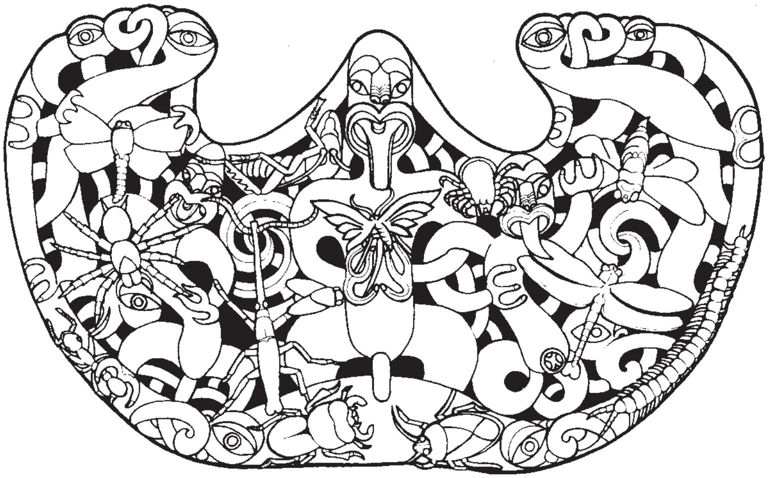

Fauna of New Zealand
Ko te Aitanga Pepeke o Aotearoa

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Pisauridae

(Arachnida: Araneae)

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POPULAR SUMMARY

HE WHAKARĀPOPOTOTANGA

Class **Arachnida**

Order **Araneae**

Family **Pisauridae**

Illustration / Whakaahua: *Dolomedes aquaticus* Goyen, female (Illustrator / Kaiwhakaahua: N. Dupérré).

Nurseryweb spiders

Worldwide, the family Pisauridae (nurseryweb spiders) has more than 300 known species. They are found in a wide range of habitats with some genera associated with water. Nurseryweb spiders are easily recognised in New Zealand by the nurseryweb that the female builds around the eggsac, which serves to protect the newly emerged spiderlings. New Zealand nurseryweb spiders do not build a web for prey capture and are sit-and-wait predators.

Four closely related species of nurseryweb spiders are found in New Zealand; three on the mainland and one on the Chatham Islands. All species are endemic to New Zealand and are likely to be related to Australian species. The most common species is *Dolomedes minor*, which is found throughout New Zealand in scrubland, grassland, swamps, and marshes. *Dolomedes aquaticus* is found in open riverbeds and stony lakeshores throughout the South Island and in the southern half of the North Island. Another species, *Dolomedes dondalei* is found in shaded riverbeds throughout mainland New Zealand. The Chatham Islands species, *Dolomedes schauinslandi*, is known from only three islands (South East, Mangere, and Houruakopara Islands) and is nationally endangered due to its restricted range.

Ngā pūngāwerewere māwhaiwhai kōhanga

He nui ake i te 300 ngā momo o te whānau Pisauridae (ngā pūngāwerewere māwhaiwhai kōhanga) e mōhiotia ana puta noa i te ao. Kitea ai i ngā wāhi noho maha, ā, ko ētahi puninga e whai hononga ana ki te wai. He māmā te tautohu i ēnei pūngāwerewere i Aotearoa nei, nā runga i te āhua o te māwhaiwhai ka hangaia e te uwha huri katoa i te pūkoro hua, hei kōhanga mō ana punua ka puta ana rātou ki te taiao. Kāore te kātua e hanga māwhaiwhai hei kupenga mahi kai māna — he toropuku, he upokotaua te āhua o tāna patu i āna kai.

E whā ngā momo pūngāwerewere māwhaiwhai kōhanga i Aotearoa, he uri tata katoa; e toru kei te tuawhenua, kotahi kei Rēkohu. Kitea ai ēnei momo e whā i Aotearoa anake, engari kāore e kore he whanaunga tata ō rātou i Ahitereiria. Ko te momo e kitea nuitia ana, ko *Dolomedes minor*. Kei te motu whānui tēnei, kei ngā ururua, kei ngā papa pātītī, kei ngā repo, kei ngā whenua pukewai. Kitea ai a *Dolomedes aquaticus* i ngā tahatika hōrakerake o ngā awa me ngā roto, huri noa i Te Waipounamu, me te haurua whakatetonga o Te Ika-a-Māui. Kitea ai a *Dolomedes*

(haere tonu)

Contributor **Cor Vink** was born and educated in Christchurch, New Zealand. He completed a Ph.D. at Lincoln University on the taxonomy and systematics of New Zealand Lycosidae, a major part of which was published as a revision as *Fauna of New Zealand 44*. After completing his thesis he spent nine months at AgResearch as a postdoctoral research fellow investigating the genetics of hymenopteran parasitoids of weevil pests. From 2003 to 2005, Cor was a postdoctoral associate at San Diego State University, U.S.A., where he worked on developing new molecular markers for inferring deep phylogenetic relationships in spiders. At the end of 2005 he returned to New Zealand and joined the Biosecurity Group at AgResearch, Lincoln where he is currently employed as a scientist. Cor is especially interested in the systematics of New Zealand spiders and he is the adjunct curator of spiders at the Entomology Research Museum at Lincoln University. He has recently published an annotated key to the spider families of New Zealand with Pierre Paquin and Nadine Dupérré.

Contributor **Nadine Dupérré** is from Québec, Canada. She completed a Bachelor of Science at Université de Montréal in 1997. She began illustrating spiders in 1998 and to date has produced over 5000 illustrations. Nadine is probably best known amongst arachnologists for her illustrations in the book “Spiders of North America: an Identification Manual”. Nadine has published on the taxonomy of spiders and has also produced illustrations for publications on beetles and harvestmen. Nadine is a research assistant at the American Museum of Natural History, New York where she works on Oonopidae with Norman Platnick. She recently published an annotated key to the spider families of New Zealand with Pierre Paquin and Cor Vink.

dondalei i ngā wāhi marumaru i ngā tahatika o ngā awa huri katoa i Aotearoa. Ko te momo o Rēkohu, a *Dolomedes schauinslandi*, kua kitea i ētahi moutere e toru anahe (i te ‘Tonga-mā-Rāwhiti’, i Māngere me Houruakōpara), ā, nā te whāiti o te noho, kua kīia he momo e mōrearea ana.

Translation by **H. Jacob**
Ōtaki

ABSTRACT

Four species of Pisauridae, all in the genus *Dolomedes* Latreille, 1804, are found in New Zealand; *D. minor* L. Koch, 1876 *nomen protectum* (=*D. lateralis* White, 1849, new synonymy, *nomen oblitum*, *D. sagittiger* White, 1849, new synonymy, *D. imperiosus* L. Koch, 1876, and *D. tridentatus* Hogg, 1911, new synonymy), *D. aquaticus* Goyen, 1888, *D. schauinslandi* Simon, 1899 (=*D. huttoni* Hogg, 1908, *D. trippi* Hogg, 1908, new synonymies) and *D. dondalei* sp. nov. The genus and all species are described, with information on synonymy, type data, material examined, and geographical distribution. Habitus images of adults, illustrations of important structural features, and distribution maps are provided. A key to adults is given. A molecular phylogenetic analysis examining the relationships of New Zealand species in the genus *Dolomedes* is presented. Mitochondrial DNA (cytochrome *c* oxidase subunit 1 – COI) and nuclear DNA (actin 5C) was sequenced from all four New Zealand *Dolomedes* species. COI divergence between species was low and introgression appears to have occurred between *D. minor* and *D. aquaticus*.

Keywords. Arachnida, Araneae, Pisauridae, New Zealand, nurseryweb spiders, classification, distribution, ecology, biology, new species, keys, phylogeny, cytochrome *c* oxidase subunit 1, COI, actin 5C.

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CHECKLIST OF TAXA

CONTENTS

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Thanks to Phil Sirvid and John Marris for sharing their observations on the biology of *D. schauinslandi*. Robert Raven (Queensland Museum, Brisbane) supplied information on *Dolomedes* species of Queensland and northern New South Wales. Matthew Brown (AgResearch) provided assistance in the use of ArcGIS.

We are grateful to Phil Sirvid and Ricardo Palma (Museum of New Zealand Te Papa Tongarewa, Wellington) for their input towards the *nomen protectum* of *D. minor*. We thank Mark Harvey (Western Australian Museum, Perth) for supplying scans from Bonnet (1956). Petra Sierwald (Field Museum, Chicago), Phil Sirvid, Norman Platnick (American Museum of Natural History, New York) and Thomas Buckley (New Zealand Arthropod Collection, Auckland) provided helpful comments on an earlier draft of the manuscript.

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INTRODUCTION

Spiders of the family Pisauridae Simon, 1890 (nurseryweb spiders) are found worldwide and with 339 described species in 53 genera (Platnick 2009). Pisauridae appears to be a monophyletic family (Griswold 1993, Santos 2007), which is supported by two synapomorphies; an apical pseudosegment on the tarsi (Jocqué & Dippenaar-Schoeman 2007, Santos 2007) and a distal tegular projection on the male pedipalp (Sierwald 1990, Santos 2007). However, these characters have also been observed in other, closely related families (Sierwald 1990, Jocqué & Dippenaar-Schoeman 2007). It is possible to distinguish Pisauridae from other families by a combination of characters.

The eyes are in two rows; the anterior row consists of four small eyes, the posterior eyes are larger and the posterior eye row is strongly recurved. The posterior eyes have a layer of light-reflecting cells called the grate-shaped tapetum (Homann 1971), which is a synapomorphy for the superfamily Lycosoidea (Griswold 1993). Within the Lycosoidea, both Lycosidae Sundevall, 1833 and Trechaleidae Simon, 1898 have eye arrangements that are similar to pisaurids. However, trechaleids are found only in the Americas, have flexible tarsi and flattened eggsacs carried attached to the spinnerets. Lycosidae have larger posterior eyes in a more strongly recurved row, no retrolateral tibial apophysis on the male pedipalp, the eggsac is carried on the spinnerets of females, and the early instar spiderlings are carried on specialised setae on the dorsal surface of the female abdomen (see Vink 2002). New Zealand adult pisaurids are also much larger than adult lycosids.

Females of many pisaurid species carry their spherical eggsac in the chelicerae and by a thread from the spinnerets (Carico 2005). Shortly before the spiderlings are due to hatch females of some species build an elaborate web structure, called a nurseryweb, around the eggsac. The spiderlings hatch within the nurseryweb and spend at least the first instar inside. The construction of a nurseryweb has been suggested as a synapomorphy for the Pisauridae; however, nurserywebs have been observed in only a few pisaurid species and are also known in other spider families (Sierwald 1997). All New Zealand pisaurid species build a nurseryweb. The early instars of some pisaurid species disperse by ballooning on long buoyant strands of silk (Bell *et al.* 2005). As a result, some species may not be restricted by geographic boundaries. If they have particular habitat requirements, they can be restricted to local areas of suitable habitat despite being widely distributed (Carico 1973). Pisaurids are found in a wide range of habitats and some genera (e.g., *Dolomedes* Latreille, 1804, *Megadolomedes* Davies & Raven, 1980, *Thalassius* Simon, 1885) are most common near water (Davies & Raven 1980, Sierwald 1989b, Carico 2005), which they are able to move across (Davies & Raven 1980, Sierwald 1989b, Stratton *et al.* 2004) and dive under (Carico 1973, Davies & Raven 1980, Sierwald 1989b).

Pisaurids, like all spiders, are predators and their main prey is arthropods. Species that are common near water feed mainly on aquatic insects (Williams 1979). Using stable isotopes of carbon and nitrogen, Collier et al. (2002) determined that *Dolomedes* found alongside streams in the North Island of New Zealand obtained over half of their body carbon from aquatic production. Some pisaurid species will catch and feed on small fish (Carico 1973, Williams 1979, Zimmermann & Spence 1989, Carico 2005). Webs are used for prey capture in some pisaurid genera, such as *Eurychoera* Thorell, 1897, *Inola* Davies, 1982 and *Polyboea* Thorell, 1895 (Davies 1982, Zhang *et al.* 2004), but New Zealand pisaurids do not build a web for prey capture and are sit-and-wait predators (Williams 1979, Forster & Forster 1999). Some pisaurid species are nocturnal hunters and the eye physiology of *Dolomedes* is consistent with night-time activity (Blest & Day 1978). Sexual cannibalism has been studied in some *Dolomedes* species (Arnqvist 1992, Arnqvist & Henriksson 1997, Johnson 2001, Kreiter & Wise 2001, Johnson 2005, Johnson & Sih 2005). Males of the Palaearctic *Pisaura mirabilis* (Clerck, 1757), which is the type species of the family, offer females insect prey as nuptial gifts and feign death to avoid sexual cannibalism (Bilde *et al.* 2006, 2007, Hansen *et al.* 2008). Much of what is known about moulting in spiders is based on studies of *P. mirabilis* (Bonaric 1976, Bonaric & De Reggi 1977) and it is also one of the few spiders in which diapause has been examined (Dondale & Legendre 1970, 1971).

Dolomedes is the most speciose genus in the Pisauridae with 100 species (Platnick 2009). Lehtinen (1967) proposed the family Dolomedidae for *Dolomedes* and several other pisaurid genera, but the family has never been clearly defined and is not currently recognised (Jocqué & Dippenaar-Schoeman 2007, Platnick 2009). All of the eleven New Zealand pisaurid species that have been described so far are in *Dolomedes*. The first pisaurid to be described from New Zealand was *Dolomedes mirificus* Walckenaer, 1837; however, this species is considered *nomen dubium* (see below).

NOMEN DUBIUM

***Dolomedes mirificus* Walckenaer, 1837**. Walckenaer (1837) described this species from an unspecified number of unsexed specimens collected from Australia and New Zealand. His description was not detailed enough for adequate identification (Walckenaer 1837) and the type was not located in the Muséum national d'Histoire naturelle, Paris (C. Rollard, pers. comm.). Unsuccessful attempts have been made to locate other type specimens of other New Zealand spiders described by Walckenaer (Court & Forster 1988) and his collection is believed to be lost (H.W. Levi, unpublished). Walckenaer (1837) did not specify where in Australia and New Zealand the specimens were collected from. The material he described was collected in early 1827 during the voyage of the French corvette *Astrolabe* (Forster 1967), which landed at localities in the north of the South Island (Astrolabe Bay, French Pass, D'Urville Island) and the North Island (Tolaga Bay, Whangarei, Waitemata Harbour, Bay of Islands) (Oliver 1951, Andrews 1986). *Dolomedes minor*, *D. aquaticus,* and *D. dondalei* can be found at or near all of these localities and all three species could have been found at some localities (e.g., Astrolabe Bay). The *Astrolabe* also landed at Port Jackson, Australia (Oliver 1951) but New Zealand and Australia do not appear to share any *Dolomedes* species (R.J. Raven, pers. comm.). Walckenaer's (1837) description is not sufficient for adequate identification and we here consider *D. mirificus* as *nomen dubium*.

