

A revision of *Nomaua* (Araneae: Synotaxidae) and description of a new synotaxid genus from New Zealand

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ABSTRACT: The genus *Nomaua* (Araneae: Synotaxidae: Pahorinae), endemic to New Zealand, is revised, including description of five new species (*Nomaua urquharti*, *N. rimutaka*, *N. repanga*, *N. taranga* and *N. rakiura*). The female of the type species (*Nomaua crinifrons* (Urquhart, 1891)) is also described for the first time. The genus *Wairua* is placed as a new junior synonym of *Nomaua*. Species of *Nomaua* are now known from Northland to Stewart Island. A new genus and new species, *Zeatupua forsteri* (Synotaxidae: Physogleninae), related to the Australian genera *Tupua* and *Paratupua*, is also described.

KEYWORDS: Revision, spiders, Synotaxidae, New Zealand, *Nomaua*, *Wairua*, *Zeatupua*, *Paratupua*.

Introduction

The synotaxids are small, long-legged spiders found in New Zealand, Australia (including Tasmania) and South America (Forster *et al.* 1990; Agnarsson 2003). At present, the family contains 68 species in 13 genera (Platnick 2008). All the 47 species of New Zealand synotaxids listed by Forster *et al.* (1990) are endemic, with only two described prior to 1990 and almost half known from their type locality only. Five of the genera belong in the endemic subfamily Pahorinae: *Pahora* Forster, 1990 (in Forster *et al.* 1990) (nine species); *Pahoroides* Forster, 1990 (in Forster *et al.* 1990) (two species); *Wairua* Forster, 1990 (in Forster *et al.* 1990) (two species); *Nomaua* Forster, 1990 (in Forster *et al.* 1990) (six species); and *Runga* Forster, 1990 (in Forster *et al.* 1990) (five species). The subfamily Physogleninae is represented in New Zealand only by the endemic genus *Meringa* Forster, 1990 (in Forster *et al.* 1990) (nine species). The endemic genus *Mangua* Forster, 1990 (in Forster *et al.* 1990) (14 species) was not placed in any subfamily but listed as a possible relative of the Pahorinae and Physogleninae. The subfamily Synotaxinae is not known from New Zealand.

Since the late 1970s, during surveys of arthropods from southern beech (*Nothofagus* spp.) and mixed podocarp/hardwood forest of the Orongorongo Valley, near Wellington (see Alley *et al.* 2001), we (and others) have collected specimens of three synotaxid species: an undescribed species of *Nomaua*; an undescribed genus and species of Physogleninae; and *Meringa borealis* Forster, 1990 (in Forster *et al.* 1990). Furthermore, the collections in the Museum of New Zealand Te Papa Tongarewa (MONZ) hold material of an undescribed species of *Nomaua* from Stewart Island, and we collected another three undescribed species from other parts of New Zealand.

In addition, we found some confusion in the descriptions of species placed in the genera *Nomaua* and *Wairua* by Forster *et al.* (1990), as well as in their pairing of males and females. The holotype male of *Wairua reinga* Forster, 1990 (in Forster *et al.* 1990) is actually a male of *Nomaua perdita* Forster, 1990 (in Forster *et al.* 1990), while the female of *W. reinga* cannot be placed in any known genus or species; the description of the allotype male of *Wairua waikanae* Forster, 1990 (in Forster *et al.* 1990) matches males of an

undescribed *Nomaua* species from the Orongorongo Valley; and specimens that were referred by Forster *et al.* (1990) to the type species of *Nomaua* (i.e. *N. crinifrons* (Urquhart, 1891)) belong to two other different species of *Nomaua* (see Table 1).

In this paper we revise the genus *Nomaua*, we place *Wairua* as a new junior synonym of *Nomaua*, we describe five new species of *Nomaua*, we describe a new genus and species of Physogleninae from the Orongorongo Valley, and we clarify the confusion mentioned above (see Table 1).

Material and methods

Type material

Most of the type specimens designated by Forster (in Forster *et al.* 1990) are listed in that publication as held in Otago Museum (as OMD). However, the holotypes of *Nomaua waikaremoana* Forster, *Wairua waikanae* Forster, *Mangua caswell* Forster, *Mangua flora* Forster, *Mangua kapiti* Forster, *Meringa australis* Forster and *Runga flora* Forster are listed as belonging to NMW (=MONZ). These specimens, except for the type of *W. waikanae*, are currently held at Otago Museum. At the time of going to press, Otago Museum management was disputing ownership of these specimens and we advise anyone interested in working on them to check with both OMNZ (Otago Museum) and MONZ to see where they are held. The institutional identifier for specimens currently under dispute is given here as MONZ-OMNZ.

Institutional acronyms

AMNH = American Museum of Natural History, New York, USA

CMNZ = Canterbury Museum, Christchurch, New Zealand

MONZ = Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand

OMNZ = Otago Museum, Dunedin, New Zealand

Abbreviations for body parts

Eyes:

ALE = anterior lateral eyes

AME = anterior median eyes

PLE = posterior lateral eyes

PME = posterior median eyes

Cephalothorax:

LM = lateral thoracic mounds

SP = stridulatory picks

Male palp:

CP = curved process of TTA

DP = denticulate process of TTA

MA = median apophysis

PC = paracymbium

PM = patellar macroseta

TM = tibial macroseta

TTA = theridioid tegular apophysis

VP = vertical process of TTA

Characters that conform to the generic diagnosis are not repeated in species descriptions. Features of the bulb of the male palp differ substantially between species of *Nomaua* and are diagnostic. In describing palps, we use the palpal terminology of Agnarsson (2003, 2004). Colour information is based on ethanol-preserved specimens. Measurements (given in millimetres) for each species were made using an eyepiece micrometer on a Zeiss Stemmi® 2000 binocular microscope. Eyemound height was measured from the upper edge of the ALE to the top of the mound and is expressed as a proportion of the vertical diameter of the AME. For the figures, specimens were photographed using a Canon® G2 digital camera on the same microscope, and a series of photographs was combined with focus-stacking software, including Combine ZM, to produce images with extended depth of field.

