

A NEW GENUS AND TWO NEW SPECIES OF ARBOREAL OPPIIDAE (Acari: Cryptostigmata) FROM NEW ZEALAND

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Abstract: A new genus is erected on the basis of 2 new species of Oppiidae, *Tuparezetes christineae* and *Tuparezetes philodendrus*. These mites were collected from the foliage of 2 different indigenous plant species in New Zealand. Both species appear to be well adapted for an arboreal existence in that they possess a deep wax layer on the notogaster and prodorsum. Some trophic and humidity relationships are considered briefly.

The specimens on which this work is based were collected from the foliage of living plants. Both species appear to be well adapted for an arboreal existence and are here described as new.

Superfamily OPPIOIDEA Balogh, 1961

Family OPPIIDAE Grandjean, 1954

The relationships of the new species described below appear to place them closest to the family Oppiidae Grandjean, 1954. However, they are not members of the Oppiidae *sensu stricto* as they possess tridactylous instead of monodactylous tarsi and 6 genital setae instead of the maximum of 5 given by Grandjean (1954). The notogastral chaetotaxy of the new species is similar to that of the Oppiidae except that the setae *te*, *ti*, *ms*, *r*₂ and *r*₃ are, within this family, never developed to the same extent as in the species described below. The prodorsum of the new species is unique in its possession of large paired prodorsal spines and well developed setae *l* and *il*.

It is considered that the peculiarity of these species may warrant the erection of a new familial category when related species have been studied.

Genus *Tuparezetes* Spain, new genus

Cryptostigmata with long tactile solenidion (φ_1) on a prominent projection. Tarsal claws with median thickest. Prodorsum with weakly developed ridges and a large pair of posteriorly directed spines inserted laterad of bases of setae *l*. Sensilli spheroidal, on a narrow stalk. Bothridia prominent. Setae *l* and *il* long, barbed all around. Exobothridial setae minute or absent. Notogaster and posterior part of prodorsum covered with a deep, white, wax layer. Notogastral setae *te*, *ti*, *ms*, *r*₃ and *r*₂ long, thick, barbed all around. Three notogastral fissures (*im*, *ips* and *ih*) present. Venter normal, with weakly developed coxisternal ridges, coxisternal setal formula

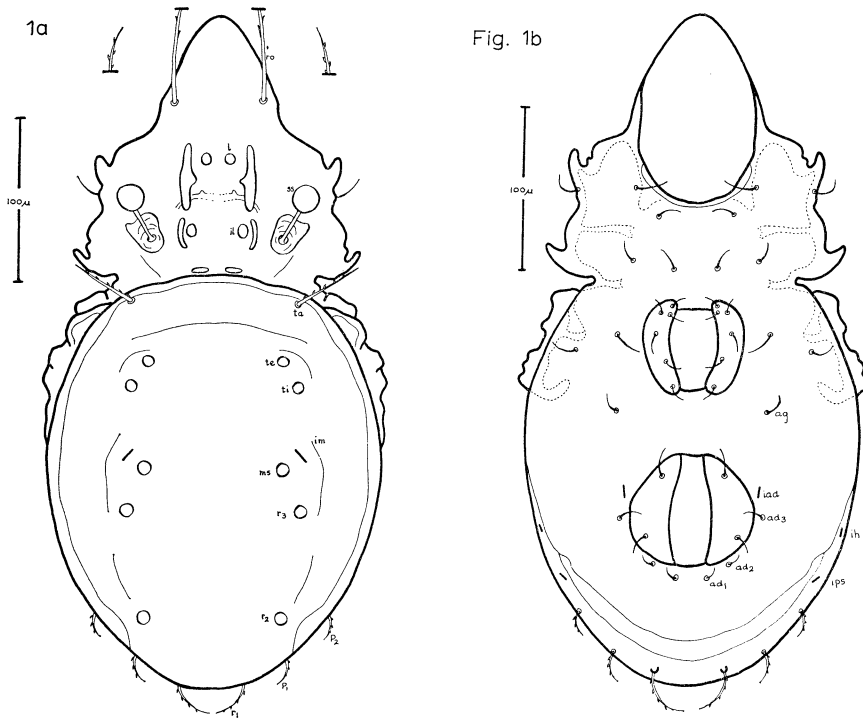


Fig. 1. *Tuparezetes christineae* n. sp.: a, dorsum; b, venter.