SPECIES NOT CONSIDERED PART OF NEW ZEALAND FAUNA

Dolomedes facetus L. Koch, 1876. Recorded from Australia (New South Wales and Queensland), Samoa, New Guinea, and New Zealand (Koch 1876, Chrysanthus 1967). In his description of *D. facetus*, Koch (1876) stated there were examples of this species in "Mr Bradley's Sammlung [Collection]" from New Zealand. Chrysanthus (1967) examined Koch's existing types and illustrated specimens from New Guinea. Chrysanthus' (1967) illustrations are good and there are similarities to New Zealand species of *Dolomedes*. However, *D. facetus* is clearly different from any *Dolomedes* species found in New Zealand; therefore we believe either Koch (1876) incorrectly identified the specimens he mentioned from the Bradley Collection, which is considered almost completely lost (Framenau 2005), or there were specimens of *D. facetus* in the Bradley Collection that were incorrectly labelled as originating from New Zealand. *Dolomedes facetus* is here considered not part of the New Zealand fauna.

MORPHOLOGY AND TERMINOLOGY

The morphological structures required for the identification of New Zealand Pisauridae are referred to in Fig. 1–11, 18–25 and explained in the glossary of technical terms (Appendix A), and Forster (1967). As with almost all spiders, the male pedipalp and the female epigynum are important when identifying pisaurids to species; however, colouration is also useful in the identification of *Dolomedes* species (Carico 1973), so it is possible to identify later instar juveniles of some species. The morphological nomenclature of the pedipalp and the epigynum follows Sierwald (1989a, 1990). Somatic nomenclature follows Carico (1973).

A phylogenetic species concept (Wheeler & Platnick 2000) has been implemented in this study. It defines a species as the smallest aggregation of populations diagnosable by a unique combination of character states.

METHODS AND CONVENTIONS

Collecting. Pisaurids can be collected by a variety of methods. The best method for collecting pisaurids is with a strong head torch at night (about two hours after sunset, when New Zealand species appear to be most active, CJV, pers. obs.). Light is reflected off the grate-shaped tapeta in the eyes and the spider's presence is indicated by a bluish sparkle. Another useful method is daytime hand searching, either by looking for specimens directly on the ground or turning over rocks and logs. Females can often be found on nurserywebs at night; however, in the daytime, they can sometimes be found on or below their nurserywebs. Females can also be found in the daytime by searching the ground at the base of foliage that nurserywebs are attached to. Pitfall trapping is effective but unless the specimens are collected within a couple of days of being caught they can start to decay, which can make identification difficult. Decay can be prevented by the use of a good preservative such as propylene glycol, which also preserves DNA but can shrivel soft tissue (Vink *et al.* 2005).

Preservation. Pisaurids are best preserved in 70-75% ethanol. To ensure adequate DNA preservation, specimens should also be stored at -20°C or less (Vink *et al.* 2005). Spiders can be stored in 95-100% ethanol to preserve DNA but it is best to combine this with storage temperatures less than or equal -20°C (Vink *et al.* 2005). 95-100% ethanol makes specimens brittle and can be unsuitable for morphological examination.

Preparation. Specimens should be labelled with the locality, including area code (Crosby *et al.* 1976, 1998), and, if known, latitude and longitude, collection date, collector's name and habitat data.

Most morphological features used for identifications can be seen under an ordinary dissecting microscope. When examining specimens in alcohol they should be rested in washed quartz sand or glass beads to provide support for the spider. External sclerites of the epigynum can be viewed *in situ*. However, if the abdomen is shrivelled the epigynum can be obscured or distorted. To see the structures clearly it is often necessary to remove hairs from the epigynum by scraping them with an entomological pin or pulling them out with fine forceps. The features of the male pedipalp are best viewed by removing the left pedipalp at the junction between the trochanter and the femur and viewed ventrally.

Internal genitalia were prepared for examination by placing the dissected genitalia in either lactic acid or 10% KOH solution for 1–3 hours at 37°C to dissolve soft tissue. Internal genitalia were illustrated for all species.

Measurements. All measurements are in millimetres (mm). Where the measurements are expressed as a fraction, the numerator refers to the length of the structure and the denominator refers to its width. Measurements outside parentheses are for males and inside parentheses for females. The size ranges given for the body length of each species represent the smallest and largest individual of each sex found in all specimens examined. A mean body length and the standard error of the mean (s.e.m.) were calculated and the number of specimens measured is given. Intraspecific and interspecific mean body lengths were compared between males, females and species using the Student's t-Test.

Types. New Zealand collections were searched and enquiries were made at overseas collections known to be associated with species' authors for type specimens of New Zealand pisaurids.

In the descriptive part of this work, the status, repositories, and full label data for all type specimens examined are given. Label data are listed as follows: different labels are denoted by a solidus (/) and different lines on a label by a semicolon. All other punctuation is as it appears on the label. Additional information not included on the label is placed between square brackets.

Descriptions. For the new species, illustrations, measurements, and colour pattern descriptions were made from type specimens. For existing species, illustrations, measurements, and colour pattern descriptions were prepared from a non-type representative male and female specimen (with collection information shown).

Epigynal and male pedipalpal illustrations omit the setae for clarity.

Descriptions of colours are for alcohol-preserved specimens. It should be noted that colours and colour patterns can fade in older specimens that have not been stored away from light.

When possible, measurements were made with a micrometer ruler fitted to the eyepiece of a stereo microscope. However, longer measurements, such as body length, were made using a digital vernier calliper.

Characters diagnostic in other spider families (e.g., eye size and position) are not diagnostic for Pisauridae (Carico 1973) and have not been included in the descriptions.

Illustrations. Specimens to be illustrated were first photographed with a Nikon Coolpix 950 digital camera attached to a SMZ-U Nikon dissection microscope. The digital photos were then used to establish proportions and the illustrations were detailed and shaded by referring back to the structure under the microscope. Female internal genitalia were excised using a sharp entomological needle and cleared in lactic acid.

Map images were created using the geographic information system software ArcGIS 9 (ESRI).

Text conventions. The area codes of Crosby *et al*. (1976, 1998) are used in collection records.

The following acronyms for repositories are used:

AMNZ	Auckland Museum, Auckland, New Zealand
BMNH	Natural History Museum, London, United Kingdom
CMNZ	Canterbury Museum, Christchurch, New Zealand
LUNZ	Entomology Research Museum, Lincoln University, New Zealand
MNHN	Muséum National d'Histoire Naturelle, Paris, France
MONZ	Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand
NZAC	New Zealand Arthropod Collection, Auckland, New Zealand
OMNZ	Otago Museum, Dunedin, New Zealand

Molecular biology. To construct a molecular phylogeny of New Zealand Pisauridae and to facilitate the identification of immature *Dolomedes* specimens, we used the mitochondrial gene cytochrome *c* oxidase subunit 1 (COI) and the nuclear gene actin 5C. COI is one of the fastest evolving mtDNA genes and has been used to examine genetic differences between species in *Dolomedes* (Tanikawa & Miyashita 2008) and between species and populations in the closely related Lycosidae (Colgan *et al*. 2002, Vink & Paterson 2003, Chang *et al*. 2007, Hebets & Vink 2007). Actin 5C evolves more slowly and includes an intron of approximately 100 bp, which can vary between species (Vink *et al*. 2008a).

Table 1. Specimens used for molecular analyses.

Species	Specimen code	Sex	Collection information	GenBank Accession numbers
D. minor	D003	♀	TK, Stony River, 39°15’S, 173°57’E, 1 December 2000, CJV, LUNZ (00012775)	GQ337328
D. minor	D005	♀	FD, Kepler Track, 45°24.982’S 167°31.711’E, 22 March 2008, J. Malumbres-Olarte, LUNZ (00012811)	GQ337329, GQ337386
D. minor	D006	♀	AK, near Clevedon, 36°59.25’S, 175°02.93’E, 24 January 2001, CJV, LUNZ (00012772)	GQ337330
D. minor	D014	♀	MC, Lake Ellesmere, 43°43’S, 172°30’E, 20 November 1999, R.M. Emberson, LUNZ (00012787)	GQ337331, GQ337387
D. minor	D017	♀	MC, Kennedys Bush Scenic Reserve, 43°37.9’S, 172°37.4’E, 29 March 2008, CJV & P. Paquin, LUNZ (00012807)	GQ337332, GQ337388
D. minor	D018	♀	SL, near Bald Hill, 46°10.563’S, 167°54.776’E, 18 March 2008, P. Paquin & J. Malumbres-Olarte, LUNZ (00012817)	GQ337333, GQ337389
D. minor	D019	♀	SL, near Bald Hill, 46°10.563’S, 167°54.776’E, 18 March 2008, P. Paquin & J. Malumbres-Olarte, LUNZ (00012816)	GQ337334, GQ337390
D. minor	D021	♀	BR, Saint James Walkway, 42º22.65’S, 172º24.2’E, 13 February 2008, J. Malumbres-Olarte, LUNZ (00012801)	GQ337335, GQ337391
D. minor	D022	♀	FD, near Redcliff, 45°40.23’S, 167°40.37’E, 16 February 2008, J. Malumbres-Olarte, LUNZ, 00012814	GQ337336, GQ337392
D. minor	D023	♀	WN, Stokes Valley, 41°11.2’S, 174°58.77’E, February 2008, B.M. Fitzgerald, MONZ (AS.001391)	GQ337337
D. minor	D024	♀	FD, near Te Anua, 45°26.499’S, 167°41.297’E, 24 March 2008, J. Malumbres-Olarte, LUNZ (00012812)	GQ337338
D. minor	D025	♀	FD, near Te Anua, 45°26.499’S, 167°41.297’E, 24 March 2008, J. Malumbres-Olarte, LUNZ (00012813)	GQ337339, GQ337393
D. minor	D026	♂	WN, York Bay, Lower Hutt, 41°15.7’S, 174°54.6’E, 15 February 2008, P.J. Sirvid, MONZ (AS.001392)	GQ337340, GQ337394
D. minor	D027	♂	WN, Stokes Valley, 41°11.2’S, 174°58.77’E, 6 February 2008, B.M. Fitzgerald, MONZ (AS.001393)	GQ337341
D. minor	D030	♂	WN, Stokes Valley, 41°11.2’S, 174°58.77’E, January 2008, B.M. Fitzgerald, MONZ (AS.001396)	GQ337342
D. minor	D031	♀	WN, Stokes Valley, 41°11.2’S, 174°58.77’E, January 2008, B.M. Fitzgerald, MONZ (AS.001397)	GQ337343
D. minor	D033	subadult ♀	BP, Waiorongoma Stream, 37°33.5’S, 175°45.4’E, 9 November 2008, J.C. Banks, LUNZ (00012798)	GQ337344
D. minor	D036	♀	WD, Okarito Swamp, 43°14.9’S, 170°12.4’E, 27 January 2009, G. Hall & R.J.B. Hoare, NZAC	GQ337345
D. minor	D040	♀	CO, Lammermoor Range, 45°37.535’S, 169°52.82’E, 27 February 2009, CJV & J. Malumbres-Olarte, LUNZ (00012815)	GQ337346, GQ337395
D. minor	D041	♀	NC, Waipara River Mouth, 43°09.3’S, 172°47.6’E, 17 February 2009, A.J.D. Tennyson, MONZ (AS.001401)	GQ337347, GQ337396
D. minor	D042	♀	SC, near Kimbell, 44°03.492’S, 170°46.33’E, 1 March 2009, CJV, LUNZ (00012809)	GQ337348, GQ337397
D. minor	D043	♀	SC, near Kimbell, 44°03.492’S, 170°46.33’E, 1 March 2009, CJV, LUNZ (00012810)	GQ337349, GQ337398
D. minor	D048	♂	WO, Te Rapa, 37°44.3’S, 175°14.8’E, 2 February 2009, B.N. McQuillan, LUNZ (00012795)	GQ337350, GQ337399
D. minor	D049	♀	WO, Te Rapa, 37°44.3’S, 175°14.8’E, 2 February 2009, B.N. McQuillan, LUNZ (00012796)	GQ337351, GQ337400
D. minor	D056	♀	NN, Motueka Valley, 41°09.293’S, 172°56.124’E, 23 March 2009, CJV, S.J. Crampton & M.W. Crampton, LUNZ (00012799)	GQ337352, GQ337401
D. minor	D057	♀	MB, near Canvastown, 41°17.432’S, 173°40.737’E, 24 March 2009, CJV, S.J. Crampton & M.W. Crampton, LUNZ (00012802)	GQ337353, GQ337402