In locality data, two-letter entomological area codes follow Crosby *et al.* (1998). All locality records are from New Zealand unless stated otherwise.

Systematics

Family Synotaxidae

Subfamily Pahorinae Forster, 1990

Pahorinae Forster, 1990 (in Forster *et al.* 1990: 36).

TYPE GENUS: *Pahora* Forster, 1990 (in Forster *et al.* 1990: 40).

DIAGNOSIS: Based on Forster *et al.* (1990). In males, the ocular area behind the AME is setose (e.g. Fig. 2) and in some species it is elevated. Multipore secretory pits are present on the clypeus and eyemound (see Forster *et al.* 1990: figs 133, 134). In males, a pick or paired picks on the posterior margin of the carapace engage with a stridulatory file on the antero-dorsal surface of the abdomen. The male palp has an excavated paracymbium on the proximal edge of the retromargin of the cymbium (e.g. Fig. 8).

Table 1 Change of status for some species of *Nomaua*.

<i>Sensu</i> Forster (in Forster <i>et al.</i> 1990)	This paper
<i>Nomaua crinifrons</i> (Urquhart, 1891) ♂	<i>Nomaua urquharti</i> new species
<i>Nomaua crinifrons</i> (Urquhart, 1891) ♀	<i>Nomaua perdita</i> Forster, 1990
<i>Nomaua perdita</i> Forster, 1990 ♀	<i>Nomaua urquharti</i> new species
<i>Wairua reinga</i> Forster, 1990 ♂	<i>Nomaua perdita</i> Forster, 1990
<i>Wairua reinga</i> Forster, 1990 ♀	<i>Incertae sedis</i>
<i>Wairua waikanae</i> Forster, 1990 ♂	<i>Nomaua rimutaka</i> new species
<i>Wairua waikanae</i> Forster, 1990 ♀	<i>Nomaua waikanae</i> new combination, <i>incertae sedis</i>

DESCRIPTION: Abdomen of males is more elongate than in females; legs long and slender, the first pair much longer; leg formula 1243 or 1423. Eight eyes in two rows, posterior row slightly recurved. AME smallest, other eyes subequal. Chelicerae are vertical, with promarginal and retromarginal teeth and a patch of denticles in furrow (in contrast to a single row of denticles as in species of Physogleninae). Labium about twice as wide as long, sternum about as long as wide; coxae IV separated by their width. Male palp with paracymbium excavated on proximal edge of retromargin of cymbium. See Forster *et al.* (1990) for further information.

Genus *Nomaua* Forster, 1990

Nomaua Forster, 1990 (in Forster *et al.* 1990: 59). Type species: *Cornicularia crinifrons* Urquhart, 1891 [as *Bolyphantes crinifrons* (Urquhart)].

Wairua Forster, 1990 (in Forster *et al.* 1990: 57). Type species: *Wairua reinga* Forster, 1990 (in Forster *et al.* 1990). **New synonymy.**

DIFFERENTIAL DIAGNOSIS: *Nomaua* can be distinguished from *Pahora*, *Pahoroides* and *Mangua* by the lateral thoracic mounds, the numerous hairs on the ocular mound in both sexes, and in males by a pair of stridulatory picks on the posterior margin of the carapace, associated with a pair of files on the antero-dorsal abdomen. *Runga* can be distinguished from *Nomaua* by the elongate denticulate process of males, and the well-developed epigynum and distinctive genitalia of females (Forster *et al.* 1990).

DESCRIPTION:

Size: Total body length ranges from 3 mm to 5 mm in both sexes.

Colour: AME black, other eyes opaque-white with copper-coloured surround. Eyemound orange-brown, remainder of carapace pale yellow-brown. Thoracic margin edged with black and one, occasionally two, rows of black dots across the radial ridges, parallel to the margin. Blackish shading extends, narrowing, from the PLE to the posterior margin of the carapace (Fig. 1). Sternum pale yellow-brown, sometimes with a light grey-black wash. Abdomen with white patches dorsally and laterally, and with black flecks antero-dorsally and laterally. A blackish streak extends down each postero-lateral surface to the sides of the spinnerets. Ventral surface is pale, with a broad black band anterior to the epigastric furrow, and in some specimens a grey stripe between the epigastric furrow and the spinnerets. Legs light brownish yellow, femora and tibia with light brownish annulations. Metatarsus and tarsus are light brown, sometimes with traces of annulations evident. Colour similar in both sexes.

Cephalothorax: An eyemound is present, high and conical in males of some species (*Nomaua crinifrons*, *N. urquharti* and *N. arborea*), and low in males of other species and in females. The eyemound of males has numerous hairs (from about 15 in *N. perdita* to >50 in *N. crinifrons*); in females the hairs are fewer and weaker. The carapace has deep cervical grooves and a deep thoracic groove extending back from the crescent-shaped fovea, becoming shallow toward the posterior margin of carapace. Lateral thoracic mounds are almost as high as the cephalic region (Fig. 2). The labium is about twice as wide as long and strongly rebordered. The sternum is about as long as wide. The coxae IV are separated by a gap that is slightly greater than their width. The pedicel is sclerotised on the dorsal and ventral surfaces in males but only on the dorsal surface in females.