(3-2-0-2). Setae of genito-anal region and coxisternal rows a and b fine, smooth, tapering. Six pairs of genital setae. Setae Ad_1 and Ad_2 inserted posterior to anal aperture. Pedotecta I and II toothed.

Type species: *Tuparezetes christineae* n. sp.

The genus is named for the "host" plant of the type-species (*Olearia colensoi* Hook. f.) whose maori name is *tupare*.

***Tuparezetes christineae* Spain, new species**

Prodorsum: Rostrum rounded, setae *ro* smooth to finely barbed at tips, inserted on slight prominences in a dorsolateral position; nearly $2\times$ as long as mutual distance of their bases, curving broadly forward of rostrum by approximately $1/3$ their length.

Prodorsal ridges present; indistinct and interrupted in parts, visible lateral to bases of setae *il*. Anteriorly interrupted for a short distance and reappearing as mesially curving ridges extending to bases of small, forward projecting cusps, these latter partially joined by a weak, medianly interrupted ridge. A large pair of sharp, posteriorly directed spines on prodorsum (fig. 1a, 2a). In dorsal view, bases of spines inserted laterad of bases of setae *l*. Points of spines directed posteriorly over mesially curving portions of prodorsal ridges, from which they are quite separate. Posterior portions of bases of spines forming small, mesially directed projections. Tutorium apparently absent. Setae *l* thick, long, heavily barbed all around (fig. 2c); in-

serted lateral to mid-dorsal line opposite approximate middle of pedotectum I. Setae *il* similar to *l*; inserted between bothridia. Posterior portion of lamellar region bordered by a mesially interrupted ridge which may be incurving extensions of posterior parts of prodorsal ridges. Bothridia prominent, directed obliquely forward (fig. 2b). Sensilli large, spherical with a narrow stalk (fig. 2b). Exobothridial setae absent or minute. Pedotecta I and II well developed.

Notogaster: Oval in shape, convex, somewhat truncate anteriorly. In life this and prodorsum are covered with a deep, white to whitish-gray wax which may extend as high as half way up the major notogastral setae *ti* and *ms*. Nine pairs of notogastral setae. Setae *ta* finely barbed, situated on front corners of notogaster; directed obliquely forward at approximately 45° to mid-dorsal axis of body. Setae *te*, *ti*, *ms*, *r*₃ and *r*₂ similar in structure to *il* and *l*, directed vertically upwards; inserted as shown in fig. 1a (only bases of these setae are shown to avoid obscuring the figure). Setae *r*₁ barbed, smaller than *r*₂ and *r*₃; curving horizontally mesad. Setae *P*₁ and *P*₂ smaller but similar in structure and curvature to *r*₁. Three pairs of notogastral fissures noted, (*im*, *ips* and *ih*) positioned as shown in figures 1a and 1b. A row of irregularly-shaped, more lightly pigmented areas extends around notogaster immediately above level of setae *r*₁, *P*₁ and *P*₂.

Infracapitulum: Diarthral, labio/genal articulation complete. Setae *h*, *m* and *a* broadly curved, tapering, finely barbed. Pedipalps 5-segmented, chaetotaxy as in fig. 3a; setal formula (0-2-1-3-9).

Ventral region of podosoma: Coxisternal ridges not well developed. Ridges I, II and sejugal present; III and IV absent. A weakly chitinized sternal ridge present joining ridges I, II and sejugal. Coxisternal setae fine, smooth, similar in length to genital setae. Coxisternal setal formula (3-2-0-2). Apodemata I and II moderate in length; III, IV and sejugal short and heavily chitinized (fig. 1b).

Genito-anal region: (fig. 1b). Anal aperture widest posteriorly. Anal plates bear 2 small, smooth setae (fig. 2f). Adanal setae similar in structure to anals; *Ad*₁ located immediately behind anal aperture and just lateral to mid-ventral line, *Ad*₂ located lateral to *Ad*₁, *Ad*₃ lateral to and inserted approximately half-way along anal aperture. Anal fissure (*iad*) runs parallel to edge of anal aperture, lateral to its anterior 1/2. One pair of aggenital setae inserted posterolaterad of genital aperture. Genital aperture narrowest posteriorly. Genital plates bear 6, small, smooth setae arranged as in fig. 2e; the positions of the most anterior appear to be slightly variable.