D. minor	D058	♀	KA, near Meriburn, 42°10.995’S, 173°53.588’E, 24 March 2009, CJV, S.J. Crampton & M.W. Crampton, LUNZ (00012805)	GQ337354, GQ337403
D. aquaticus	D001	♂	BR, Caledonian Creek, 42°19.193’S, 171°30.223’E, 2 December 2007, CJV & H.P. Hudson Vink, LUNZ (00012843)	GQ337355, GQ337404
D. aquaticus	D002	♂	BR, Caledonian Creek, 42°19.193’S, 171°30.223’E, 2 December 2007, CJV & H.P. Hudson Vink, LUNZ (00012844)	GQ337356
D. aquaticus	D004	♀	MK, Lake Tekapo, 44°00.173’S, 170°28.373’E, 5 January 2001, CJV & M.A. Hudson, LUNZ (00012832)	GQ337357
D. aquaticus	D008	♀	NN, Kelly Creek, 41°15.000’S, 172°12.682’E, 4 May 2002, CJV, LUNZ (00012819)	GQ337358, GQ337405
D. aquaticus	D009	♂	NC, Waipara River Gorge, 43°03.2’S, 172°36.9’E, 2 January 2000, S.J. Crampton & CJV, LUNZ (00012824)	GQ337359, GQ337406
D. aquaticus	D010	♂	BR, Moana, 42°34’S, 171°29’E, 28 January 2001, A.M. Paterson, LUNZ (00012822)	GQ337360
D. aquaticus	D015	♀	NC, Waipara River, 43°03.57’S, 172°35.41’E, 1 January 2008, CJV, LUNZ (00012848)	GQ337361, GQ337407
D. aquaticus	D016	♂	NC, Waipara River, 43°03.57’S, 172°35.41’E, 1 January 2008, CJV, LUNZ (00012849)	GQ337362
D. aquaticus	D020	♀	WD, near Ward Hill, 43°42.5’S, 169°27.4’E, 15 April 2008, J.L. Monk, LUNZ (00012850)	GQ337363, GQ337408
D. aquaticus	D039	♀	BR, Murchison, 41°48’S, 172°20’E, January 2006, A. & S. James, MONZ (AS.001325)	GQ337364
D. aquaticus	D044	♂	SC, Opuha River, 44°04.923’S, 170°58.72’E, 1 March 2009, CJV, LUNZ (00012851)	GQ337365, GQ337409
D. aquaticus	D045	♂	BR, Boyle River, 42°31.111’S, 172°23.423’E, 6 February 2009, M.A. Hudson & CJV, LUNZ (00012845)	GQ337366, GQ337410
D. aquaticus	D046	♀	BR, Boyle River, 42°31.111’S, 172°23.423’E, 6 February 2009, CJV & M.A. Hudson, LUNZ (00012846)	GQ337367, GQ337411
D. aquaticus	D047	♀	BR, Boyle River, 42°30.897’S, 172°23.128’E, 7 February 2009, CJV, LUNZ (00012847)	GQ337368, GQ337412
D. aquaticus	D051	♂	WA, Waipoua River, 40°57.5’S, 175°40.5’E, 17 February 2009, A. McEwan, LUNZ (00012839)	GQ337369
D. aquaticus	D054	♂	NN, Motueka River, 41°16.780’S, 172°48.435’E, 23 March 2009, CJV, S.J. Crampton& M.W. Crampton, LUNZ (00012840)	GQ337370, GQ337413
D. aquaticus	D055	♀	NN, Motueka River, 41°16.780’S, 172°48.435’E, 23 March 2009, CJV, S.J. Crampton& M.W. Crampton, LUNZ (00012841)	GQ337371, GQ337414
D. dondalei	D011	♂	MC, Barrys Bay Valley, 43°45.265’S, 172°52.880’E, 24 January 2003, CJV, LUNZ (00012760)	GQ337372
D. dondalei	D012	♀	NN, Oparara River, 41°12.668’S, 172°09.284’E, 9 December 2001, CJV, LUNZ (00012755)	GQ337373
D. dondalei	D013	♀	SD, Cullen Creek, 41°18.9’S, 173°51.25’E, 16 March 2002, CJV & S.J. Crampton, LUNZ (00012757)	GQ337374
D. dondalei	D032	immature	BP, Waiorongoma Streem, 37°33.5’S, 175°45.4’E, 9 November 2008, J.C. Banks, LUNZ (00012764)	GQ337375
D. dondalei	D034	subadult ♀	SD, Otatara Bay, 41°04.8’S, 174°02.5’E, 23 January 2009, S.J. Crampton, LUNZ (00012767)	GQ337376, GQ337415
D. dondalei	D035	♂	SD, Otatara Bay, 41°04.8’S, 174°02.5’E, 23 January 2009, S.J. Crampton, LUNZ (00012768)	GQ337377, GQ337416
D. dondalei	D037	immature	WN, Stokes Valley Creek, 41°11’S, 174°59’S, March 2001, B.M. Fitzgerald, MONZ (AS.001337)	GQ337378
D. dondalei	D050	♀	WO, Te Rapa, 37°44.3’S, 175°14.8’E, 2 March 2009, B.N. McQuillan, LUNZ (00012763)	GQ337379
D. dondalei	D052	subadult ♀	WA, Waipoua River, 40°57.5’S, 175°40.5’E, 17 February 2009, A. McEwan, LUNZ (00012765)	GQ337380, GQ337417
D. dondalei	D053	immature	WN, Mangaore Stream, 40°36.4’S, 175°26.1’E, 25 February 2009, A. McEwan, LUNZ (00012766)	GQ337381, GQ337418
D. schauinslandi	D007	♂	CH, South East Island, 44°21.0S, 176°10.5’W, December 2005, E.S. Kennedy, LUNZ (00012753)	GQ337382, GQ337419
D. schauinslandi	D028	subadult ♀	CH, South East Island, 44°21.0’S, 176°10.5’W, 6 February 2007, P.J. Sirvid, MONZ (AS.001394)	GQ337383
D. schauinslandi	D029	♀	CH, South East Island, 44°21.0’S, 176°10.5’W, 6 February 2007, P.J. Sirvid, MONZ (AS.001395)	GQ337384
D. schauinslandi	D038	♀	CH, Houruakopara Island, 44°05’58.7S, 176°30’08.5W, 9 February 2005, T. Gregory-Hunt & R. Williams, MONZ (AS.001346)	GQ337385

DNA was extracted from the muscle of one to three femurs of 58 specimens using a ZR Genomic DNA II Kit™ (Zymo Research) and each specimen was arbitrarily assigned a specimen code (Table 1). The primers initially used to amplify and sequence a 1054 bp COI fragment were LCO-1490 (5’-GGTCAACAAATCATAAAGATATTGG-3’) (Folmer *et al*. 1994) plus C1-N-2568 (5’-GCTACAACATAATAAGTATCATG-3’) (Hedin & Maddison 2001). However, we were able to PCR amplify a 1054 bp fragment for only five specimens, but a shorter COI fragment (850 bp) was successfully amplified and sequenced from the other specimens using C1-J-1718-spider (5’-GGNGGATTTGGAAATTGRTTRGTTCC-3’) (Vink *et al.* 2005) plus C1-N-2568. To amplify a 935 bp fragment of actin 5C, which included a 107 bp intron, we used the primers actin5C-F-229 (5’-AAGTATCCNATTGAGCATGGTATTG-3’) (Vink *et al.* 2008a) plus actin5C-R-1057 (5’-TTNGADATCCACATTTGTTGGAA-3’) (Vink *et al.* 2008a). PCR amplification of actin 5C was not always successful, presumably because the DNA had degraded. Vink *et al*. (2005) found that low copy genes, such as actin, could not be amplified from arachnid tissue that had not been preserved optimally for DNA preservation. PCR amplification was performed using i-StarTaq™ DNA Polymerase (iNtRON Biotechnology) in a Mastercycler® (Eppendorf) thermocycler with a cycling profile of 35 cycles of 94 ºC denaturation (30 s), 48 °C annealing (30 s), 72 ºC extension (1 min) with an initial denaturation of 3 min and a final extension of 5 min. Excess primers and salts were removed from the resulting double-stranded DNA using a DNA Clean & Concentrator™ Kit (Zymo Research). Purified PCR fragments were sequenced in both directions at the Allan Wilson Centre Genome Service (Massey University). Sequence data were deposited in GenBank (ww.ncbi.nlm.nih.gov/GenBank/ – see Table 1 for accession numbers). Sequences were edited and compared to each other using Sequencher 4.6 (Gene Codes Corporation).

We also explored the phylogenetic utility of a section of the nuclear genome spanning the two ribosomal internal transcribed spacer regions (ITS1 and ITS2), all of the nuclear ribosomal RNA subunit 5.8S and small fragments of the flanking 18S and 28S. ITS1 and ITS2 have been used at the species and population level in spiders (Hedin 1997, Arnedo & Gillespie 2006, Vink *et al.* 2008b) including the related Lycosidae (Chang *et al.* 2007). However, in New Zealand *Dolomedes*, we occasionally observed double bands when visualising the PCR products and multiple peaks in the electropherograms of some specimens, which indicates there are multiple copies of ITS1 and ITS2 that have not evolved concertedly. Even if the separate copies were sequenced for each species, it is unlikely that we could be certain we were comparing homologous copies.

PHYLOGENETIC ANALYSIS

Methods. Sequences were edited and aligned using Sequencher 4.6 (Gene Codes Corporation). There was no evidence of insertions/deletions or stop codons in the coding sequences or the actin 5C intron and alignment was straight forward. Uncorrected pairwise distances were calculated using PAUP* version 4.0b10 (Swofford 2002). Partitioned Bayesian analyses implemented in MrBayes version 3.1.2 (Ronquist & Huelsenbeck 2003) following the methods of Brandley *et al*. (2005) were used to estimate the COI phylogenetic tree topology. A partitioned analysis was not used for actin 5C as the only variation occurred in the 3rd codon positions. COI and actin 5C sequences for 27 specimens were combined into one dataset and also analysed with partitioned analyses in MrBayes. MrModeltest version 2.2 (Nylander 2005) implemented in PAUP* version 4.0b10 (Swofford 2002) was used to select the model parameters. Within MrModeltest the Akaike Information Criterion was used for model selection (Posada & Buckley 2004). The COI data were partitioned by codon, using the model HKY (Hasegawa *et al.* 1985) for the 2nd codon positions and HKY+Γ (Hasegawa *et al.* 1985, Yang 1994) for the 3rd codon positions. All COI 1st codon positions were identical and were excluded from the analyses. The model F81 (Felsenstein 1981) was applied to the actin 5C data. The same partitions and their models were applied to the combined dataset. Bayesian analyses were conducted by running two simultaneous, completely independent analyses each with four heated chains, sampling every 1000th tree. The analyses were run for at least 2×10^7 generations until the average standard deviation of split frequencies had dropped below 0.005, which indicated that the two tree samples had converged. MrBayes was used to construct majority rule consensus trees, discarding the first 25% of trees generated as burn-in. TreeView 1.6.6 (Page 1996) was used to view and save trees in graphic format.

Results. Thirty-seven COI haplotypes occurred among the 58 specimens of New Zealand *Dolomedes*; 17 of *D. minor*, 11 of *D. aquaticus*, 7 of *D. dondalei*, and 2 of *D. schauinslandi*. One COI haplotype was found in both *D. aquaticus* and *D. minor* specimens.

Uncorrected pairwise distances between COI sequences of *D. minor*, *D. aquaticus*, *D. dondalei,* and *D. schauinslandi* are shown in Table 2. Sixty of the 850 COI nucleotide sites were variable. Only one nucleotide change was nonsynonymous, which was a transition in specimen D034 (*D. dondalei*).

Table 2. Summary of the uncorrected distance matrix for cytochrome *c* oxidase subunit 1 (COI) showing minimum and maximum distance within and between species. Not including specimens where introgression has occurred.

	D. minor	*D. aquaticus*	*D. dondalei*	*D. schauinslandi*
D. minor	0.000-0.0165			
D. aquaticus	0.008-0.0212	0.000-0.011		
D. dondalei	0.008-0.0212	0.012-0.025	0.000-0.013	
D. schauinslandi	0.022-0.0282	0.027-0.033	0.022-0.027	0.000-0.002

Of the 935 nucleotides of actin 5C data, there were five variable sites, three of which were phylogenetically informative, and the other two sites were heterozygous in some specimens. All variable sites occurred in the exon. There were also three other sites that were heterozygous in some species. All nucleotide changes were synonymous, which was expected as nonsynonymous substitutions have not been observed in actin 5C across all Araneae (Vink *et al.* 2008a). There were no insertions or deletions in the actin 5C intron.

The phylogenetic analysis of the COI data (Text-fig. 1) showed that *D. schauinslandi* and *D. dondalei* are monophyletic with posterior probabilities of 1 and 0.96 respectively. *Dolomedes aquaticus* was also monophyletic with the exception of two *D. minor* haplotypes, one of which was identical to *D. aquaticus*. Within *D. minor*, *D. aquaticus,* and *D. dondalei*, there were some geographically related groups.

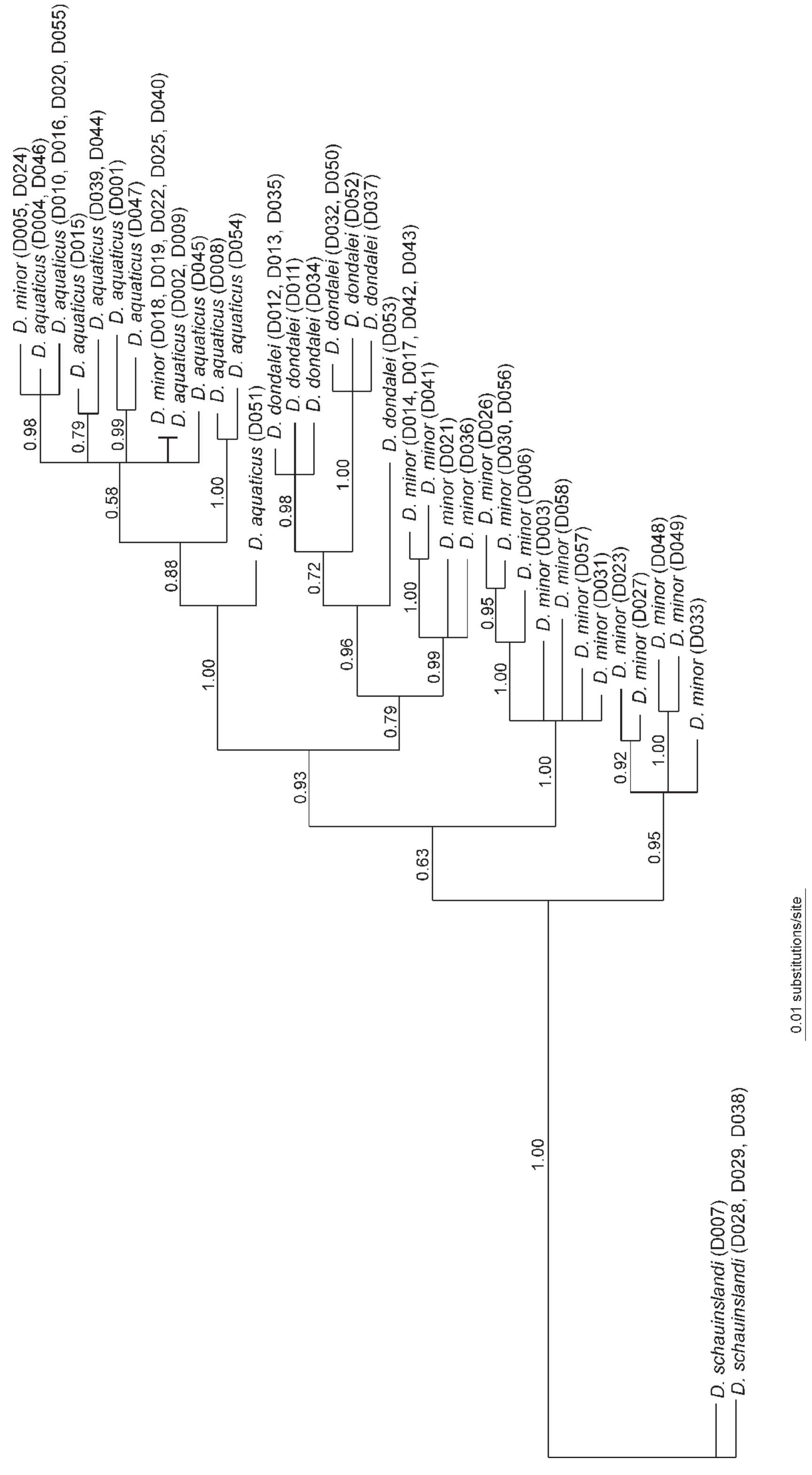
The phylogenetic analysis of the actin 5C data (Text-fig. 2) supported the monophyly of *D. aquaticus* and *D. dondalei*. All four species have species-specific nucleotide combinations at positions 348, 459, and 1038 of the actin 5C coding sequence.