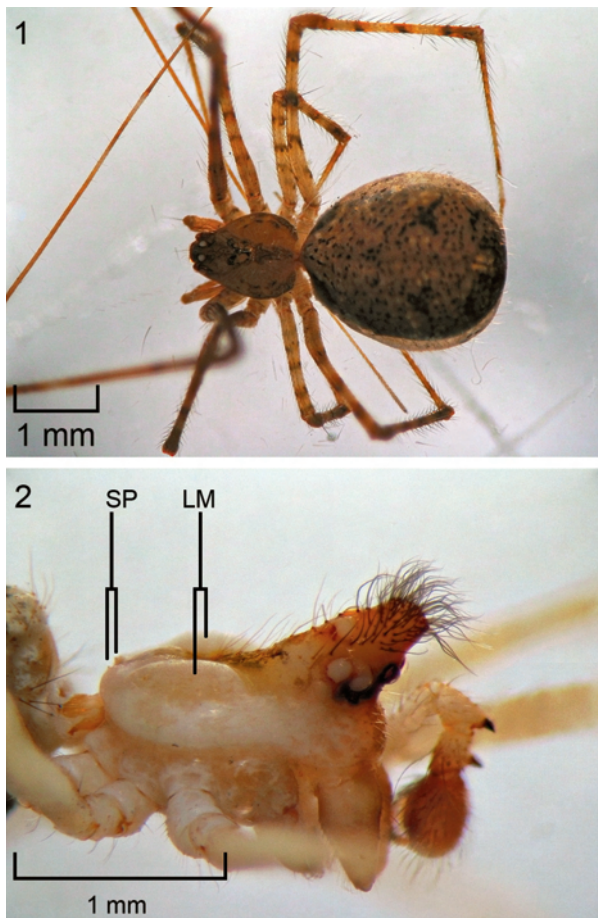


Fig. 1 *Nomaua cauda* female, dorsal view, showing colour pattern.

Fig. 2 *Nomaua crinifrons* male cephalothorax, showing the conspicuous eyemound.

Chelicerae: Promargin usually with several large teeth; retromargin with up to five small teeth; the distal half of the fang furrow with many denticles.

Palp: In males is short (e.g. Figs 3, 4), about one-fifth of the length of leg 3; in females is about a quarter to a third of the length of leg 3. Palpal claw in females is long and smooth, without teeth. In males, the dorso-distal portion of the palpal patella bears a long, slender macroseta or a stout macroseta. The male palpal tibia has either one or two stout macrosetae, or a small, curved macroseta, or only a long macroseta. In some species there is a rugose lobe on the tibia (e.g. *Nomaua cauda*). In males, the tibia usually has two retrolateral and one or more dorso-prolateral trichobothria. The cymbium has a deeply excavated, triangular paracymbium on the proximal retromargin (Forster *et al.* 1990: fig. 219). A large, complex sclerite, the theridioid tegular apophysis (TTA) bears several

processes that differ in size and shape. It consists of a vertical process, variable in shape and size, and a horizontal, curved process. In addition, a denticulate process of the TTA is present in some species. The median apophysis, ventral to the TTA, appears to be fused to the TTA and differs in shape between species. The embolus originates on the tegulum and is usually obscured by the cymbium.

Abdomen: In males is elongate, more than twice as long as wide in all species except *Nomaua rakiura*; in females is triangular, wider posteriorly and usually only slightly longer than wide.

Colulus: Triangular, usually with three to five hairs, although Forster *et al.* (1990: 61) report that the colulus has only two hairs.

Legs: Formula 1, 2, 4, 3; long and slender, with the first pair much longer than the others and the third pair clearly the shortest. Leg measurements for eight species of *Nomaua* are given in Table 2. Leg measurements for *N. waikaremoana*, *N. nelson*, *N. arborea* and *N. waikanae* (as *Wairua waikanae*) can be found in Forster *et al.* (1990).

Female genitalia: Epigynum is distinct, raised posteriorly above the epigastric furrow. The genitalia usually have two, but sometimes four, receptacula. The genital ducts lead directly to external openings near the margin of the epigastric furrow.

DISTRIBUTION: Known from Northland (Hen Island) in the north, to Stewart Island in the south.

BIOLOGY: *Nomaua* are common in forest, living in vegetation close to the ground and under fallen logs. Where nikau palms (*Rhopalostylis sapida* H. Wendl. et Drude) are present, *Nomaua* are often found in the large swollen bases of the dead, fallen fronds. They are also found on the underside of leaves of low shrubs and ferns (especially *Microsorium* spp.). Although Forster *et al.* (1990: 39) state that pahorines construct distinctive domed webs and BMF has observed many of these webs occupied by *Pahoroides*, we have not observed *Nomaua* on anything more than simple, horizontal threads. Males and females are present throughout the year. A female of *N. taranga* was collected on 5 December 2004 in the base of a fallen nikau frond, together with a spherical egg sac covered in fragments of litter and frass. The egg sac contained 36 spiderlings. A female of *N. cauda* collected at Waikanae on 18 October 2006 and held in a tube for two days produced 17 eggs in a white spherical egg sac suspended from threads attached to the walls of the tube. The female hung upside down, from the underside of the egg sac.

Table 2 Measurements of the segments of the legs and palp of *Nomaua* spp. described in this paper. For measurements of other species see Forster *et al.* 1990. (Abbreviations for the segments are: fem. = femur; pat. = patella; tib. = tibia; met. = metatarsus; tar = tarsus.)