Legs: Long; order of increasing size is II, I, III, IV. All tarsi tridactylous; claws finely barbed dorsally under high (1750X) magnification, the median somewhat longer and 2× as thick as laterals (fig. 2d). The chaetotaxy of the 1st genu, tibia and tarsus shown in fig. 3b. Long tactile solenidion (φ_1) inserted on a conspicuous projection. The "touffe du premier tarse" of

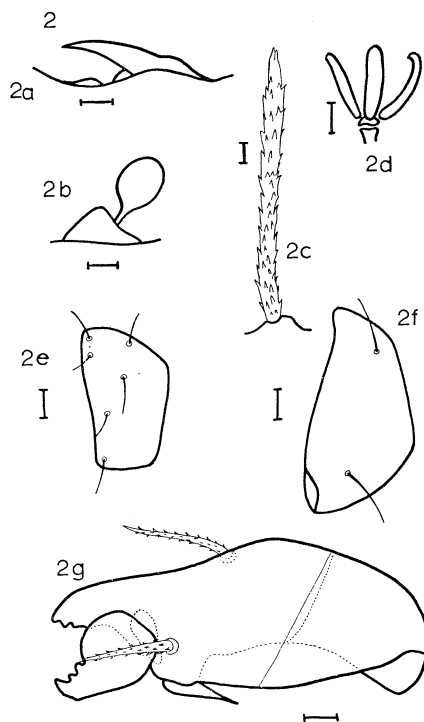


Fig. 2. *Tuparezetes christineae* n. sp. (Scale lines 10 μ): a, prodorsal spine—right lateral aspect; b, bothridium and sensillus—right lateral aspect; c, seta *l*; d, tarsal claws—leg I dorsal aspect; e, left genital plate; f, left anal plate; g, chelicera.

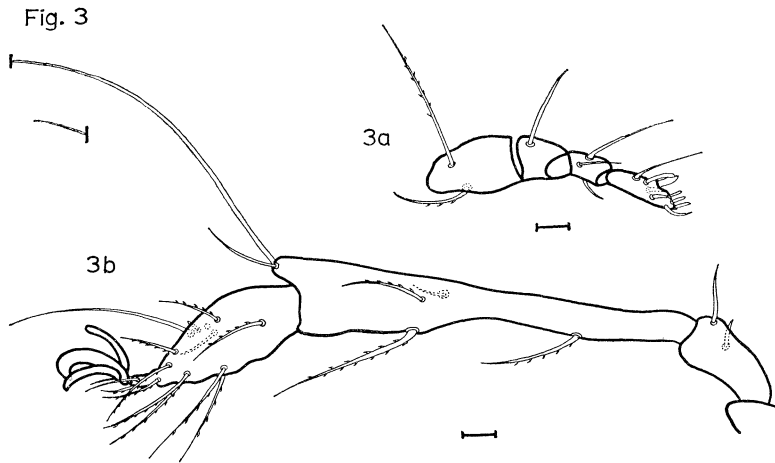


Fig. 3. *Tuparezetes christineae* n. sp. (Scale lines 10μ). a, palp; b, leg I.

Grandjean (1935) is raised on a small prominence and contains the famulus, 2 solenidia and seta *tf*. Chaetotaxy of other legs not studied.

Size: Mean body length of 20 specimens from all localities was 407μ , range 371μ to 451μ . The mean body width of these specimens, at the widest part of the notogaster, was 214μ , range 190μ to 232μ .

The holotype is 425μ long, 220μ wide and 210μ deep.

The lengths, in microns, of the legs of 12 specimens from all localities are as follows:

Leg I	mean	362,	range	315 to 405
Leg II	"	332,	"	303 to 357
Leg III	"	374,	"	339 to 423
Leg IV	"	459,	"	435 to 514

The lengths, in microns, of the major dorsal setae of 12 specimens from all localities are as follows:

seta	mean	range	seta	mean	range
<i>ro</i>	103	92-116	<i>l</i>	132	122-146
<i>il</i>	132	122-158	<i>te</i>	127	103-146
<i>ti</i>	132	92-158	<i>ms</i>	122	97-140

Holotype ♀, Mt Wharite, 29.X.1966, taken from foliage of *Olearia colensoi* Hook. f. at 1025 m, A. V. Spain.