The combined phylogenetic analysis of the COI and actin 5C data (Text-fig. 3) supported the monophyly of *D. aquaticus* and *D. dondalei*. *Dolomedes minor* formed three geographically related monophyletic clades; northern North Island, southern North Island plus northern South Island, and South Island.

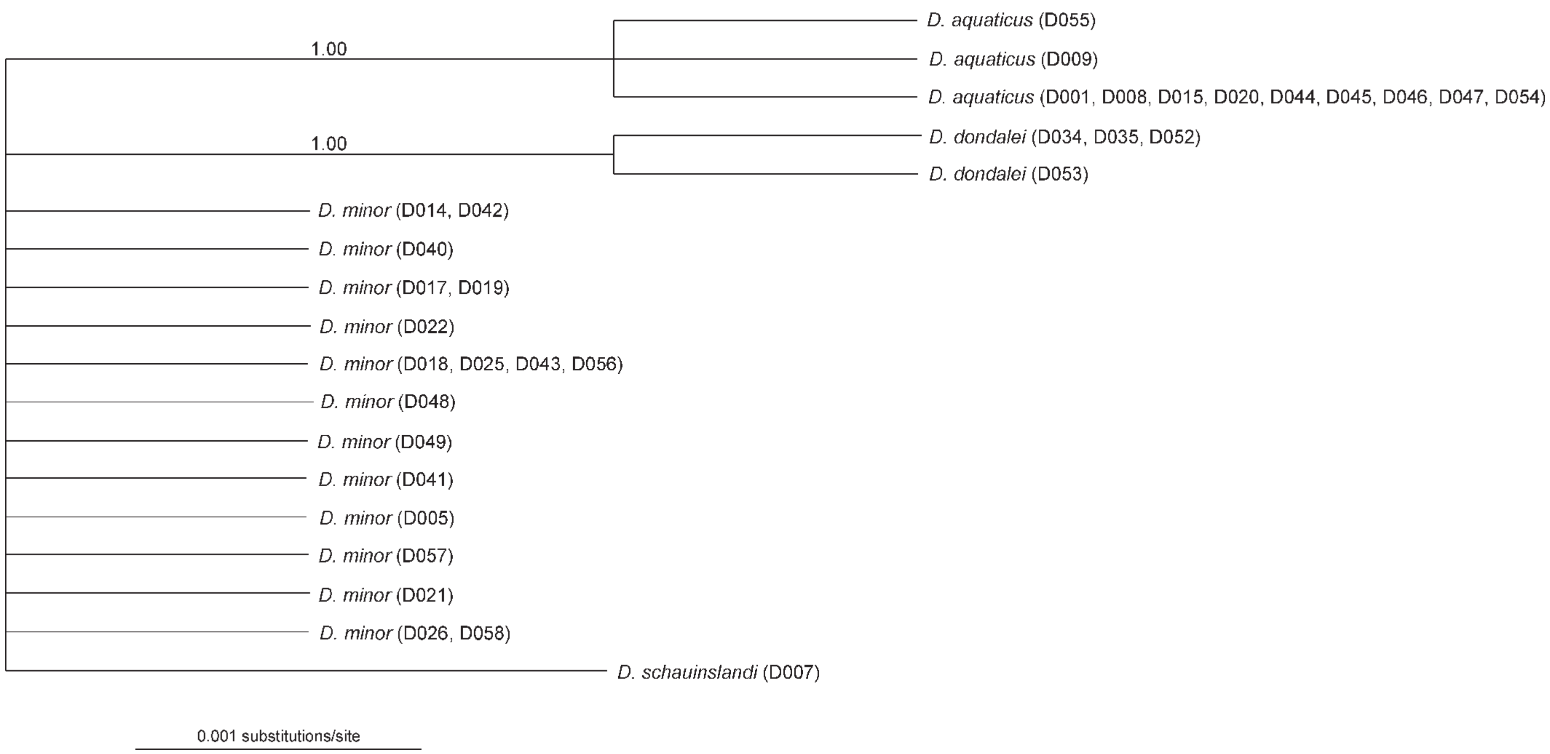
Discussion. Seven *D. minor* specimens (D005, D024, D018, D019, D022, D025, D040 –Table 1) have mitochondrial DNA (mtDNA) sequences (COI) that are the same as or closely related to those of *D. aquaticus*. However, the morphology and nuclear DNA sequences (actin 5C) of these seven *D. minor* specimens are consistent with those of other *D. minor* specimens. This suggests relatively recent or on-going introgression that resulted from interspecific hybridisation. Introgression of mtDNA has been noted in other spiders (Johannesen & Veith 2001, Croucher *et al.* 2004, Vink *et al.* 2008b, Hedin & Lowder 2009) including species in the sister family Lycosidae (Chang *et al.* 2007). Both *D. minor* and *D. aquaticus* males may prefer to mate with newly moulted, virgin females to avoid sexual cannibalism, which has also been documented as a strategy in other *Dolomedes* species (Arnqvist 1992, Johnson 2001). This could result in interspecific hybridisation as morphological or behavioural mechanisms that might normally prevent mating between *D. minor* and *D. aquaticus* may not be as effective in newly moulted, virgin females. It would seem that the introgressions observed have resulted from at least two accidental matings between male *D. minor* and female *D. aquaticus*. The likely scenario is that the offspring that resulted from interspecific hybridisation retained more *D. minor* characteristics than those of *D. aquaticus* and backcrossed with *D. minor*. All *D. minor* specimens that we sampled from five different locations in Central Otago, Southland, and Fiordland (Table 1) had *D. aquaticus* COI sequences. It is possible that all *D. minor* in these regions have *D. aquaticus* mtDNA. It would be interesting to obtain COI sequence data from *D. aquaticus* in Central Otago, Southland, and Fiordland, which we would predict would be the same as, or close to, *D. minor* COI haplotypes in these regions.

All four New Zealand *Dolomedes* species have shared haplotypes among specimens from geographically distant localities, which indicates that they disperse over some geographic boundaries. However, long-range dispersal seems to be limited or uncommon, as there is some genetic structure linked to geographic locations within each species.

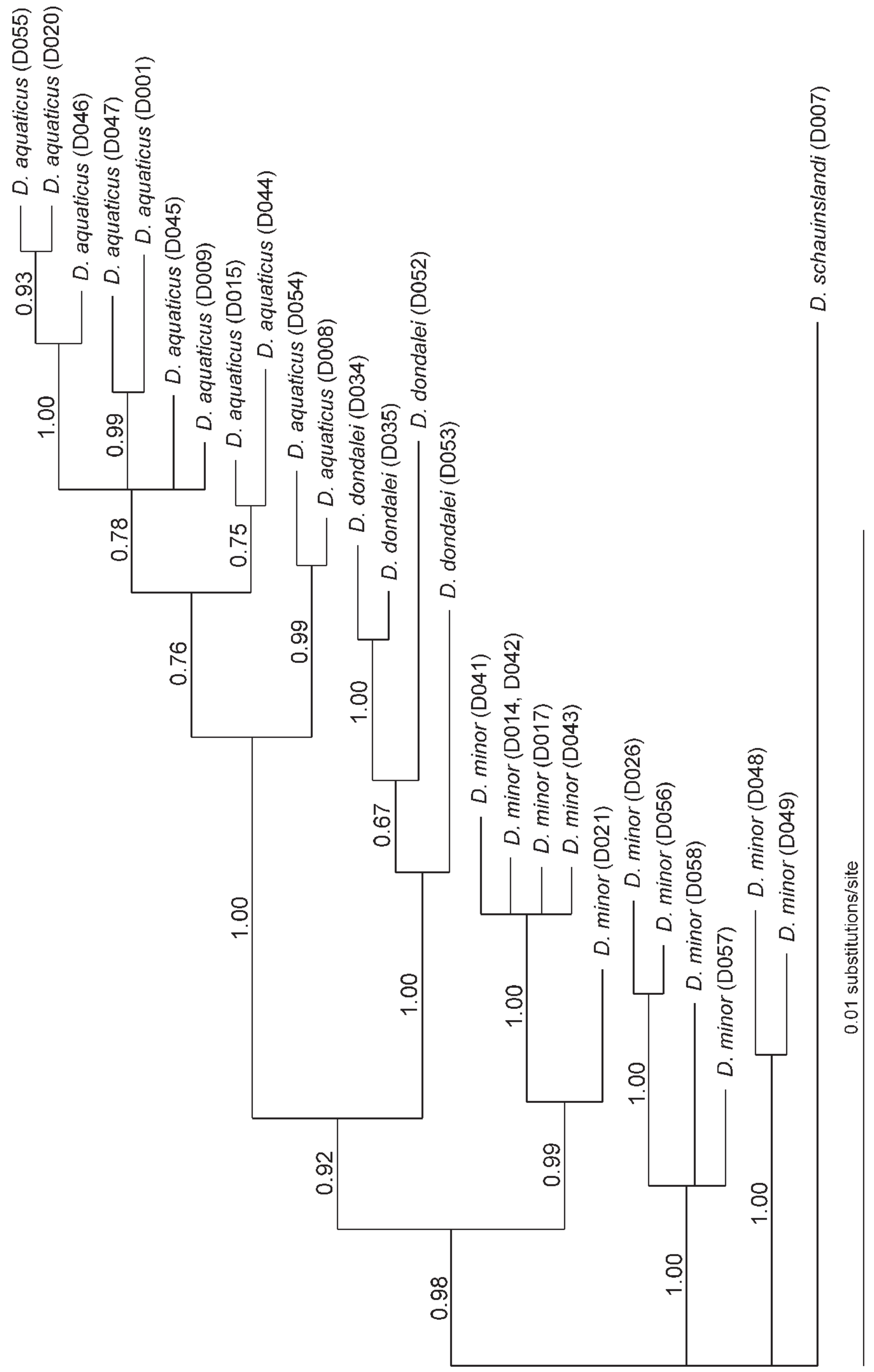
Interspecific divergences in COI between New Zealand *Dolomedes* species are very low (Table 2) and lower than the divergences in 99.6% of 1249 closely related chelicerate species surveyed by Hebert *et al*. (2003b). However, some Japanese *Dolomedes* species differed by only 2% (Tanikawa & Miyashita 2008). Some specimens of *D. minor* differed from *D. aquaticus* and *D. dondalei* by only 0.08%, which is as low as the intraspecific variation observed in some spider species (Vink *et al.* 2009). COI sequence data is not variable enough to study population structure in New Zealand *Dolomedes* species; however, microsatellites (Ji *et al.* 2004) could be used to provide the resolution needed.



Text-fig. 1 Bayesian consensus tree based on cytochrome *c* oxidase subunit I (COI) sequence data. Values above branches are posterior probabilities. Specimen codes are listed in Table 1.



Text-fig. 2 Bayesian consensus tree based on actin 5C sequence data. Values above branches are posterior probabilities. Specimen codes are listed in Table 1.



Text-fig. 3 Bayesian consensus tree based on a combined analysis of cytochrome *c* oxidase subunit I (COI) and actin 5C sequence data. Values above branches are posterior probabilities. Specimen codes are listed in Table 1.

Dolomedes schauinslandi are 2.2-3.3% divergent in COI from mainland species. Brower (1994) estimated a rate of 2.3% pairwise divergence per million years in mtDNA in arthropods, which also appears to apply to spiders (e.g., Hedin 2001). This would indicate that *D. schauinslandi* and *D. minor* diverged approximately one million years ago, which is lower than other divergences (2–6 Ma) between Chatham Island arthropod species and mainland species (Trewick 2000) including the closely related Lycosidae (Vink & Paterson 2003). It is possible that mtDNA in Pisauridae evolves at a slower rate than in other spiders.

Both the mtDNA introgression and the small genetic distances between species, mean that New Zealand *Dolomedes* species cannot be reliably identified using a DNA barcoding approach (Hebert *et al.* 2003a) and highlights the importance of using a number of different datasets in the delimitation of species-group taxa.

KEY TO NEW ZEALAND PISAURIDAE

1 Very large spiders (female body length 23.3–30.2 mm, male body length 18.6–26.0 mm) found only on the Chatham Islands. RTA of the male pedipalp with a hooked tooth directed anterioventrally and usually a smaller ventral tooth (Fig. 10, 17). Middle field of epigynum wider than long (Fig. 20). Epigynal fold and opening to copulatory duct are at the posterior end of the middle field ....(p. 24)... ***Dolomedes schauinslandi* Simon**

—Large spiders (female body length 12.6–26.0 mm, male body length 7.9–18.0 mm) found only on the New Zealand mainland and nearby islands. RTA of the male pedipalp not as above. Middle field of epigynum as long or longer than wide. Epigynal fold and opening to copulatory duct are approximately at the midpoint of the middle field 2

2(1) Abdomen with serrated submarginal bands of light yellow brown extending to the posterior with several patches extending briefly towards the centre of the abdomen (Fig. 1, 32, 33, 40). RTA of the male pedipalp with 3, short, subequal teeth in a dorsoventral line (Fig. 11). Middle field of epigynum with sclerotised anteriolateral edges (Fig. 21) ....(p. 25)…***Dolomedes dondalei* sp. nov.**

—Abdomen with non-serrated submarginal bands that do not have patches extending briefly towards the centre of the abdomen. RTA of the male pedipalp not as above. Middle field of epigynum without sclerotised anteriolateral edges 3

3(2) Cephalothorax with a longitudinal light orange median band extending from the eye region to the fovea (Fig. 26, 27, 35). RTA of the male pedipalp usually with 2, long, subequal ventral and median teeth and a reduced dorsal tooth (Fig. 8, 12), but the dorsal tooth is sometimes enlarged (Fig. 13), all teeth are reduced (Fig. 14), or there is just 1 large tooth (Fig. 15). The space between the ventral and median teeth of the RTA is approximately equal to the width of 1 tooth (Fig. 4). Epigynum usually with a bump midway along the outer lateral margin, and an indentation anterior to the bump (Fig. 18), but the outer lateral margin can be smooth ....(p. 20)…***Dolomedes minor* L. Koch**

—Cephalothorax without a longitudinal light orange median band extending from the eye region to the fovea (Fig. 28, 29) or band very reduced (Fig. 36). RTA of the male pedipalp usually with 3, short, blunt subequal teeth (Fig. 9), which can sometimes be pointed (Fig. 16). The space between the ventral and median teeth of the RTA is larger than the width of 1 tooth (Fig. 5). Epigynum with a smooth outer lateral margin (Fig. 19) ....(p. 23)…***Dolomedes aquaticus* Goyen**

BIOSYSTEMATICS

Family PISAURIDAE

Medium to very large, three clawed spiders. Eyes in two rows; anterior row straight or slightly recurved; posterior row strongly recurved and separated from anterior row (Fig. 1, 3, 34, 41). Trochanters with a notch on the distal edge of the ventral side. Tarsi with an apical pseudosegment. Male pedipalp with a retrolateral tibial apophysis (Fig. 4–11) and a distal tegular projection (Fig. 4–7).