<i>Nomaua crinifons</i>						
Male	fem.	pat.	tib.	met.	tar.	Total
leg 1	5.276	0.551	4.488	5.591	3.307	19.213
leg 2	3.150	0.394	2.441	2.913	1.654	10.551
leg 3	1.890	0.394	1.339	1.654	0.787	6.063
leg 4	2.913	0.433	1.890	2.520	1.102	8.858
palp	0.390	0.244	0.220	—	0.341	1.195
Female	fem.	pat.	tib.	met.	tar.	Total
leg 1	4.094	0.512	4.252	4.882	3.307	17.047
leg 2	3.150	0.433	1.811	2.441	1.575	9.409
leg 3	1.811	0.394	1.181	1.102	0.866	5.354
leg 4	2.441	0.472	2.283	2.441	1.102	8.740
palp	0.488	0.220	0.244	—	0.463	1.415
<i>Nomaua urquharti</i>						
Male	fem.	pat.	tib.	met.	tar.	Total
leg 1	5.197	0.630	4.961	5.669	3.543	20.000
leg 2	3.228	0.472	2.677	3.386	1.811	11.575
leg 3	2.047	0.394	1.260	1.575	1.102	6.378
leg 4	3.307	0.472	2.520	2.677	1.260	10.236
palp	0.537	0.220	0.171	—	0.439	1.366
Female	fem.	pat.	tib.	met.	tar.	Total
leg 1	4.803	0.551	4.409	5.039	3.228	18.031
leg 2	3.071	0.472	2.441	2.835	1.732	10.551
leg 3	1.890	0.394	1.181	1.339	0.709	5.512
leg 4	2.835	0.472	2.441	2.598	1.181	9.528
palp	0.512	0.220	0.268	—	0.512	1.512
<i>Nomaua perdita</i>						
Male	fem.	pat.	tib.	met.	tar.	Total
leg 1	5.118	0.472	5.748	6.457	4.094	21.890
leg 2	3.622	0.394	2.913	3.465	1.890	12.283
leg 3	2.756	0.394	1.339	1.969	0.945	7.402
leg 4	3.543	0.472	2.835	3.071	1.654	11.575
palp	0.463	0.171	0.171	—	0.341	1.146
Female	fem.	pat.	tib.	met.	tar.	Total
leg 1	5.354	0.551	4.803	5.906	3.071	19.685
leg 2	3.307	0.472	2.835	3.465	1.732	11.811
leg 3	2.047	0.394	1.339	1.811	0.945	6.535
leg 4	3.622	0.551	2.992	2.677	1.339	11.181
palp	0.585	0.220	0.220	—	0.537	1.561

continued next page

Nomaua cauda

Male	fem.	pat.	tib.	met.	tar.	Total
leg 1	5.394	0.591	4.961	6.535	4.016	21.496
leg 2	3.465	0.394	2.795	3.543	1.890	12.087
leg 3	1.969	0.315	1.339	1.732	0.866	6.220
leg 4	3.150	0.472	1.890	2.677	1.496	9.685
palp	0.610	0.207	0.268	—	0.366	1.451
Female	fem.	pat.	tib.	met.	tar.	Total
leg 1	4.331	0.551	3.937	4.882	3.071	16.772
leg 2	2.835	0.472	2.362	2.913	1.654	10.236
leg 3	1.732	0.394	1.102	1.496	0.787	5.512
leg 4	2.992	0.472	2.047	1.732	1.260	8.504
palp	0.488	0.220	0.293	—	0.585	1.585

Nomaua rimutaka

Male	fem.	pat.	tib.	met.	tar.	Total
leg 1	5.591	0.630	4.961	6.299	4.094	21.575
leg 2	3.622	0.551	2.756	3.622	2.126	12.677
leg 3	2.047	0.472	0.945	2.047	0.945	6.457
leg 4	3.150	0.512	2.598	3.071	1.496	10.827
palp	0.537	0.244	0.146	—	0.341	1.268
Female	fem.	pat.	tib.	met.	tar.	Total
leg 1	4.016	0.551	3.937	4.252	2.835	15.591
leg 2	2.598	0.472	2.047	2.520	1.496	9.134
leg 3	1.654	0.394	1.024	1.417	0.709	5.197
leg 4	2.677	0.472	1.969	1.811	1.102	8.031
palp	0.585	0.171	0.293	—	0.585	1.634

Nomaua repanga

Male	fem.	pat.	tib.	met.	tar.	Total
leg 1	5.276	0.472	4.724	5.591	3.386	19.449
leg 2	3.307	0.472	2.756	3.228	0.945	10.709
leg 3	1.969	0.315	1.181	1.732	0.866	6.063
leg 4	3.228	0.394	2.520	2.756	1.457	10.354
palp	0.463	0.146	0.171	—	0.366	1.146
Female	fem.	pat.	tib.	met.	tar.	Total
leg 1	4.646	0.551	4.488	5.276	3.071	18.031
leg 2	3.071	0.472	2.283	3.071	1.417	10.315
leg 3	1.811	0.394	1.181	1.575	0.709	5.669
leg 4	2.992	0.472	1.811	2.520	1.102	8.898
palp	0.439	0.171	0.244	—	0.439	1.293

Nomaua taranga

Male	fem.	pat.	tib.	met.	tar.	Total
leg 1	5.984	0.551	5.748	6.693	3.071	22.047
leg 2	3.937	0.472	3.228	4.094	1.890	13.622

Nomaua taranga cont'd

Male	fem.	pat.	tib.	met.	tar.	Total
leg 3	2.047	0.394	1.339	2.047	0.866	6.693
leg 4	3.465	0.472	2.913	2.756	1.339	10.945
palp	0.415	0.195	0.268	—	0.390	1.268
Female	fem.	pat.	tib.	met.	tar.	Total
leg 1	4.488	0.472	4.094	4.409	2.677	16.142
leg 2	2.835	0.394	2.126	2.677	1.417	9.449
leg 3	1.575	0.315	1.024	1.575	0.709	5.197
leg 4	2.756	0.394	1.969	2.362	1.024	8.504
palp	0.415	0.171	0.244	—	0.439	1.268

Nomaua rakiura

Male	fem.	pat.	tib.	met.	tar.	Total
leg 1	5.512	0.551	5.591	6.220	4.173	22.047
leg 2	3.622	0.472	3.150	3.307	2.244	12.795
leg 3	2.205	0.472	1.575	1.732	0.866	6.850
leg 4	3.622	0.551	2.835	2.992	1.496	11.496
palp	0.902	0.390	0.293	—	0.585	2.171
Female	fem.	pat.	tib.	met.	tar.	Total
leg 1	4.331	0.551	4.724	4.961	3.307	17.874
leg 2	3.071	0.472	2.520	2.913	1.811	10.787
leg 3	2.047	0.472	1.339	1.260	0.945	6.063
leg 4	3.150	0.551	2.441	2.283	1.417	9.843
palp	0.634	0.244	0.317	—	0.683	1.878