Paratypes: All collected from foliage of *Olearia colensoi*. Ruahine Ranges: 5, Hinerua Ridge, 13.VIII.1967, P. Lewis; 8, Waipawa Saddle, 28.XII.1966, A. V. Spain; 2, Mt Wharite, 28.VII.1966, 23 sp., 29.X.1966, Spain. Tararua Ranges: 2, Arête Stream Basin, 23.II.1965, Spain. South I.: 4, Magister Ridge, 25.IX.1966, Spain; 14, Mt Fox, 6.XI.1966, P. Wardle; 1, Strachan Range, 31.VIII.1965, Spain; 2, Pillan's Pass, 3.I.1967, Spain. Stewart I.: 13, Thomson Ridge, 23.II.1967, J. C. McIlroy. The holotype and all paratypes with the exception of those collected from Mt Wharite on 28.VIII.1966 are lodged in the collection of the Entomology Division, D. S. I. R., Nelson, New Zealand. The paratypes collected from Mt Wharite on 28.VIII.1966 are lodged in the collection of the Bernice P. Bishop

Museum, Hawaii.

OTHER RECORDS: Rangiwahia Ski Club Hut Area, Ruahine Ranges, 4.IV.1964, A. V. Spain. Blue Range, Tararua, Ranges, 23.II.1965, A. V. Spain. (Only damaged specimens were available from these localities.)

Ecology: The only host plant so far known for *Tuparezetes christineae* is *Olearia colensoi* Hook. f. This is a composite shrub that grows up to 3 meters high and forms dense stands in the subalpine areas of New Zealand. It is found below 38°S (Allan 1961) normally where the mean annual rainfall exceeds approximately 250 cm. *T. christineae* is undoubtedly a fungivore as masses of fungal hyphae and spores were noted in squash preparations of food boluses. One such preparation was sent to the Commonwealth Mycological Institute and the following identifications of the fungi present were made:

Conidia of *Clasterosporium* sp. or *Sporidesmium* sp.

Conidia of *Cladosporium* sp.

Groups of setae which may belong to *Colletotrichum* sp.

Other fungi known from *Olearia colensoi* are *Uredo tupare* Cunningham, 1924. (Cunningham, 1931) and another tentatively identified as *Asterina* sp. (Holloway, et al. 1963). It may well be that either or both of these latter are also utilized by *Tuparezetes christineae*. During the course of this study the large orange uredospores of *Uredo tupare* were observed to be present on both the upper and lower leaf surfaces of the host plant and thus readily available for consumption by *T. christineae*. It is not known, however, whether they are utilized as they may be too large for the relatively small mouth parts of *christineae*.

T. christineae is normally found on the lower leaf surfaces of the host plant, on and amongst the deep, diffuse tomentum. This presumably provides it with a favorable level of humidity and mechanical protection. It appears to be adapted to an arboreal existence in that it possesses long legs and well developed claws, with which it can cling most tenaciously to the leaves. It also possesses, in life, a white waxy substance that covers the posterior part of the prodorsum and notogaster to some depth and this probably aids in water conservation. *Tuparezetes christineae* probably spends at least some of its nymphal stadia on the foliage as oppioid nymphs were noted to be present on the foliage. This mite is the only member of the Oppioidea present in this habitat thus it is considered that these nymphs are probably those of *T. christineae*. These facts, together with the absence of *christineae* from litter samples collected underneath stands of the host plant, suggest that this mite is truly arboreal in its habits.

***Tuparezetes philodendrus* Spain, new species**

Prodorsum: Rostrum rounded, setae *ro* smooth to finely barbed at the tips; inserted on slight prominences in a dorsolateral position. Slightly longer than mutual distance of bases, curving broadly forward of the rostrum by nearly 1/2 their length.

Prodorsal ridges indistinct; represented by small ridges contiguous with and anterolaterad of setae *il*. A conspicuous pair of spines inserted immediately laterad of bases of setae *l*; spines conical, sharply pointed, directed obliquely rearward at approximately 45° to longitudinal axis of body, bases round. Tutorium apparently absent.

Setae *l* thick, long, barbed all round; inserted on slight prominences just laterad of mid-dorsal