Genus *Dolomedes* Latreille

Dolomedes Latreille, 1804: 135. —Carico 1973: 448-450. Dondale & Redner 1990: 331-332. Zhang, Zhu & Song 2004: 368. Type species *Araneus fimbriatus* Clerck, 1757, by subsequent designation of Walckenaer (1805).

Description. Body length (for New Zealand species) 7.9 – 30.2 mm. Carapace longer than wide, usually flat, yellow-brown to dark red-brown with light orange or orange submarginal bands. Abdomen yellow-brown to brown or grey with light heart stripe. Chelicerae with 2 or 3 promarginal teeth and 4 retromarginal teeth. Legs in descending order of length usually IV, I, II, III with leg IV always longest and legs I and II subequal. Male: pedipalpal tibia with retrolateral apophysis, embolus typically long, hair-like, conductor thin, membranous, lamelliform, tip of median apophysis flat, sclerotised. Female: epigynum with large, ovoid middle field between lateral lobes, spermatheca with basal accessory bulb, homologous to head of spermatheca in other pisaurid genera (Sierwald 1989a). A single spherical eggsac is produced and carried below the cephalothorax in the chelicerae. A nurseryweb is constructed around the eggsac prior to the emergence of the spiderlings.

Remarks. *Dolomedes* species are found worldwide and there are close to 100 known species (Platnick 2009). The taxonomy of *Dolomedes* is well known in Asia (Zhang *et al.* 2004, Tanikawa & Miyashita 2008), Europe (Renner 1987, 1988), North America (Carico 1973, Dondale & Redner 1990), and New Guinea (Chrysanthus 1967). The highest species diversity in the genus occurs in Asia (Zhang *et al.* 2004). The palpal and epigynal morphology of New Zealand *Dolomedes* species is typical of the *fimbriatus* group (see Carico 1973: 462).

The lengths of the legs have previous been thought to be of taxonomic significance in New Zealand *Dolomedes* (Hogg 1908); however, within each species leg lengths vary among individuals and occasionally between pairs on an individual. In spiders, if a leg is lost in an early instar, it will regenerate, but will be shorter and thinner than the original leg (Foelix 1996). Therefore, leg length, especially comparisons between legs I and II are of little taxonomic significance in *Dolomedes*.

Biology. All four New Zealand *Dolomedes* species are nocturnal hunters (Williams 1979, Forster & Forster 1999, Sirvid 2008) and their eye physiology is consistent with night-time activity (Blest & Day 1978). Other species of *Dolomedes* found overseas are not restricted to hunting at night (Carico 1973, Zimmermann & Spence 1989, Smith 2000, P. Sierwald, pers. comm.). The restriction of New Zealand *Dolomedes* to night-time activity is unlikely to be due to competition as other spider species (e.g., Lycosidae) that occupy the same niches are much smaller and are also nocturnal. Predation pressure from pompilid wasps and fernbirds (*Bowdleria* spp.) may prevent diurnal activity in New Zealand *Dolomedes* species.

Sexual cannibalism has been documented in several *Dolomedes* species (Arnqvist 1992, Arnqvist & Henriksson 1997, Johnson 2001, Kreiter & Wise 2001, Johnson 2005, Johnson & Sih 2005). In some overseas species, adult males mate with newly moulted, virgin females to avoid sexual cannibalism (Arnqvist 1992, Johnson 2001). This may also occur in New Zealand species as the only observed mating in a New Zealand species, *D. aquaticus*, was between an adult male and a virgin female (Forster & Forster 1973, 1999) and males of three New Zealand species, *D. minor*, *D. aquaticus,* and *D. dondalei*, have been observed with subadult females.

Dolomedes minor L. Koch

Fig. 4, 8, 12–15, 18, 22, 26, 27, 34, 35; Map 1

Dolomedes lateralis White, 1849: 4. **New synonymy.** ***Nomen oblitum.***

Dolomedes sagittiger White, 1849: 4. **New synonymy.**

Dolomedes minor L. Koch, 1876: 864-867, plate 74, figs 2-3. ***Nomen protectum.***

Dolomedes imperiosus L. Koch, 1876: 867-869, plate 74, fig. 4.—Synonymy by Dalmas, 1917: 408.

Dolomedes tridentatus Hogg, 1911: 311-313, fig. 96.—Dalmas, 1917: 409. **New synonymy.**

Diagnosis. Distinguished from all other New Zealand *Dolomedes* species by a longitudinal light orange median band extending from the eye region to the fovea. The retrolateral tibial apophysis (RTA) of the male pedipalp usually has long ventral and median teeth and a reduced dorsal tooth. *Dolomedes minor* is very similar to *D. aquaticus* but can be differentiated by the longitudinal light orange median band on the carapace, which is absent or very reduced in *D. aquaticus*. The space between two teeth of the RTA is smaller in *D. minor* and the ventral and median teeth are usually longer. The epigynum in *D. minor* usually has a bump midway along the outer lateral margin, and an indentation anterior to the bump; however, in some specimens the outer lateral margin is smooth, like *D. aquaticus*. Males of *D. minor* are significantly smaller (mean body length) than males of all other New Zealand *Dolomedes* species ($p < 0.001$). The nucleotide at position 348 of the actin 5C coding sequence is a cytosine (C), position 459 is a thymine (T) and position 1038 is a cytosine (C).

Description. Colour: carapace orange-brown with light orange submarginal bands, longitudinal light orange median band extending from eye region to fovea, longitudinal bands on carapace covered with white pubescence, 2 longitudinal, light orange stripes extending from PLE to approximately 2/5 along carapace (Fig. 26, 27, 35); sternum orange-brown; abdomen yellow-brown with yellowish heart stripe and light yellow submarginal bands, covered with dense, white pubescence, submarginal bands extend to posterior of abdomen in males (Fig. 26) and half way along abdomen in females (Fig. 27); femur, ventral surface of patella, and tibia yellow brown, metatarsus, tarsus, and dorsal surface of patella and tibia brown. Colours darker in specimens from high altitudes and southern latitudes.

Chelicerae with 3 promarginal teeth (mesal and ectal reduced) and 4 retromarginal teeth. Tarsi and metatarsi with scopulae, less dense on legs III and IV in both sexes. Female scopulae denser than male scopulae. Male pedipalp (Fig. 4, 8, 12–15) with RTA usually consisting of 2, long, subequal ventral and median teeth and a reduced dorsal tooth (Fig. 8, 12); variation includes enlargement of the dorsal tooth (Fig. 13), reduction of tooth length (Fig. 14) or the presence of a single, large tooth (Fig. 15). Basal apophysis of cymbium angular when viewed retrolaterally (Fig. 8). Epigynum (Fig. 18, 22) usually with bump midway along outer lateral margin, and indentation anterior to bump. Middle field usually wide anteriorly and narrows posteriorly. Genitalia vary and can be indistinguishable from that of *D. aquaticus*. Internal genitalia usually symmetrical (Fig. 22b), but occasionally non-symmetrical (Fig. 22a).

Dimensions (mm). Male MC, Hinewai Reserve (female MC, Lincoln): total length 11.0 (17.4); carapace 5.4/4.5 (7.9/6.3), height 2.2 (2.6); abdomen 6.9/3.1 (9.6/4.2); sternum 2.3/2.3 (3.0/3.0).

Size range, mean ± s.e.m. Male body length 7.9–13.8, 11.0 ± 0.17, $n = 62$. Female body length 12.6–24.8, 17.4 ± 0.19, $n = 159$. Males were significantly smaller (mean body length) than females ($p < 0.0001$).

Total length of legs: leg I 20.5 (22.6), leg II 18.9 (22.6), leg III 17.0 (21.0), leg IV 21.8 (26.1).

Type data. Types of *Dolomedes minor*: Not seen. Original description based on male and female specimens from an unspecified locality in New Zealand listed by Koch (1876) as deposited in "Mr. Bradleys Sammlung" and "k. k. Hofcabinet zu Wien" (Naturhistorisches Museum, Vienna). Almost all the Bradley Collection is lost (Framenau 2005) and specimens could not be located at the Naturhistorische Museum, Vienna (C. Hörweg, pers. comm.). The type specimen of *D. minor* is not at the Museum für Naturkunde, Berlin (J. A. Dunlop, pers. comm.), Natural History Museum, London (J. Beccaloni, pers. comm.), or listed amongst the types at the Zoologisches Institut und Zoologisches Museum, Hamburg (Rack 1961) where other Australasian L. Koch type specimens are held. We consider the type of *Dolomedes minor* lost.

Type(s) of *Dolomedes imperiosus*: Not seen. Original description based on a female specimen(s) from an unspecified locality in New Zealand listed by Koch (1876) as deposited "Mr. Bradleys Sammlung". Almost all the Bradley Collection is lost (Framenau 2005) and the type of *D. imperiosus* could not be located at the Naturhistorische Museum, Vienna (C. Hörweg, pers. comm.), Museum für Naturkunde, Berlin (J. A. Dunlop, pers. comm.), Natural History Museum, London (J. Beccaloni, pers. comm.), or listed amongst the types at the Zoologisches Institut und Zoologisches Museum, Hamburg (Rack 1961). We consider the type of *Dolomedes imperiosus* lost.

Syntypes of *Dolomedes lateralis*: 2 males (BMNH), dried and pinned, labelled "New Zealand [handwritten] / *Dolomedes lateralis*; White. Zool. Ereb & Terror; t. f6. New Zealand [handwritten]"

Syntypes of *Dolomedes sagittiger*: 2 females (BMNH), dried and pinned, labelled "New Zealand [handwritten] / *Dolomedes*; *sagittiger* White; Zool. Ereb & Terror; t. f7. [handwritten]"

Type of *Dolomedes tridentatus*: female (BMNH) labelled "1924.III.1.973 G20; *Dolomedes tridentatus* Hogg ♀; TYPE; Dunedin, N.Z. [New Zealand]; G.M. Thomson Hogg Coll. [handwritten] / Dunedin; G.M. Thomson [handwritten] / *Dolomedes tridentatus*; Dunedin nov. sp. Type.; G.M. Thomson [handwritten]"

Material examined. Syntypes of *Dolomedes lateralis* and *Dolomedes sagittiger*, type of *Dolomedes tridentatus*, plus 219 non-type specimens (63 males, 158 females, 1 subadult female) - see Appendix B for collection details of specimens examined.

Distribution (Map 1)**.** Found throughout New Zealand (ND, AK, CL, WO, BP, TO, TK, HB, WI, WA, WN / NN, BR, MB, KA, BR, NC, WD, MC, SC, MK, OL, FD, CO, DN, SL, SI). Large numbers of nurserywebs were seen near Mason Bay, Stewart Island (46°55'S, 167°49'E) in 1991 (C.J. Vink pers. obs.) but specimens were not collected and therefore, are not included in Appendix B.

Biology. *Dolomedes minor* inhabits swamps, open scrubland (including introduced gorse, *Ulex europaeus* L.), and exotic grasslands from sea level to sub-alpine areas. Adults have been found throughout the year but most commonly from November to May, peaking in February and March. Courtship and mating has not been observed in *D. minor*, but adult males have been observed with subadult females. It is possible that males mate with newly moulted, virgin females to avoid sexual cannibalism, which has been documented in other *Dolomedes* species (Arnqvist 1992, Johnson 2001). Broken off emboli have been found in the epigynal folds of four females, perhaps as a result of hurried copulation, which appears to be common in *Dolomedes* (Forster & Forster 1973, Arnqvist 1992, Forster & Forster

1999). Females have been found with eggsacs from September to April. Females carry the spherical eggsac in their chelicerae (Fig. 34) for at least five weeks (Forster & Forster 1973, 1999). After five weeks the female constructs a nurseryweb around the eggsac and the spiderlings emerge shortly after the web is completed (Forster & Forster 1973, 1999). Nurserywebs are constructed at night and are built at the top of shrubs or tall grasses. At night females guard the nurserywebs and lay down additional silk; during the day females typically move down to the base of the vegetation that their nurseryweb is attached to, but occasionally they will sit on or just below the nurseryweb. Females guarding nurserywebs (Fig. 35) have been seen from December to April. The spiderlings emerge from the nurseryweb approximately one week after its construction and after two weeks most of them have left (Forster & Forster 1973, 1999), presumably by ballooning. *Dolomedes minor* is a nocturnal hunter and is found under rocks, logs, and in grass and foliage during the daytime. Although *D. minor* hunts mainly on the ground and on foliage, it has been observed waiting for prey at the water's edge with its anterior legs resting on the surface of the water (B. N. McQuillan, unpublished).

Dolomedes minor is parasitised by the pompilid wasps *Cryptocheilus australis* (Guérin-Méneville, 1830), *Priocnemis monachus* (Smith, 1855), and *Sphictostethus nitidus* (Fabricius, 1775) (Harris 1987). The only known host records for *C. australis*, an Australian species accidentally introduced into New Zealand in the early 1960s, are *Dolomedes* spp. (Harris 1987). *Dolomedes minor* and their eggsacs form a large proportion of the diet of nestling fernbirds, *Bowdleria punctata* (Quoy & Gaimard, 1830) (Forster & Forster 1999, Parker 2002).

DNA. Twenty-seven cytochrome *c* oxidase subunit I and eighteen actin 5C DNA sequences for this species are listed in GenBank (www.ncbi.nlm.nih.gov/Genbank/) under accession numbers GQ337328–GQ337354 and GQ337386–GQ337403 respectively. One 12S rRNA DNA sequence for this species is also listed in GenBank under accession number AF380503 (Vink *et al.* 2002). N.B. Seven of the cytochrome *c* oxidase subunit I sequences for this species (GQ337329, GQ337333, GQ337334, GQ337336, GQ337338, GQ337339, and GQ337346) are the same as or similar to those of *D. aquaticus* and likely represent a historical introgression between the species.

Remarks. Although the types of *D. minor* were not found and are presumed lost, Koch's (1876) illustrations are clear enough for specimens to be identified. The type(s) of *D. imperiosus* was also not found and is presumed lost. Dalmas (1917) synonymised *D. imperiosus* with *D. minor* and we agree with his synonymy. Koch's illustration of *D. imperiosus* genitalia is stylised and could be interpreted as depicting either *D. minor* or *D. aquaticus*; however, the colour pattern illustrated conforms to that of *D. minor* and is sufficient to confirm the synonymy. Dalmas (1917) also mentioned the possibility that *D. tridentatus* may also be a junior synonym of one of the already described New Zealand *Dolomedes* species, but he did not formally synonymise it.