DISCUSSION: We have synonymised *Wairua* under *Nomaua* because the diagnostic features of the holotype of *Wairua reinga* are identical with those of *Nomaua perdita* (compare illustrations in Forster *et al.* (1990) of the male palp of *W. reinga* in figs 200, 201 with that of *N. perdita* in fig. 220). We have examined the type specimens of both type species. The right palps of the holotype males of both *W. reinga* and *N. perdita* are missing – presumably they were used for the microphotographs in Forster *et al.* (1990: figs 200, 201 and 220, respectively) and not kept, but the left palps are mirror images of those figures. Although *Wairua* has page precedence, we have retained *Nomaua* because species of the latter genus are most easily identified by the characteristics of the male palp. In general, male spiders are more diagnostic than females in characterising species. Five of the six species of *Nomaua* listed by Forster *et al.* (1990) have male holotypes, whereas only one of the two species of *Wairua* has a male holotype. Therefore, we have designated males as holotypes for the five new species of *Nomaua* described

below. The generic description given above is based on Forster 1990 (in Forster *et al.* 1990) and augmented by our own observations.

Nomaua crinifrons (Urquhart, 1891)

(Figs 2, 3, 11)

Cornicularia crinifrons Urquhart, 1891: 155, plate XXI, figs 3, 11.

'*Synotaxus crinifrons*: Simon, 1894: 662' Forster 1990 (in Forster *et al.* 1990: 61).

Bolyphantes crinifrons (Urquhart); Dalmas 1917: 365.

Bolyphantes crinifrons (Urquhart); Parrott 1946: 75.

TYPE MATERIAL: **Holotype** ♂, Stratford, Taranaki, North Island, New Zealand. Presumed lost (see 'Comments' below).

DIFFERENTIAL DIAGNOSIS: Males are distinguished by the forward-projecting eyemound with numerous hairs (Fig. 2), and by the palp with two stout black macrosetae, one disto-dorsal on the patella and one about mid-dorsal on the tibia

(Fig. 3); and females by the broad median projection extending down the posterior margin of the epigynum (Fig. 11).

DESCRIPTION:

Male

Measurements: Total length 3.307; carapace length 1.496, width 1.496; sternum length 0.634, width 0.659; labium length 0.146, width 0.268.

Eyes: AME 0.085, ALE 0.098, PME 0.098, PLE 0.098; AME–AME 0.073, AME–ALE 0.073, PME–PME 0.122, PME–PLE 0.122, ALE–PLE 0.012.

Carapace: Eyemound is high, slightly more than twice the diameter of the AME and projects out over the clypeus, with numerous (>50) hairs on the lateral and posterior surfaces. The eyemound slopes back in a more or less straight line to the fovea and is much higher than the lateral thoracic mounds (Fig. 2).

Chelicerae: Promargin with two large teeth and one smaller tooth (a very small tooth, not much larger than the denticles, between each of the larger teeth), retromargin with one or two small teeth and the fang groove with a broad area of denticles.

Colulus: With three hairs, the middle one slightly proximal to the two laterals.

Palp: As in Fig. 3. Patella with a stout black macroseta on the enlarged dorso-distal region, which extends out about half the width of the patella-tibia joint. Tibia is straight-sided, with a stout black macroseta about the dorsal mid-point of the tibia. The TTA has a black bilobed vertical process, a small denticulate process associated with it, and a horizontal curved process (thinner and deeper than in other species). The MA has a curved spike, with a flange on one side (Fig. 3).

Female

Measurements: Total length 2.992; carapace length 1.102, width 0.945; sternum length 0.659, width 0.659; labium length 0.146, width 0.268.

Eyes: AME 0.085, ALE 0.098, PME 0.098, PLE 0.110; AME–AME 0.049, AME–ALE 0.049, PME–PME 0.134, PME–PLE 0.073, ALE–PLE 0.024.

Carapace: Eyemound is slightly raised, projecting forward over the anterior eyes, with numerous (*c.*40) hairs. Cephalic region extends back horizontally about half the distance to the fovea before sloping down.

Chelicerae: Promargin with three large teeth, retromargin with one to three small teeth.

Palp: With long, distal macrosetae on the patella and tibia, and a long, slender claw, without teeth, on the tarsus.

Colulus: With four or five hairs in two rows, three hairs slightly proximal to the other two.

Genitalia: Epigynum is sclerotised and protuberant. The posterior margin is raised, and a thickened median projection occupying the central third of the margin extends down the vertical surface (Fig. 11). Internal genitalia with a pair of receptacula; genital ducts widely spaced and parallel back to the posterior margin, then sloping to open on either side of the distal edge of the median projection.

MATERIAL EXAMINED: TK. 1 ♂ (collected as a penultimate ♂, moulted to adult on 4 May 2007), 1 immature, beaten from ferns in forest, Mountain House, Egmont National Park, 28 Mar. 2007, B.M. Fitzgerald (MONZ); 3 ♀, beaten from ferns in forest, York Loop Track, Egmont National Park, 20 Apr. 2007, B.M. Fitzgerald (MONZ).

DISTRIBUTION: Taranaki, North Island.

COMMENTS: Urquhart (1891) based his description on a single male specimen, but there is no record of it being in the Urquhart Collection held in the CMNZ. Bryant (1933) did not include it in her account of the Urquhart types in the CMNZ, Parrott (1946) indicated that neither the type nor other specimens were held in the CMNZ, and Forster *et al.* (1990) did not find it in the Urquhart Collection and considered it lost. Finally, it is not included in the published list of arachnid types held by the CMNZ (Nicholls *et al.* 2000).