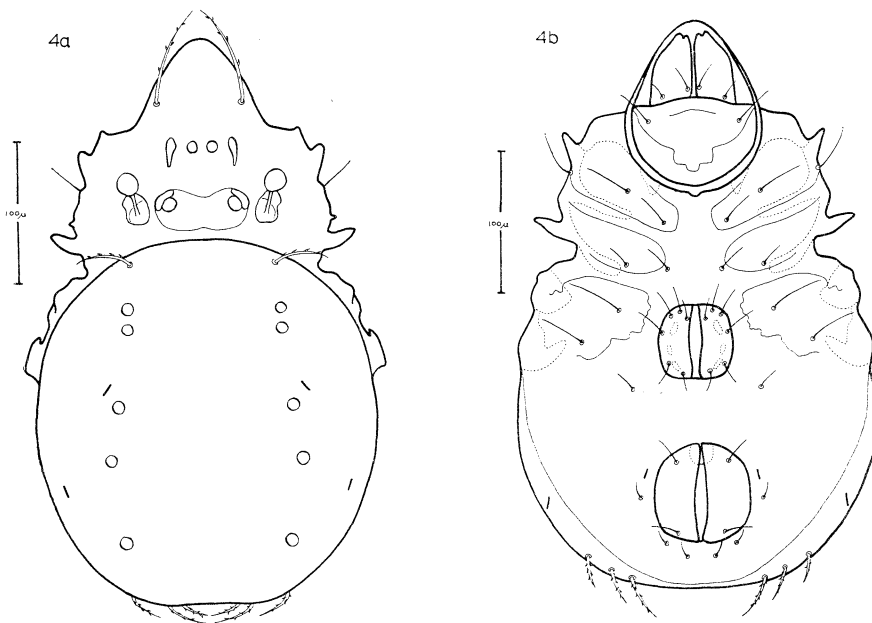


Fig. 4. *Tuparezetes philodendrus* n. sp.: a, dorsum; b, venter.

line opposite anterior part of Pedotectum I. Setae *il* similar to *l*; inserted mesad of bothridia on large rounded prominences which have small areas of chitinisation anterolaterally. Setae *ex* minute; inserted immediately laterad of bothridia, obscured by latter when viewed in dorsal aspect. Bothridia prominent, directed obliquely forward. Sensilli prominent, spheroidal with a narrow stalk. Pedotecta I and II well developed, toothed.

Notogaster: Convex, generally oval in dorsal aspect but broader posteriorly and somewhat truncate both anteriorly and posteriorly. In life notogaster and posterior part of prodorsum covered with a deep, white, diffuse, wax layer.

Nine pairs of notogastral setae present, inserted as shown in fig. 4a (only setal bases are shown to avoid obscuring the figure). Setae *ta* moderately short, finely barbed unilaterally. Setae *te*, *ti*, *ms*, *r*₃ and *r*₂ similar in structure to setae *l* and *il*, directed vertically upward. Setae *r*₂, *P*₁ and *P*₂ small, barbed all round, curving broadly rearward and meso-ventrad, inserted at approximately equal distances from each other.

Three pairs of notogastral fissures noted (*im*, *ips* and *ih*) positioned as in fig. 4a and 4b. In cleared specimens a line of irregularly-shaped lighter areas extends laterally around sides of notogaster between levels of setae *te* to *r*₂ and setae *r*₁ to *P*₂ extending from opposite setae *P*₁ to opposite setae *ti*.

Infracapitulum: Diarthral, labio/genal articulation complete. Setae *h*, *m*, *a* fine, smooth, tapering. Pedipalps 5-segmented, setal formula (0-2-1-3-9) chaetotaxy as for *Tuparezetes christineae*.

Ventral region of podosoma: Coxisternal ridges not well developed; ridges I, II and sejugal present, III and IV absent. A weakly chitinized sternal ridge present and joins coxisternal ridges. Coxisternal setae fine, smooth, tapering except for *lc* which is finely barbed. Coxisternal setal formula (3-2-0-2). Apodemata I moderate in length, II and sejugal longer, III and IV short.

Genito-anal region: Anal aperture widest posterior. Anal plates (fig. 5a) bear 2 small smooth setae. Adanal setae small, smooth, tapering; Ad_1 located immediately behind anal aperture and lateral of mid ventral line, Ad_2 located anterolaterad of Ad_1 near edge of anal aperture, Ad_3 inserted immediately laterad of anal aperture approximately half way down its length. Anal fissure (*iad*) runs parallel to edge of anal aperture opposite its anterior half. Preanal organ small, truncate anteriorly, confined to anterior end of anal aperture. One pair of small, smooth, tapering ag-genital setae inserted posterolaterad of genital aperture. Genital aperture broadest anteriorly. Genital plates bear 6 pairs of fine, smooth, tapering setae (fig. 5b).

Ovipositor: As in fig. 5c.

Legs: Legs long; order of increasing size is I, II, III, IV. All tarsi tridactylous, claws finely barbed dorsally, median somewhat thicker and slightly shorter than laterals. The long tactile solenidion (φ_1) is inserted on a conspicuous projection. Chaetotaxy not otherwise studied.

Size: Mean body length of 14 specimens was 430 μ , range 371 μ to 451 μ . Mean body width, at widest part of notogaster, was 254 μ , range 235–275 μ .