White (1849) described *Dolomedes lateralis* and *D. sagittiger* from specimens collected in late 1841 during the Antarctic expedition of the *Erebus* and *Terror* (Forster 1967, Andrews 1986, Paine 2000). The only recorded locality for the specimens is "New Zealand"; however, it is likely they were collected from the Bay of Islands as that is the only New Zealand locality that the expedition visited (Forster 1967, Andrews 1986, Paine 2000). The expedition also visited Auckland and Campbell Islands (Forster 1967, Andrews 1986), but *Dolomedes* species have not been recorded from there (Berland 1931, Forster 1955, 1964). It is clear from the RTA and colour pattern that the type specimens of *D. lateralis* are synonymous with *D. minor*. It was not possible to examine the genitalia of *D. sagittiger* as the specimens were dried and brittle; however, it was clear from the colour pattern of the types that they were synonymous with *D. minor*.

Although *Dolomedes lateralis* is a senior synonym of *Dolomedes minor*, we propose that the junior synonym (*Dolomedes minor*) be regarded as the valid name (*nomen protectum*) and the senior synonym (*Dolomedes lateralis*) be relegated to an invalid name (*nomen oblitum*) in accordance with Article 23.9 on reversal of precedence in the International Code of Zoological Nomenclature (International Commission on Zoological Nomenclature 1999). The name *Dolomedes lateralis* (and *D. sagittiger*) has only been used in lists and catalogues (Urquhart 1897, Hutton 1904, Parrott 1946, Roewer 1955, Bonnet 1956, Platnick 2009). Therefore the condition demanded concerning the lack of usage of a senior synonym after 1899 by Articles 23.9.1.1 and 23.9.6 (International Commission on Zoological Nomenclature 1999) is met. The name *Dolomedes minor* has been used in 33 publications (Hogg 1908, Dalmas 1917, Forster 1948, Powell 1954, Bandsma & Brandt 1961, Harrison 1966, Forster 1967, Harrison & White 1969, Forster & Forster 1970, 1973, Parrott 1974, Forster 1975, Williams 1979, Jarman & Jackson 1986, Green & Lessiter 1987, Harris 1987, Winterbourn 1987, Jackson 1990b, Jackson 1990a, Faulls *et al.* 1991, Gill 1998, Crowe 1999, Forster & Forster 1999, Dawson & Lucas 2000, Jackson *et al.* 2002, Vink *et al.* 2002, Peterson *et al.* 2004, Whitehouse & Lubin 2005, Crowe 2007, Hillyard 2007, Greenwood 2008, Howe 2008, Early 2009) not including lists and catalogues. The requirements of Article 23.9.1.2 (International

Commission on Zoological Nomenclature 1999) have been more than satisfied as the name *Dolomedes minor* has been used in over 25 works, by more than 10 different authors, during the last 50 years.

Dolomedes aquaticus Goyen

Fig. 5, 9, 16, 19, 23, 28, 29, 36, 37; Map 2

Dolomedes aquaticus Goyen, 1888: 133-136.—Dalmas, 1917: 409.

Diagnosis. Distinguished from all other New Zealand *Dolomedes* species by the retrolateral tibial apophysis (RTA) of the male pedipalp and the female genitalia. *Dolomedes aquaticus* is very similar to *D. minor* but can be differentiated by the absence or almost complete reduction of the longitudinal light orange median band on the carapace. The space between the ventral and median teeth of the RTA is wider than in *D. minor*, *D. schauinslandi,* and *D. dondalei*. Female genitalia of *D. aquaticus* with smooth outer lateral margin and the middle field is longer than wide, tapering posteriorly. The nucleotide at position 348 of the actin 5C coding sequence is a cytosine (C), position 459 is a guanine (G) and position 1038 is a cytosine (C).

Description. Colour: carapace yellow-brown with orange-brown area behind eye region, light orange submarginal bands with black-brown blotchy edges (Fig. 28, 29); longitudinal bands on carapace covered with white pubescence; sternum dark orange-brown; abdomen light grey with yellowish heart stripe and dense white pubescence along abdominal margins, sometimes extending to posterior in males (Fig. 28) and 1/4–1/2 way along abdomen in females (Fig. 29); femur, patella, and proximal 1/3 of tibia pale straw, orange-brown near joints, distal 2/3 of tibia orange-brown, metatarsus and tarsus dark orange-brown. Female colouration usually darker than males.

Chelicerae with 3 promarginal teeth (mesal and ectal reduced) and 4 retromarginal teeth. Tarsi and metatarsi with dense scopulae, less dense on legs III and IV. Male pedipalp (Fig. 5, 9, 16) with RTA consisting of 3, short, blunt subequal teeth (Fig. 9), which can sometimes be pointed (Fig. 16). Basal apophysis of cymbium angular when viewed retrolaterally (Fig. 9). Epigynum (Fig. 19, 23) with smooth outer lateral margin and middle field longer than wide, tapering posteriorly. Internal genitalia usually symmetrical (Fig. 23).

Dimensions (mm). Male NN, Motueka River (female NN, Motueka River): total length 15.0 (20.3); carapace 7.3/6.5 (10.6/8.8), height 2.4 (2.8); abdomen 7.9/4.2 (9.8/5.8); sternum 3.1/3.0 (4.2/4.1).

Total length of legs: leg I 29.2 (31.1), leg II 29.1 (31.1), leg III 27.7 (30.0), leg IV 32.8 (36.1).

Size range, mean ± s.e.m. Male body length 10.7–17.9, 14.2 ± 0.24, *n* = 54. Female body length 13.1–26.0, 19.4 ± 0.32, *n* = 72. Males were significantly smaller (mean body length) than females ($p < 0.0001$).

Type data. Syntypes of *Dolomedes aquaticus*: Not seen. Original description based on female and male specimens from Otago. The bulk of Goyen's collection has been destroyed (Forster 1967) and what remains of it is in OMNZ. The type(s) were not found in the OMNZ collection of Pisauridae and are not listed amongst the types at OMNZ (C. Fraser, pers. comm.). The types are presumed lost.

Material examined. 126 non-type specimens (54 males, 72 females) - see Appendix B for collection details of specimens examined.

Distribution (Map 2**).** Found throughout New Zealand south of 37°S (TK, RI, WI, WA, WN / NN, BR, NC, WD, MC, SC, MK, OL, FD, CO, DN, SL).

Biology. *Dolomedes aquaticus* inhabits open, stony riverbeds and rocky lake shores. The northern range of *D. aquaticus* is probably limited by the occurrence of braided rivers, which do not occur in the northern half of the North Island (Gray & Harding 2007). *Dolomedes aquaticus* biomass is greatest at rivers with intermediate flood disturbance (Greenwood & McIntosh 2008). Adults have been found from September and May, peaking in January. Courtship and mating has been observed once in *D. aquaticus*, which occurred between a male and a newly moulted, virgin female (Forster & Forster 1973, 1999). Adult males have also been observed with subadult females. It is possible that males mate with newly moulted, virgin females to avoid sexual cannibalism, which has been documented in other *Dolomedes* species (Arnqvist 1992, Johnson 2001). Eggsacs have been found from September to April. Females carry the eggsac with their chelicerae and build a nurseryweb between stones. *Dolomedes aquaticus* is a nocturnal hunter and is found under rocks and logs during the daytime. At night, *D. aquaticus* waits for prey at the water's edge with its anterior legs resting on the surface of the water. It senses the waterborne vibrations of insects on or in the water, which it captures and digests on land (Forster & Forster 1999). When disturbed, *D. aquaticus* runs across the surface of the water or pulls itself under water trapping a film of air that is caught between the hairs on its body (Fig. 37). *Dolomedes aquaticus* is able to remain submerged for at least 30 minutes (Forster & Forster 1973, 1999).

Dolomedes aquaticus is parasitised by the pompilid wasp *Sphictostethus nitidus* (Harris 1987). Harris (1987) also recorded *D. aquaticus* in the host records for *Cryptocheilus australis*, but this introduced Australian species is found only in Northland and Auckland, which is outside the recorded range of *D. aquaticus*. *Dolomedes aquaticus* and their eggsacs form a large proportion of the diet of nestling fernbirds, *Bowdleria punctata* (Forster & Forster 1999).

DNA. Seventeen cytochrome *c* oxidase subunit I and eleven actin 5C DNA sequences for this species are listed in GenBank (www.ncbi.nlm.nih.gov/Genbank/) under accession numbers GQ337355–GQ337371 and GQ337404–GQ337414 respectively.

Remarks. Although the types of *Dolomedes aquaticus* were not found and are presumed lost, Goyen's (1888) description of the colouration, habitat, and behaviour are adequate to identify this species. Dalmas (1917) incorrectly suspected that *D. aquaticus* may be a junior synonym one of the already described New Zealand *Dolomedes* species.

Dolomedes schauinslandi Simon

Fig. 6, 10, 17, 20, 24, 30, 31, 38, 39; Map 3

Dolomedes schauinslandi Simon, 1899: 436-437.

Dolomedes huttoni Hogg, 1908: 340-342, fig. 74.—Dalmas, 1917: 409. **New synonymy.**

Dolomedes trippi Hogg, 1908: 342-344, fig. 75.—Dalmas, 1917: 409. **New synonymy.**

Diagnosis. Distinguished from all other New Zealand *Dolomedes* species by their locality, size, the retrolateral tibial apophysis (RTA) of the male pedipalp, and the female genitalia. The RTA has a hooked tooth directed anterioventrally and usually a smaller ventral tooth. The middle field of the female genitalia wider than long; the epigynal fold and opening to the copulatory duct are at the posterior end of the middle field. *Dolomedes schauinslandi* is the only *Dolomedes* species found on the Chatham Islands (South East, Mangere, and Houruakopara Islands). Males and females of *D. schauinslandi* are significantly larger (mean body length) than those of all other New Zealand *Dolomedes* species ($p < 0.003$). The nucleotide at position 348 of the actin 5C coding sequence is a cytosine (C), position 459 is a thymine (T) and position 1038 is a thymine (T).

Description. Colour: carapace dark red-brown with broken, orange submarginal bands (Fig. 30, 31); carapace covered with white pubescence and patchy areas of black pubescence; sternum dark red-brown; abdomen dark orange-brown or mottled yellow brown on dark orange-brown, with a light orange heart stripe with thinner light orange stripe on either side; broken areas of light orange on the sides of the abdomen extending from anterior end to first quarter of abdomen in females (Fig. 30) and up to half way along abdomen in males (Fig. 31); legs red-brown, ventral surface of femurs lighter and metatarsus and tarsus darker.

Chelicerae with 3 promarginal teeth (mesal and ectal reduced) and 4 retromarginal teeth. Tarsi and metatarsi with dense scopulae, less dense on legs III and IV. Male pedipalp (Fig. 6, 10, 17) with RTA consisting of hooked tooth directed anterioventrally and smaller ventral tooth (Fig. 10); smaller ventral tooth was absent (Fig. 17) in two specimens (from Mangere Island and Pitt Island). Basal apophysis of cymbium, when viewed retrolaterally, rounded anteriorally and wrinkled posteriorly (Fig. 10). Epigynum (Fig. 20, 24) with middle field wider than long; epigynal fold and opening to copulatory ducts at posterior end of middle field. Internal genitalia with wide copulatory ducts (Fig. 24).

Dimensions (mm). Male CH, South East Island (female CH, South East Island): total length 22.3 (27.7); carapace 10.2/9.2 (12.2/9.7), height 2.9 (4.0); abdomen 12.5/8.8 (16.9/13.2); sternum 4.0/4.2 (4.2/4.3).

Total length of legs: leg I 34.1 (33.7), leg II 33.2 (33.7), leg III 30.8 (31.3), leg IV 36.8 (36.8).

Size range, mean ± s.e.m. Male body length 18.63–26.0, 23.8 ± 1.24, $n = 5$. Female body length 23.3–30.2, 26.5 ± 0.91, $n = 6$. Males were significantly smaller (mean body length) than females ($p < 0.025$).

Type data. Type(s) of *Dolomedes schauinslandi*: (MNHN) Not seen. Original description based on a female specimen(s) from Pitt Island.

Syntypes of *Dolomedes huttoni*: female and subadult male (BMNH) labelled "*Dolomedes Huttoni*; Pitt Island Hogg; C.H. Tripp Esq; Cotype. F331 [handwritten] / Pitt Island Type HRH [H.R. Hogg] F330; *Dolomedes* nov. sp. *Huttoni* [*Trippi* had been crossed out] HRH. [H.R. Hogg had initialled the correction]; same as single female; of C.H. Tripp from Pitt Island [handwritten] / Pitt Island.; Cap$^{\underline{tn}}$ Hutton. [handwritten]"

Synypes of *Dolomedes trippi*: male and subadult female (BMNH) labelled "HRH. [H.R. Hogg] F332; *Dolomedes Trippi* Types; Pitt Island. Chathams Group [handwritten]"

Material examined. Syntypes of *Dolomedes huttoni* and *Dolomedes trippi*, plus 11 non-type specimens (4 males, 5 females, 2 subadult females) - see Appendix B for collection details of specimens examined.

Distribution (Map 3)**.** Found only on South East Island (Rangatira), Mangere Island, and Houruakopara Island in the Chatham Islands group (CH). *Dolomedes schauinslandi* was originally recorded from Pitt Island (Rangiauria) in 1897 and prior to 1908 (Simon 1899, Hogg 1908) but has not been seen there since despite extensive invertebrate surveys (Emberson *et al.* 1996).

Biology. *Dolomedes schauinslandi* inhabits scrubland and forest (P. J. Sirvid, pers. comm.). Adults have been found from November to February. Courtship and mating has not been observed in *D. schauinslandi*. Eggsacs have been observed in November and December. Females carry the spherical eggsacs in their chelicerae (Fig. 38) and build nurserywebs in foliage. Females have been observed guarding nurserywebs (Fig. 39) from December to February. *Dolomedes schauinslandi* is mainly active at night (Sirvid 2008) and have been frequently observed feeding on weta (Orthoptera: Rhaphidophoridae) (Dugdale & Emberson 1996), including *Talitropsis megatibia* Trewick, 1999 (J. W. M. Marris, pers. comm.). Natural predators of *D. schauinslandi* are unknown, but these spiders may have been prey for the extinct *Bowdleria rufescens* (Buller, 1869) (Chatham Islands fernbird), as other species of *Dolomedes* and their eggsacs form a large proportion of the diet of nestlings of the closely related *B. punctata* on the New Zealand mainland (Forster & Forster 1999, Parker 2002).