Forster's description of *Nomaua crinifrons* (in Forster *et al.* 1990: 61) is based on a series of male and female *Nomaua* from a small area of the Manawatu, about 130 km distant from the type locality. Forster's description of the male palp differs somewhat from that in Urquhart (1891). We have collected a male and three female *Nomaua* from Egmont National Park, within a few kilometres of the type locality of *N. crinifrons*. The palp of our male (reared in captivity through the final moult) matches Urquhart's (1891) description in most respects, including the black macroseta on the patella of the palp, but our specimen also has a black macroseta on the palpal tibia (Fig. 3). The epigynum and internal genitalia of our specimens (Fig. 11) also differ from those described by Forster (in Forster *et al.* 1990: 217). We accept *N. crinifrons* as a valid species, but conclude that Forster's (in Forster *et al.* 1990) concept of *N. crinifrons* refers to two distinct species: the male to an unnamed species, described below as *N. urquharti*; and the female conspecific with *N. perdita* (see below).

Quotes in the above synonymy indicate that, while Simon (1894) did not make the combination of this species with *Synotaxus*, Forster (1990) wrongly ascribed it to him.

Nomaua urquharti new species

(Figs 4, 12)

'*Nomaua crinifrons* Forster' (in Forster *et al.* 1990: 61, figs 207–14). Not *Cornicularia crinifrons* Urquhart, 1891.

In part, males only.

'*Nomaua perdita* Forster' (in Forster *et al.* 1990: 63, fig. 218).Not *Nomaua perdita* Forster, 1990. In part, females only.TYPE MATERIAL: **Holotype** ♂ and **allotype** ♀, Bruce Park Scenic Reserve, Silverhope, south of Hunterville, **WI**. In rimu forest, beaten from ferns, 14 May 2007, B.M. Fitzgerald (MONZ). **Paratypes**, 2♂, 7♀, same data as holotype.

ETYMOLOGY: The species epithet is a patronymic in honour of A.T. Urquhart, who described the type species of the genus.

DIFFERENTIAL DIAGNOSIS: Males of *Nomaua urquharti* can be distinguished from other *Nomaua* species by the stout, twisted macroseta on the palpal patella, by two stout, disto-dorsal macrosetae close together on the tibia, and by the large denticulate process on the TTA (Fig. 4); and females by the narrow median projection on the posterior margin of the epigynum (Fig. 12).

DESCRIPTION:

Male*Measurements*: Total length 3.150; carapace length 1.260, width 1.024; sternum length 0.537, width 0.439; labium length 0.098, width 0.244.*Eyes*: AME 0.085, ALE 0.098, PME 0.098, PLE 0.098; AME–AME 0.049, AME–ALE 0.049, PME–PME 0.110, PME–PLE 0.061, ALE–PLE 0.000.*Carapace*: Eyemound is conical and high, twice the diameter of the AME, with 30–35 long, wavy hairs on the lateral and posterior surfaces (see Forster *et al.* 1990: figs 207, 208).*Chelicerae*: With three teeth on promargin, one tooth on retromargin, and numerous strong denticles in the fang furrow (see Forster *et al.* 1990: fig. 210).*Colulus*: With four or five hairs.*Palp*: As in Fig. 4. Disto-dorsal region of patella is enlarged, extending out about half the width of the patella-tibia joint; with an elongate, twisted, stout disto-dorsal macroseta on the tip and a more slender macroseta of about the same length behind it; tibia with two stout macrosetae near the distal margin, one larger than the other, and two slender, curved macrosetae on the distal margin, adjacent to the retrolateral edge of the cymbium. The distal stout macroseta has a basal pore (see Forster *et al.* 1990: figs 211, 212). On the TTA, the curved, horizontal process is typical, the ventral, vertical process is missing, and the black denticulate processis greatly enlarged (see Forster *et al.* 1990: figs 213, 214). The MA is well defined but simple, appearing to consist of two fused pieces that curve upwards, retrolaterally (Fig. 4).**Female***Measurements*: Total length 3.465; carapace length 1.417, width 1.102; sternum length 0.732, width 0.707; labium length 0.122, width 0.268.*Eyes*: AME 0.122, ALE 0.122, PME 0.110, PLE 0.122; AME–AME 0.049, AME–ALE 0.049, PME–PME 0.098, PME–PLE 0.073, ALE–PLE 0.*Carapace*: Eyemound low, with numerous (*c.* 28) hairs, these shorter than in male.*Chelicerae*: Promargin with three large and one small tooth, retromargin with one or two small teeth.*Colulus*: With three to six hairs.*Genitalia*: Epigynum sclerotised and protuberant, raised posteriorly, with a small median projection on the posterior margin extending down the vertical, posterior surface. The vertical surface is sclerotised to form a pair of oval areas with dark centres at the openings of the genital ducts (Fig. 12).OTHER MATERIAL EXAMINED: **RI**. 1♂*, Vinegar Hill Reserve, 12 Dec. 1948, R.R. Forster (OMNZ); 1♂*, 1 penultimate ♂* (recorded in Forster *et al.* 1990: 63 as '1♀'), Vinegar Hill Reserve, low shrubs in forest, 18 Dec. 1948, R.R. Forster (OMNZ); allotype ♀ of '*Nomaua perdita*', beaten from shrubs in podocarp forest, Manawatu, Vinegar Hill Reserve, 6 Jan. 1967, R.R. Forster (Iv 2943, OMNZ); 4♂*, low shrubs in forest, Vinegar Hill Reserve, 10 Jan. 1974, R.R. Forster (OMNZ); 1♂*, Totara Reserve, Pohangina Valley, Manawatu, 20 Jan. 1981, R.R. Forster (OMNZ); 2♀ (1 moulted in captivity), beaten from ferns in mixed tawa forest, Vinegar Hill Reserve, 18 Feb. 2008, B.M. Fitzgerald and P.J. Sirvid (MONZ). **WI**. 1♀**, bushes in podocarp forest, Feilding, 19 Nov. 1947, R.R. Forster (OMNZ); 1♂*, Feilding, 26 Dec. 1949, R.R. Forster (OMNZ); 1♀**, Feilding, 6 Jan. 1952, R.R. Forster (OMNZ); 1 penultimate ♂, 4 immatures, rimu forest, beaten from ferns, Bruce Park Scenic Reserve, Silverhope, 14 May 2007, B.M. Fitzgerald (MONZ). (* Recorded in Forster *et al.* 1990: 63 as *N. crinifrons*; ** recorded in Forster *et al.* 1990: 63 as *N. perdita*.)