The leg lengths, in microns, of 12 specimens are as follows:

Leg I	mean 354,	range 283–417
Leg II	mean 356,	range 295–413
Leg III	mean 399,	range 364–478
Leg IV	mean 458,	range 364–538

The lengths, in microns, of the major dorsal setae of 12 specimens are as follows:

seta	Mean	Range	Seta	Mean	Range
<i>ro</i>	91	73–107	<i>l</i>	151	140–165
<i>il</i>	197	190–206	<i>te</i>	212	185–240
<i>ti</i>	219	190–246	<i>ms</i>	202	197–213
<i>r₃</i>	193	174–206	<i>r₂</i>	176	150–194

Holotype ♀, Hundalee Hills, Marlborough Province, 26.VIII.1967, beaten from foliage of *Nothofagus solandri* (Hook. f.), A. V. Spain. Lodged at Entomology Division, D. S. I. R., Nelson, New Zealand.

Paratypes: 19 specimens, Hundalee Hills, Marlborough Province, 26.VIII.1967, beaten from foliage of *Nothofagus solandri* (Hook. f.), A. V. Spain, (British Museum, (Nat. Hist.), 10 paratypes; the B. P. Bishop Museum, Hawaii, 5 paratypes; Entomology Division, D. S. I. R., Nelson, New Zealand, 4 paratypes). 1 specimen, Mt Robert, Nelson, 10.X.1965, from foliage of *Olearia lacunosa* (Forst. f.), at 900 m, E. Collyer. Lodged at Entomology Division, D. S. I. R., Nelson, New Zealand.

Ecology: Little is known of the ecology of this species. It is similar to *Tuparezetes christineae* in its possession of a deep wax layer and long legs and appears to be well adapted for an arboreal existence. It may well have been feeding on the "sooty mould"

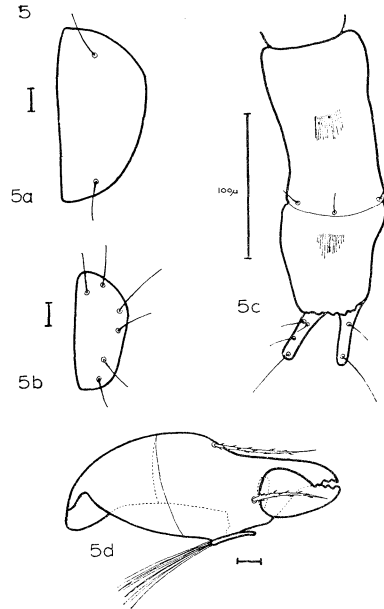


Fig. 5. *Tuparezetes philodendrus* n. sp. (Scale lines 10 μ except where otherwise indicated) a, left anal plate; b, left genital plate; c, ovipositor; d, chelicera.

(Capnodiaceae) that grows profusely on *Nothofagus solandri* as a consequence of its infestation with *Eriococcus fagicorticis* Maskell which produces copious honey dew. The trophic relationships of this species on *Olearia lacunosa* are unknown.

Differences between *Tuparezetes christineae* and *T. philodendrus*: A comparison of the sizes of the 2 species of *Tuparezetes* described above shows that, although they are of fairly similar length, *philodendrus* is considerably broader than *christineae*. A further difference between the 2 species is that *philodendrus* is somewhat truncate posteriorly while *christineae* is not.

Tuparezetes philodendrus has longer setae *l*, *il*, *te*, *ti*, *ms*, *r*₃ and *r*₂ than *christineae* although setae *r*₁, *P*₁ and *P*₂ are finer in the latter species.

Another feature distinguishing the 2 species is the length of the median tarsal claw. That of *christineae* is longer, and that of *philodendrus* shorter, than the 2 laterals.

The most obvious difference between the 2 species is in the form of the prodorsal spines and associated structures. From a lateral aspect it can be seen that the prodorsal spines of *christineae* are longer than those of *philodendrus* and extend posteriorly almost as far as the bases of setae *il*. They are also curved and more closely appressed to the prodorsum. In comparison, the prodorsal spines of *philodendrus* are short, conical and directed obliquely rearward. From a dorsal aspect, the bases of the prodorsal spines of *christineae* can be seen to be produced mesad and are somewhat elongate while those of *philodendrus* are round.

Beneath the free, rearwardly directed part of the spine a transverse ridge can be seen in *christineae*. This structure is absent in *philodendrus*.

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