Dolomedes schauinslandi is listed by the New Zealand Department of Conservation as "Nationally Endangered" due to their restricted location (Hitchmough *et al.* 2007). *Dolomedes schauinslandi* had been found on Pitt Island (Rangiauria) up until the early 1900s but has not been seen there since despite extensive invertebrate surveys (Emberson *et al.* 1996). Mice (*Mus musculus* Linnaeus, 1758) were accidentally introduced to Pitt Island sometime before 1951 (Bell 1955) and may have caused the extinction of *D. schauinslandi* there; mice are predators of spiders (Fitzgerald *et al.* 1996) and are capable of killing and eating large spiders (Laing 1975, Alley *et al.* 2001). The buff weka (*Gallirallus australis hectori* (Hutton, 1874)), which was introduced to Pitt Island in the 1970s (Aikman & Miskelly 2004), may have also contributed to the extinction *D. schauinslandi* there. Cats (*Felis catus* Linnaeus, 1758) are also found on Pitt Island, but as they were recorded there before 1868 (Fitzgerald 1990) are unlikely to have caused the local extinction of *D. schauinslandi*. Cats were also present on Mangere Island from shortly before 1893 until the 1950s, when they died out (Fitzgerald 1990), but *D. schauinslandi* are still found there. *Dolomedes schauinslandi* was probably present on Chatham Island (Rekohu/Wharekauri) prior to humans arriving there, as it is found on Houruakopara Island, which is approximately only 200 metres off the south coast. However, *D. schauinslandi* probably became extinct on Chatham Island due to predation by a variety of introduced mammals and weka. Although *D. schauinslandi* spiderlings have not been directly observed ballooning, they do point their abdomens upwards in response to a breeze in laboratory conditions (P. J. Sirvid, pers. comm.), which is a behaviour associated with ballooning. It is quite probable that they are able to balloon the short distances between Pitt Island and the neighbouring South East Island and Mangere Island. Therefore, if predator-free areas of vegetation are established on Pitt Island, *D. schauinslandi* may re-establish there.

DNA. Four cytochrome *c* oxidase subunit I and one actin 5C DNA sequences for this species are listed in GenBank (www.ncbi.nlm.nih.gov/Genbank/) under accession numbers GQ337382–GQ337385 and GQ337419 respectively.

Remarks. We were not able to examine the type(s) of *Dolomedes schauinslandi*, which is held at MNHN; however, Simon's (1899) description and locality data are adequate to identify this species. Dalmas (1917) had indicated that *D. huttoni* and *D. trippi* were likely to be junior synonyms of *D. schauinslandi* and that it was unlikely that three closely related *Dolomedes* species would exist on a small island (Pitt Island). We have examined the types of *Dolomedes huttoni* and *D. trippi* and their genitalia match *D. schauinslandi*, which confirms the synonymy that Dalmas (1917) suspected.

***Dolomedes dondalei* new species**

Fig. 1–3, 7, 11, 21, 25, 32, 33, 40, 41; Map 4

Diagnosis. Distinguished from all other New Zealand *Dolomedes* species by abdominal colour pattern, the retrolateral tibial apophysis (RTA) of the male pedipalp, and the strongly sclerotised anteriolateral edges of the middle field of the female genitalia. The abdomen has submarginal bands of light yellow brown extending to the posterior with several patches extending briefly towards the centre of the abdomen. The RTA consists of 3, short, subequal teeth in a dorsoventral line. The anteriolateral edges of the middle field of the female genitalia are sclerotised. The nucleotide at position 348 of the actin 5C coding sequence is a thymine (T), position 459 is a thymine (T), and position 1038 is a cytosine (C).

Description. Colour: carapace dark orange-brown with a darker area behind each PLE, orange submarginal bands with black-brown blotchy edges (Fig. 32, 33); longitudinal bands on carapace covered with white pubescence; sternum dark orange-brown; abdomen brown or mottled grey on brown, with light yellow-brown heart stripe and light yellow brown serrated submarginal bands extending to posterior with several patches extending briefly towards centre of abdomen (Fig. 32, 33, 40); femur and patella yellow brown with brown blotches, rest of leg dark orange-brown.

Chelicerae with 3 promarginal teeth (in males mesal and ectal reduced; in females ectal very reduced or absent (Fig. 2) and mesal not reduced) and 4 retromarginal teeth.

Tarsi and metatarsi with dense scopulae, less dense on legs III and IV. Male pedipalp (Fig. 7, 11) with RTA consisting of 3, short, subequal teeth in dorsoventral line. Basal apophysis of cymbium, when viewed retrolaterally, approximately spherical (Fig. 11). Epigynum (Fig. 21, 25) with sclerotised anteriolateral edges of middle field. Internal genitalia symmetrical (Fig. 25).

Dimensions (mm). Male holotype (female allotype): total length 17.2 (18.2); carapace 8.5/7.4 (9.2/7.9), height 3.2 (3.3); abdomen 8.7/5.7 (9.0/6.1); sternum 3.5/3.1 (3.8/3.2).

Total length of legs: leg I 36.5 (31.2), leg II 35.0 (31.2), leg III 31.2 (29.4), leg IV 39.1 (35.8).

Size range, mean ± s.e.m. Male body length 11.9–18.0, 16.1 ± 0.88, $n = 6$. Female body length 17.9–25.3, 19.9 ± 0.57, $n = 15$. Males were significantly smaller (mean body length) than females ($p < 0.01$).

Type data. Holotype: male (LUNZ, 00012760) labelled “NZ, MC, Banks Peninsula, near Barrys Bay; 43°45.265’S 172°52.880’E; shaded stream bed, under rock; 24.i.2003 C.J. Vink [handwritten]”

Allotype: female (LUNZ, 00012759) labelled “NEW ZEALAND, MC, Banks Peninsula; Kaituna Valley, top end of Kaituna River; in riverbed; 22.i.1995, V.A. Parr”

Paratypes: 6 males, 12 females: 1 ♂, ND, Kaitaia, 35°07’S, 173°16’E, 30 January 1981, R.R. Forster, OMNZ, IV31722; 1 ♂, CL, Whangapoua, 36°42.8’S, 175°36.0’E, 25 January 2000, C.J. Vink, LUNZ, 00012754; 1 ♀, WO, Te Rapa, 37°44.3’S, 175°14.8’E, 2 March 2009, B.N. McQuillan, LUNZ, 000127631; 1♀, GB, Marumaru, Possum Cave, 38°53’S, 177°28’E, December 1959, A. Morgrove, NZAC; 3 ♀, WN, Maungakotukutuku Valley, 40°56’S, 175°03’E, 27 February 1965, R.G. Ordish, MONZ, AS.001357; 1 ♂, WN, Stokes Valley Creek, 41°11’S, 174°59’S, 1 March 2001, J.J. & I.R. Prentice, MONZ, AS.001348; 1 ♂, WN, Stokes Valley, 41°11.2’S, 174°58.77’E, May 1996, B.M. Fitzgerald, MONZ, AS.001330; 1 ♀, NN, Karamea River, 41°14.910’S, 172°12.784’E, 8 December 2001, C.J. Vink, LUNZ, 00012756; 1 ♂, SD, Otatara Bay, 41°04.8’S, 174°02.5’E, 23 January 2009, S.J. Crampton, LUNZ, 00012768; 1 ♀, NC, Horsley Downs Road, near Hawarden, 42°55’S, 172°38’E, 18 March 2003, A. Heta, LUNZ, 00012758; 1 ♂, MC, Narbey Stream, 43°49.5’S, 173°2.5’E, 1 April 1997, J.B. Ward, CMNZ; 1 ♀, SC, Gunns Bush, 44°39.8’S, 170°58.5’E, 15 April 1998, M.H. Bowie, LUNZ, 00012761; 1 ♀, DN, Taieri, 45°53’S, 170°15’E, 1 July 1979, J.E. Carico, OMNZ, IV31748; 1 ♀, DN, Waipori River, 45°56’S, 170°04’E, 9 June 1967, Dunedin Training College, OMNZ, IV31838; 1 ♀, SL, Winton, 46°08.5’S, 168°19.5’E, 10 November 1981, W.M. Jukes, OMNZ, IV31746; 1 ♀, SL, Owaka, 46°27’S, 169°39’E, 1 March 1995, M. Gunion, OMNZ, IV31724.

Material examined. Type specimens plus 15 non-type specimens (2 females, 2 subadult males, 6 subadult females, 5 immatures) - see Appendix B for collection details of specimens examined.

Distribution (Map 4)**.** Found throughout New Zealand (ND, AK, CL, WO, BP, GB, WA, WN / NN, SD, BR, NC, MC, SC, OL, DN, SL).

Biology. *Dolomedes dondalei* inhabits shaded riverbeds in native forest and dense vegetation. Adults have been found throughout the year but are most common in December and January. Courtship and mating has not been observed in *D. dondalei*, but adult males have been observed with subadult females. It is possible that males mate with newly moulted, virgin females to avoid sexual cannibalism, which has been documented in other *Dolomedes* species (Arnqvist 1992, Johnson 2001). Only two eggsacs have been found, in March and April, but it is likely they are also produced in the summer months. Females carry the eggsac with their chelicerae and build a nurseryweb in foliage alongside streams (Forster & Forster 1999). *Dolomedes dondalei* is a nocturnal hunter and is found under rocks and logs during the daytime. At night, *D. dondalei* waits for prey at the water’s edge with its anterior legs resting on the surface of the water (Fig. 40). It senses the waterborne vibrations of insects on or in the water, which it captures and digests on land (Williams 1979, Forster & Forster 1999). *Dolomedes dondalei* also catches and feeds on small fish (Williams 1979), which has also been observed in other species of *Dolomedes* (Carico 1973, Zimmermann & Spence 1989, Carico 2005). When disturbed, *D. dondalei* runs across the surface of the water or pulls itself under water trapping a film of air that is caught between the hairs on its body (Williams 1979, Forster & Forster 1999). *Dolomedes dondalei* will also pursue prey by running across water (Williams 1979).

It is likely that *D. dondalei* is parasitised by the pompilid wasps *Cryptocheilus australis* and *Sphictostethus nitidus* (Harris 1987). Both are found within the range of *D. dondalei* and an unidentified *Dolomedes* species (not *D. minor* or *D. aquaticus*) was recorded in the host records for *C. australis* and *S. nitidus* (Harris 1987). *Dolomedes dondalei* (*Dolomedes* sp. in Forster & Forster 1999) and their eggsacs form a large proportion of the diet of nestling fernbirds, *Bowdleria punctata* (Forster & Forster 1999).

DNA. Ten cytochrome *c* oxidase subunit I and four actin 5C DNA sequences for this species are listed in GenBank (www.ncbi.nlm.nih.gov/Genbank/) under accession numbers GQ337372–GQ337381 and GQ337415–GQ337418 respectively.

Etymology. The specific name is in honour of Dr Charles Dondale who has been very supportive of both authors’ arachnological careers and for his contributions to the taxonomy of Pisauridae.

Remarks. *Dolomedes dondalei* was referred to as *D*. III by Williams (1979), who suggested that *D. dondalei* has proportionally longer legs than other New Zealand species of *Dolomedes*. The measurements presented above do support this; however, individual variation in leg lengths (see remarks section on the genus *Dolomedes* above) could confound this as a reliable character for the diagnosis of *D. dondalei*. Forster & Forster (1999) referred to *D. dondalei* as *Dolomedes* sp.

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APPENDIX A: Glossary of technical terms

accessory bulb — the head of the spermatheca

ALE — anterior lateral eyes or eye; located at the end of the front row

AME — anterior median eyes or eye; middle pair of the front row

abdomen — posterior division of the spider body; sometimes referred to as the opisthosoma

apophysis — sclerotised cuticular process arising from the segments of the pedipalp or legs

basal apophysis of the cymbium — a sclerotised projection at the base of the cymbium

bulb— refers to the male pedipalpal organ as a whole

carapace— the hard dorsal covering of the cephalothorax

cephalothorax— anterior division of the spider body; sometimes referred to as the prosoma

chelicerae— first pair of appendages of the cephalothorax, consisting of two segments (the distal segment is called the fang, basal segment is called the paturon)

conductor — structure of the male palpal organ that is associated with the embolus; thin, membranous and lamelliform in *Dolomedes*

copulatory ducts — ducts in the female genitalia that connect the copulatory pores on the epigynum to the spermathecae

coxa — first or basal segment of the legs

cymbium — tarsus of the adult male pedipalp

distal — near the apex

distal tegular projection —a sclerotised projection at the distal end of the tegulum. This structure is thought to be a synapomorphy for the Pisauridae.

dorsal — upper (surface)

ectal — away from the midline of the body

epigynal fold — a depression in the female external genitalia that leads to the copulatory opening of the internal genitalia

epigynum — the sclerotised region of female spiders covering the internal genitalia and located between the book lungs and anterior of the epigastric furrow

embolus — the intromittent part of the bulb containing the terminal portion of the ejaculatory duct

femur — third segment of the legs and pedipalps

fovea— depression on the thoracic region of the carapace where muscles of sucking stomach are attached internally

fulcrum — an apophysis attached to the distal sclerotised tube of the apical division, which bears the embolus

genital bulb — male pedipalpal organ

lateral lobe — area lateral to the outer, lateral margins of the epigynal folds

median apophysis — sclerotised cuticular appendage of the tegulum arising from the middle of the bulb

mesal — toward the middle of the body

metatarsus — sixth segment of the legs; absent in the pedipalps

pedipalp — six-segmented second appendage of the cephalothorax, anterior to legs I

patella — fourth segment of the legs and pedipalp

PLE — posterior lateral eyes or eye

PME — posterior median eyes or eye

promarginal — anterior margin

proximal — near the base.

recurved — when a line is drawn through the centres of the four eyes in a row produces an arc in which the arms point backwards (i.e., the lateral eyes are behind the median eyes)

retrolateral — on the outer side i.e., the surface nearer to the posterior end of the body

retrolateral tibial apophysis (RTA) — a sclerotised process on the on the retrolateral face of the male palpal tibia

retromarginal— posterior margin

saddle — sclerotised area of the tegulum

sclerotised — hardened by sclerotin or other substances in the cuticle

scopula (plural **scopulae**) **—** brush of hairs

seta (plural **setae**) **—** a sclerotised hair-like projection arising from the cuticle

spermathecae — the seminal receptacles in the epigynum

sternum — plate on the ventral surface of the cephalothorax between the coxae of the legs

subtegulum — a rounded sclerite at the base of the bulb

tarsus — last segment of the legs and pedipalp

tegulum — the middle sclerite of the bulb

tibia — fifth segment of legs and pedipalp

trochanter — second segment of the leg and pedipalp

ventral — lower (surface)

APPENDIX B: Collection details of specimens examined. Localities (including co-ordinates) and dates collected, collectors, and institutions of specimens examined. CJV = C. J. Vink.