DISTRIBUTION: Manawatu region, North Island.

COMMENTS: The male *Nomaua* from the Manawatu that Forster *et al.* (1990: 63) attributed to '*N. crinifrons*' differs in several respects from Urquhart's (1891) description of the male *N. crinifrons* (as *Cornicularia crinifrons*). The recent collections of a male and three females of *N. crinifrons* from

Egmont National Park, near Stratford (type locality of *N. crinifrons*), and of males and females of an unnamed species from Bruce Park Scenic Reserve in the Manawatu, confirm that the males from the Manawatu attributed by Forster *et al.* (1990: 63) to '*N. crinifrons*' belong to a distinct, unnamed species described here as *N. urquharti*.

Furthermore, females of *Nomaua crinifrons* (*sensu* Forster in Forster *et al.* 1990: 63) belong to *N. perditia*. The description in Forster *et al.* (1990: 63) of the epigynum of '*N. crinifrons*' as 'weakly developed as small bilobed thickening on epigastric margin; internal genitalia with two receptacula on short genital ducts (fig. 217)' clearly refers to females of *N. perditia* as interpreted here (see below). On the other hand, the description in Forster *et al.* (1990: 63) of the epigynum of '*N. perditia*' as 'Epigynum with simple median projection; internal genitalia with paired, closely spaced receptacula (fig. 218)' refers to our concept of *N. urquharti* (see above). Forster *et al.* (1990: 64) stated that females of *N. waikaremoana* Forster, 1990 (in Forster *et al.* 1990) seem closely related to those of *N. perditia* (now = *N. urquharti* females). Until males of *N. waikaremoana* are obtained, the closeness of this relationship cannot be determined.

Nomaua perditia Forster, 1990

(Figs 5, 13)

'*Nomaua crinifrons* Forster' (in Forster *et al.* 1990: 61, figs 216, 217). Not *Cornicularia crinifrons* Urquhart, 1891. In part, females only.

Nomaua perditia Forster, 1990 (in Forster *et al.* 1990: 63, figs 219, 220). In part, males only.

Wairua reinga Forster, 1990 (in Forster *et al.* 1990: 57, figs 200, 201). In part, male only. **New synonymy.**

TYPE MATERIAL: **Holotype** ♂ of *Nomaua perditia*, from shrubs in mixed forest, Vinegar Hill Reserve, Manawatu, New Zealand, 6 Jan. 1967, R.R. Forster (Iv 2942, OMNZ). Examined. **Holotype** ♂ of *Wairua reinga*, from sheetweb on tree trunk in small patch of bush, Cape Reinga, Northland, New Zealand, 7 Jan. 1967, R.R. Forster (Iv 3002, OMNZ). Examined.

DIFFERENTIAL DIAGNOSIS: Males are distinguished by the lack of stout macrosetae and by the bifid form of the MA (Fig. 5); and females by the median indentation flanked by dark lobes on the posterior margin of the epigynum (Fig. 13). Forster *et al.* (1990: 63, fig. 220) considered that the prolaterally protuberant embolus observed in *Nomaua perditia* was a diagnostic character, but we found specimens of *N. perditia* where the embolus lay close to the bulb. We also found specimens of other species of *Nomaua* with a strongly

protuberant embolus (*N. rimutaka* new species (see Forster *et al.* 1990: fig. 206, as *Wairua waikanae*) and *N. rakiura* new species).

DESCRIPTION:

Male

Measurements: Total length 3.307; carapace length 1.181, width 1.102; sternum length 0.780, width 0.829; labium length 0.146, width 0.268.

Eyes: AME 0.098, ALE 0.122, PME 0.122, PLE 0.122; AME–AME 0.049, AME–ALE 0.037, PME–PME 0.073, PME–PLE 0.073, ALE–PLE 0.012.

Carapace: Eyemound height is equal to the diameter of AME. It has 15 or more hairs, the central ones wavy and projecting forward horizontally.

Chelicerae: Promargin with three strong teeth, sometimes an additional smaller tooth between the two teeth nearest the fang base; retromargin with three or four small teeth.

Colulus: With two to four hairs, the median one(s) slightly proximal to the two lateral ones.

Palp: As in Fig. 5. Patella with long, slender dorso-distal macroseta, about twice the length of the tibia. Tibia has one short, slender macroseta about the dorsal mid-point of the tibia, and lacks stout macrosetae. The TTA has a low, three-lobed process and a horizontal, curved process. The MA differs in shape from other species of *Nomaua*, having a flattened, bent-over, bifid structure in place of the simple projection of other species, and a small mound in place of the disc part of the MA (Forster *et al.* 1990: figs 200, 201, 220).

Female

Measurements: Total length 3.150; carapace length 0.945, width 1.102; sternum length 0.780, width 0.683; labium length 0.146, width 0.268.

Eyes: AME 0.098, ALE 0.122, PME 0.122, PLE 0.122; AME–AME 0.073, AME–ALE 0.049, PME–PME 0.073, PME–PLE 0.073, ALE–PLE 0.012.

