae* Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 257. **New Synonymy.**

Holotype of *setipennis* in the CAS collection was examined. Holotype female (Verlaten Isl., 26.XI.21, coll. DVL; so labelled on the slide) of *wedeliae* in the Priesner collection was compared. Metanotum is wholly striated and metepimeron is reticulated, accessory setae on sterna are 5 to 7 pairs, and grayish brown wing is slightly lighter on the basal quarter. Collected in Botel Tobago near Taiwan, Verlaten (Sertung) and Sebesi (both islets in Sunda Strait). Metanotal sculpture is different from *Thrips (Isothrips)* spp. which occur in the same region. No male is known.

A combination of *Thrips (Isoneurothrips) setipennis* (Takahashi 1936) created a secondary homonymy with *Thrips setipennis* Steinweden and Moulton 1930, but such a situation has escaped attention. Since the latter species is, however, herewith synonymized with *Thrips (Isothrips) orientalis* Bagnall, a new name does not need to be designated.

2. **Thrips sumatrensis** (Priesner), new combination

Thrips (Isoneurothrips) sumatrensis Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 254.

Thrips (Isothrips) sumatrensis: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

Holotype in the Priesner collection was examined. Metanotum is wholly striated and metepimeron is reticulated, accessory setae on sterna are 5 to 7 pairs, and the grayish brown wing is nearly clear on the basal quarter. Collected in Sumatra, Java, and Thailand. Metanotal sculpture is different from *Thrips (Isothrips)* spp. which occur in the same region.

3. *Thrips cinchonae* (Priesner), new status

Thrips (Isoneurothrips) sumatrensis var. *cinchonae* Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 256, 285.

Thrips (Isothrips) sumatrensis var. *cinchonae*: Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54.

Holotype in the Priesner collection was examined. Sculpture on pterothorax is indiscernible on all the type series, accessory setae on sterna appear more than 2 pairs, and the grayish-brown wing is slightly lighter on the basal quarter. Collected in Java. No male is known.

Genus *Isoneurothrips* Bagnall

Isoneurothrips Bagnall, 1915, Ann. Mag. Nat. Hist. Ser. 8, **15**: 592.—Karny, 1921, Treubia **1**: 241.—Priesner, 1934, Natuurk. Tijdschr. Neder.-Indie **94**: 254, 256; 1940, Bull. Soc. Fouad I Ent. **24**: 54; 1949, Bull. Soc. Fouad I Ent. **33**: 134; 1957, Zool. Anz. **159**: 166; 1964, Bestimmungsbucher Ord. Thys. p. 103, Berlin; 1964, Mon. Thys. Egypt. Deserts p. 351, Cairo.

Anomalothrips Morgan, 1929, Proc. Ent. Soc. Wash. **31**: 5.—Priesner, 1949, Bull. Soc. Fouad I Ent. **33**: 120.

Type-species by original designation: *Isoneurothrips australis* Bagnall.

Head shape and chaetotaxy, including concave front, prominent ocellar hump, swollen cheeks, absence of ante-ocellar setae, 4th and 5th setae of postocular series, are same as *Thrips (Isothrips)*; striations of occiput moderately conspicuous and finely anastomosed; setae on head thick and short. Antennae 7-segmented, III to VI cylindrical and annulated, style short; 3-segmented maxillary palpi normal. Chaetotaxy and premarginal dorsal bulging of prothorax as *Thrips (Isothrips)*; setae generally thick and short. Chaetotaxy and sculptures on meso- and metanota as *Thrips (Isothrips)*; mesonotum transversely striated, metanotum and metepimeron reticulated; weak mesospinula. Forelegs unarmed. Regularly spaced setal rows on fore and hind veins of forewing as *Thrips (Isothrips)*, setae short and numerous, scale with 6 setae on vein. Chaetotaxy on abdominal segments as *Thrips (Isothrips)*, but many (10-11 on IV) discal setae on epipleura and many (7-10 pairs on IV) accessory setae on sterna. Combs on tergum VIII incomplete and weak. ♂: Chaetotaxy on tergum IX differs from *Thrips (Isothrips)*, but same as many species of *Thrips* s. str.; 3 pairs of prominent setae on dorsum (B1, accessory marginal and dorsal setae).

Many characters of *Isoneurothrips* are common to *Thrips (Isothrips)*, but the former differs essentially by type of antenna, short and numerous wing setae, discal setae on epipleura, and chaetotaxy of male tergum IX. It also differs from *Thrips* s. str. by type of antenna and chaetotaxy of wings.

The genus, which is still monotypic, and the type species were recently treated by Priesner (1964), so that no further remarks are needed.

1. *Isoneurothrips australis* Bagnall

Isoneurothrips australis Bagnall, 1915, Ann. Mag. Nat. Hist. Ser. 8, **15**: 592.—Morison, 1930,

- Bull. Ent. Res. **21**: 13.—Steele, 1935, Aust. Council Sci. Ind. Res. Pamphl. **54**: 36, figs.—Priesner, 1940, Bull. Soc. Fouad I Ent. **24**: 54; 1964, Bestimmungsbucher Ord. Thys. p. 103, Berlin; 1964, Mon. Thys. Egypt. Deserts p. 351, Cairo.
- Thrips mediolineus* Girault, 1926, Ins. Insc. Menstr. **14**: 18.—Kelly & Mayne, 1934, Australian thrips p. 30, Sydney.
- Anomalthrips amygdali* Morgan, 1929, Proc. Ent. Soc. Wash. **31**: 5.—Priesner, 1949, Bull. Soc. Fouad I Ent. **33**: 120.

A female syntype (Mundaring Weir, Darling Range, Perth, W. A., 3-VIII-14, coll. E. B. Poulton) which is herewith designated as lectotype, and male allotype described by Morison (1930) were examined at the British Museum. A syntype of *mediolineus* in the Priesner collection and 2 syntypes of *amygdali* and *australis* in the USNM collection were also examined. The synonymies of *mediolineus* by Kelly & Mayne (1934) and of *amygdali* by Priesner (1949) were reconfirmed.

The presently known distribution covers Australia, Tasmania, New Zealand, S. Africa, S. Rhodesia, Nyasaland, Madagascar, Kenya, Egypt, Palestine, Cyprus, Canary Is., Brasil, Uruguay, Chile, Barbados, California, Hawaii and Japan. Its origin has long been considered as Australia, but its wide extent of distribution which is now revealed makes this conclusion somewhat questionable.