Carapace: Eyemound height is about half the diameter of AME, with about 20 hairs.

Chelicerae: Promargin with three large teeth, and a smaller tooth between the two large teeth nearest the base of the fang. Retromargin with four or five small teeth.

Colulus: With three hairs, the median one slightly proximal to the two lateral ones.

Genitalia: Epigynum smaller than in other species. It is raised above the abdomen and the anterior edge is clearly delineated from the abdomen by a lightly sclerotised margin, extending back postero-laterally. Inside the margins the

epigynum is slightly raised. The posterior margin is strongly indented. Lateral to the indentation, the margins are darkly pigmented and curve outwards and forward (Fig. 13). The genital openings appear to be on the ventral surface of the epigynum.

OTHER MATERIAL EXAMINED: **RI.** 1♀, shrubs in podocarp forest, Totara Reserve, Pohangina Valley, Manawatu, 20 Jan. 1967, R.R. Forster (OMNZ); 3♂, 2♀, 2 immatures, beaten from ferns in podocarp forest, Totara Reserve, Pohangina Valley, 14 Dec. 2007, B.M. Fitzgerald (MONZ); 1♂, 1♀, beaten from ferns in mixed tawa forest, Vinegar Hill Reserve, Manawatu, 18 Feb. 2008, B.M. Fitzgerald and P.J. Sirvid (MONZ). **WI.** 1♂, 1♀, Feilding, 26 Dec. 1949, R.R. Forster (OMNZ); 1♂, 6 Jan. 1952, R.R. Forster (OMNZ). **WN.** 1♂, 1♀, 1 immature, beaten from ferns in tawa/podocarp forest, Manawatu Gorge Scenic Reserve (east end of Gorge Track), 14 Dec. 2007, B.M. Fitzgerald (MONZ). **Unknown district.** 1♀, Waitapu, 4 Sep. 1966, R.W. Hutton (OMNZ).

DISTRIBUTION: In addition to the types, Forster *et al.* (1990) recorded 13 specimens (1♂, 12♀) from Taranaki, Taupo and the Manawatu. However, our examination of specimens listed by Forster *et al.* (1990) and held in OMNZ showed that some of them were misidentified. We agree in that *Nomaua perditia* occurs in the Manawatu, but some of the *N. perditia* reported by Forster *et al.* (1990) from Taupo and Taranaki are not adults and therefore their species identities cannot be determined. One specimen from 'Waitapu' (see 'Material examined' above) is likely to be from the Waitapu Stream area in the Taupo district, because R.W. Hutton collected other spiders in the Taupo region, but we cannot be absolutely sure of this because there are several other localities called 'Waitapu' in New Zealand. Regarding Taranaki as a locality for *Nomaua*, we have found only *N. crinifrons* in that district.

COMMENTS: The illustration of the male palp of *Nomaua perditia* in Forster *et al.* (1990: fig. 220) matches their illustrations of the male palp of *Wairua reinga* (Forster *et al.* 1990: figs 200, 201). The only specimens of *W. reinga* recorded by Forster *et al.* (1990) are the holotype male and a damaged female. We have examined the holotype males of *N. perditia* and *W. reinga* and the allotype female of *N. perditia*. The right palp is missing from both holotype males, but the left palp of the holotype of *W. reinga* matches the left palp of the holotype of *N. perditia*. The locality labels of the holotypes of *N. perditia* and *W. reinga* and the allotype female of *N. perditia* were

prepared at the time the species were described, 21 years after they were collected. The collection date given for the types of *W. reinga* is one day after that for the holotype male of *N. perditia*. Given the great distance between the two type localities – Manawatu and Cape Reinga – it seems unlikely that R.R. Forster, the collector of all specimens, could have been at both localities within one day. We conclude that the holotype male of *W. reinga* is a misplaced and mislabelled specimen of *N. perditia*, collected in the Manawatu district, possibly at Vinegar Hill Reserve. Several other specimens from Vinegar Hill Reserve listed by Forster *et al.* (1990) were not included in this paper as they lacked genitalia and thus their identity could not be confirmed.

The allotype female of *Nomaua perditia* is intact, and its epigynum fits the description given by Forster *et al.* (1990: 63, fig. 218), but it does not match the epigynum of females we collected with males of *N. perditia* at Totara Reserve in the Pohangina Valley and on the southeast side of the Manawatu Gorge. Instead, it matches the epigynum of females we collected with males of *N. urquharti* at Bruce Park Scenic Reserve, south of Hunterville, Rangitikei. Clearly, the allotype female of *N. perditia* has been incorrectly associated with the male holotype. It is, in fact, a female of *N. urquharti*. The error is understandable because both species live sympatrically at the Vinegar Hill Reserve, in the Manawatu.

The female of 'Wairua reinga' is known only from a badly damaged specimen collected with the male holotype. Only the genitalia were recovered and figured (Forster *et al.* 1990: 58, fig. 202), but we were unable to locate those genitalia. They are quite unlike the genitalia of any known species of *Nomaua*, and we believe they may actually belong to another genus, possibly to our new genus *Zeaturpua* (see below), for which females are still unknown. We have no other alternative but to regard the female of 'W. reinga' as genus and species *incertae sedis*, until new specimens become available to identify it correctly.

Nomaua cauda Forster, 1990

(Figs 1, 6, 14)

Nomaua cauda Forster, 1990 (in Forster *et al.* 1990: 66, figs 227–29).

TYPE MATERIAL: **Holotype** ♂, beaten from foliage, Wai-kanae, Wellington, New Zealand, 3 Jan. 1948, R.R. Forster (Iv 2947, OMNZ). Examined. **Allotype** ♀, Levin, WN, New Zealand, 6 Jun. 1948, R.R. Forster (Iv 2948, OMNZ). Examined.