Dolomedes minor

ND. *Dolomedes lateralis* syntypes 2 ♂, Bay of Islands, 1841, BMNH; *Dolomedes sagittiger* syntypes 2 ♀, Bay of Islands, 1841, BMNH; 2 ♀, Kohukohu, 35°21.7’S, 173°32.5’E, 28 August 1953, B.J. Marples, OMNZ, IV31725; 1 ♂, near Wairua River, 35°37.9’S, 174°11.9’E, 20 November 1998, CJV, LUNZ, 00012769; 2 ♂, Matarau, 35°37.9’S, 174°11.7’E, 15 February 1999, CJV, LUNZ, 00012770; 6 ♀, Waipoua, 35°39’S, 173°30’E, 30 December 1978, A.C. Harris, OMNZ, IV31736; 6 ♀, 1 immature, Waipoua, 35°39’S, 173°30’E, 30 December 1978, A.C. Harris, OMNZ, IV31738; 1 ♀, Whangarei, 35°43’S, 174°19’E, 13 February 1974, R.H. Cranston, AMNZ, 5232; 1 ♂, 2 ♀, Coronation Park, Whangarei, 35°43.2’S, 174°18.8’E, 6 February 1981, R.R. Forster, OMNZ, IV31723. **AK.** 1 ♀, Mt Auckland, 36°27’S, 174°27’E, 19 September 2004, G. Hall, NZAC; 1 ♀, Motuhoropapa Island, 36°41.3’S, 174°58.8’E, 28 August 1979, C.F. Butcher, B. Bradshaw, M. Tocker & G. Hall, OMNZ, IV31729; 1 ♂, Otata Island, 36°41.7’S, 174°58.5’E, 4 November 1977, L.L. Deitz, NZAC; 1 ♂, Otata Island, 36°41.7’S, 174°58.5’E, 14 January 1978, L.L. Dietz & J.S. Dugdale, OMNZ, IV31734; 1 ♂, Mairangi Bay, 36°44’S, 174°45’E, 9 May 1975, E.B. Bangerler, AMNZ, 81800; 1 ♀, North Shore, 36°47’S, 174°44’E, 8 July 1978, J. Young, AMNZ, 5230; 1 ♀, Takapuna, 36°47’S, 174°45’E, 9 October 1978, J.M. Gurr, AMNZ, 5240; 4 ♀, Waiheke Island, 36°48’S, 175°07’E, January 1943, G. Chamberlain, MONZ, AS.001321; 3 ♀, Waiheke Island, 36°48’S, 175°07’E, April 1946, G. Chamberlain, MONZ, AS.001323; 1 ♀, Saint Heliers, 36°51.2’S, 174°51.5’E, 20 May 1979, Mrs Howlett, AMNZ, 5238; 1 ♀, Orakei, 36°51.4’S, 174°49.0’E, 19 July 1983, B. Holland, AMNZ, 5239; 1 ♀, Kohimarama, 36°51.5’S, 174°50.6’E, 21 November 1986, NZAC; 1 ♀, Bucklands Beach, 36°51.8’S, 174°54.2’E, 8 April 1983, Mrs Purchase, AMNZ, 81798; 1 ♀, Ranui, 36°51.9’S, 174°34.2’E, 20 August 1956, K.A.J. Wise, NZAC; 1 ♂, Auckland, 36°52’S, 174°45’E, 1945, J.A. Marsden, MONZ, AS.001379; 1 ♀, Auckland, 36°52’S, 174°45’E, 3 November 1970, Mrs Stone, AMNZ, 5233; 1 ♀, Remuera, 36°52.5’S, 174°47.9’E, 3 April 1968, J.A.F. Jenkins, AMNZ, 5235; 1 ♀, Remuera, 36°52.5’S, 174°47.9’E, 20 March 1970, H. Walkley, AMNZ, 5231; 1 ♀, Henderson, 36°53’S, 174°37’E, April 1980, G. Bill, AMNZ, 5234; 1 ♀, Owairaka, 36°54’S, 174°43’E, 9 May 1959, N.Y. Webb, NZAC; 1 ♀, watershed reserve, 36°55’S, 174°31’E, 26 February 1944, G. Chamberlain, MONZ, AS.001316; 1 ♀, near Cornwallis, 36°59’S, 174°36’E, 22 January 1997, CJV & A.D. Blest, LUNZ, 00012771; 1 ♀, near Clevedon, 36°59.25’S, 175°02.93’E, 24 January 2001, CJV, LUNZ, 00012772; 1 ♂, Mangatangi, 37°06’S, 175°12’E, 9 March - 5 April 1977, I. Barton, NZAC. **CL.** 1 ♀, Great Barrier Island, Katherine Bay, 36°08’S, 175°22’E, 10 April 1966, R.G. Ordish, MONZ, AS.001372; 1 ♀, Great Barrier Island, Katherine Bay, 36°08’S, 175°22’E, 10 April 1966, R.G. Ordish, MONZ, AS.001371; 1 ♀, Great Barrier Island, Mt Hobson, 36°11.2’S, 175°24.8’E, 14 April 1966, R.G. Ordish, MONZ, AS.001359; 1 ♀, Great Barrier Island, Mt Hobson, 36°11.2’S, 175°24.8’E, 14 April 1966, R.G. Ordish, MONZ (at CMNZ); 1 ♀, Great Barrier Island, Little Windy Hill, 36°17.6’S, 175°31.6’E, 18 January - 21 Febraury 2002, P. Sutton, AMNZ, 5171; 1 ♀, Cuvier Island, main ridge track to radar camp, 36°26.1’S, 175°46.3’E, 22-27 March 1994, B.M. Fitzgerald, MONZ, AS.001361; 1 ♀, Cuvier Island, main ridge track at forest edge, 36°26.1’S, 175°46.3’E, 13 December 1996, B.M. Fitzgerald, MONZ, AS.001352; 1 ♀, Red Mercury Island, 36°37.3’S, 175°56.0’E, 23 October 1998, C.A. McGuinness, MONZ, AS.001366; 1 ♀, west Double Island, 36°40.4’S, 175°24.0’E, 10 December 1996, B.M. Fitzgerald, MONZ, AS.001351; 1 ♂, Pitoti Stream, near Coromandel, 36°46’S, 175°31’E, 24 January 2000, CJV, LUNZ, 00012773; 1 ♀, Tararu Stream, 37°06.1’S, 175°32.2’E, 28 May 1996, A.D. Blest & CJV, LUNZ, 00012774; 1 ♀, Thames, 37°08’S, 175°33’E, 9 April 1976, OMNZ, IV31768. **WO.** 2 ♀, Whangamarino River, 37°20’S, 175°7’E, January 1989, M. Burnell, AMNZ, 5241; 1 ♀, Whangamarino, 37°20.7’S, 175°7.0’E, 26 October 1989, M. Burnell, AMNZ, 5236; 1 ♂, Te Rapa, 37°44.3’S, 175°14.8’E, 2 February 2009, B.N. McQuillan, LUNZ, 00012795; 1 ♀, Te Rapa, 37°44.3’S, 175°14.8’E, 2 February 2009, B.N. McQuillan, LUNZ, 00012796; 1 ♀, Te Rapa, 37°44.3’S, 175°14.8’E, 2 February 2009, B.N. McQuillan, LUNZ, 00012797; 1 ♀, Matamata, 37°48’S, 175°46’E, 5 February 1984, D.J. Court, OMNZ, IV31763; 2 ♀, Matamata, 37°48’S, 175°46’E, 1 March 1984, D.J. Court, OMNZ, IV31807; 3 ♀, Matamata, 37°48’S, 175°46’E, 10 September 1984, D.J. Court, OMNZ, IV31809; 1 ♀, Matamata, 37°48’S, 175°46’E, 10 September 1984, D.J. Court, OMNZ, IV31744; 1 ♀, Moanatuatua Swamp Reserve, 37°57’S, 175°23’E, 11 February 1984, D.J. Court, OMNZ, IV31805; 1 ♂, 5 km N of Te Anga, 38°13'S, 174°49'E, 16 December 1967, J.K. Greenfield, MONZ, AS.001315; 1 ♂, Kiritehere Beach, 38°19.4'S, 174°42.4'E, 16 December 1967, R.G. Ordish, MONZ, AS.001313. **BP.** 1 ♀, Ngongotaha, 38°05'S, 176°13'E, 26 August 1971, M.E. Lynch, OMNZ, IV31770; 1 ♀, Waiorongomai Valley, 37°33'S, 175°46'E, 11 March 1984, D.J. Court, OMNZ, IV31743; 1 ♂, Waiorongomai Valley, 37°33'S, 175°45'E, 15 May 1984, D.J. Court, OMNZ, IV31806; 1 ♀, Waiorongomai Valley, 37°33'S, 175°45'E, 15 May 1984, D.J. Court, OMNZ, IV31804; subadult ♀, Waiorongoma Stream, 37°33.5'S, 175°45.4'E, 9 November 2008, J.C. Banks, LUNZ, 00012798; 2 ♀, Onepoto Bay Beach, 37°35.7'S, 178°18.0'E, 26 September 1995, P.J. Sirvid, MONZ, AS.001381; 1 ♀, Maraenui, 37°52.2'S, 177°35'E, 24 September 1977, H.P. Smith, AMNZ, 5237; 1 ♀, Maraenui, 37°52.2'S, 177°35'E, 24 September 1977, H.P. Smith, AMNZ, 81797; 1 ♀, Tikitere, 38°03.9'S, 176°21.1'E, 15 November 1973, R.G. Ordish, MONZ, AS.001314; 1 ♀, Rotorua, 38°08'S, 176°15'E, 12 March 1975, Mrs Hapimana, OMNZ, IV31755; 1 ♀, Forest Research Institute, 38°10'S, 176°16'E, 14 May 1971, M. Nuttal, OMNZ, IV31769; 1 ♂, Kaingaroa, 38°20'S, 176°40'E, 6 March 1975, Forest Research Institute, Rotorua, OMNZ, IV31754; 1 ♂, Kaingaroa, 38°20'S, 176°40'E, 20 March 1975, Forest Research Institute, Rotorua, OMNZ, IV31752. **GB.** 1 ♀, Papakorito Falls, 38°44.4'S, 177°10.6'E, 22 February 2007, G. Hall, R. Hoare, T. Buckley, NZAC. **TO.** 1 ♀, Mangatepopo Valley, 39°02'S, 175°32'E, 20 February 1977, R. Crabtree, OMNZ, IV31756. **TK.** 1 ♀, New Plymouth, 39°04'S, 174°05'E, October 1970, R. Allan, OMNZ, IV31833; 1 ♀, Stony River, 39°15'S, 173°57'E, 1 December 2000, CJV, LUNZ, 00012775; 1 ♀, Manaia, 39°33'S, 174°07'E, February 1974, M.A. Ordish, MONZ, AS.001387; 1 ♀, Ohawe Beach, 39°35.4'S, 174°18.5'E, 7 April 1997, M.K. Eagle, AMNZ, 5092. **HB.** 1 ♀, Mt Hukanui, 39°14.8'S, 176°32.6'E, 24 March 1996, A. Tennyson, MONZ, AS.001383; 1 ♀, Havelock North, 39°40'S, 176°53'E, May 1997, H. Steward, MONZ, AS.001363; **WI.** 1 ♀, Waiinu Beach, 39°52'S, 174°44'E, 18 March 1969, R.R. Forster, OMNZ, IV31852; 1 ♀, Oroua River, 40°14'S, 175°35'E, 2 January 1967, R.R. & D.R. Forster, OMNZ, IV31846; 1 ♂, Feilding, 40°14'S, 175°35'E, 12 January 1967, R.R. & D.R. Forster, OMNZ, IV31856. **WA.** 1 ♂, upper Norfolk Road, 40°54'S, 175°32'E, 16 October 1972, C.L. Wilton, OMNZ, IV31862; 1 ♂, 1 ♀, West Taratahi, 40°54'S, 175°32'E, 16 November - 10 December 1972, C.L. Wilton, MONZ, AS.001320. **WN.** 1 ♀, Otaki Beach, 40°44'S, 175°07'E, 23 January 1971, H.V. Hampton, MONZ, AS.001380; 1 ♀, Tawa, 41°10'S, 174°49'E, 6 October 1966, T. O'Brien, MONZ, AS.001358; 1 ♂, Stokes Valley, 41°11.2'S, 174°58.77'E, 3 May 1993, B.M. Fitzgerald, MONZ, AS.001336; 1 ♀, Stokes Valley, 41°11.2'S, 174°58.77'E, 10 April 1994, B.M. Fitzgerald, MONZ, AS.001373; 1 ♂, Stokes Valley, 41°11.2'S, 174°58.77'E, 28 May 1994, B.M. Fitzgerald, MONZ, AS.001342; 1 ♂, Stokes Valley, 41°11.2'S, 174°58.77'E, 26 May 2003, B.M. Fitzgerald, MONZ, AS.001388; 1 ♂, Stokes Valley, 41°11.2'S, 174°58.77'E, 6 February 2008, B.M. Fitzgerald, MONZ, AS.001393; 1 ♂, Stokes Valley, 41°11.2'S, 174°58.77'E, January 2008, B.M. Fitzgerald, MONZ, AS.001396; 1 ♀, Stokes Valley, 41°11.2'S, 174°58.77'E, January 2008, B.M. Fitzgerald, MONZ, AS.001397; 1 ♀, Stokes Valley, 41°11.2'S, 174°58.77'E, 3 February 2008, B.M. Fitzgerald, MONZ, AS.001391; 1 ♂, York Bay, Lower Hutt, 41°15.7'S, 174°54.6'E, 15 February 2008, P.J. Sirvid, MONZ, AS.001392; 1 ♀, Karori, 41°17'S, 174°43'E, 7 June 1975, D.H. Roberts, MONZ, AS.001367; 1 ♀, Karori, 41°17.02'S, 174°43.6'E, 31 March 1995, P.J. Sirvid, MONZ, AS.001382; 1 ♀, Wellington, 41°18'S, 174°46'E, January 1967, MONZ, AS.001355; 1 ♀, Wellington, 41°18'S, 174°46'E, April 1995, C. O'Connell, MONZ, AS.001386; 1 ♂, Brooklyn, 41°18.5'S, 174°45.6'E, 14 April 1996, A. Tennyson, MONZ, AS.001378; 1 ♀, Orongorongo Valley, 41°21'S, 174°58'E, 1 January 1994, B.M. Fitzgerald, MONZ, AS.001331. **NN.** 1 ♀, near Pakawau, 40°36'S, 172°41'E, 8 March 1967, C.L. Wilton, OMNZ, IV31794; 1 ♀, Heaphy dig, 40°59'S, 172°07'E, 8 May 1962, D. Miller, CMNZ; 1 ♀, Motueka Valley, 41°09.293'S, 172°56.124'E, 23 March 2009, CJV, S.J. Crampton, M.W. Crampton, LUNZ, 00012799; 1 ♀, Motueka Valley, 41°09.293'S, 172°56.124'E, 23 March 2009, CJV, S.J. Crampton, M.W. Crampton, LUNZ, 00012800; 1 ♂, Parkes Farm, 41°28'S, 173°00'E, 15 February 1972, N.A. Martin, NZAC; 1 ♂, Parkes Farm, 41°28'S, 173°00'E, 13 March 1973, N.A. Martin, NZAC; 2 ♀, Westport, 41°45'S, 171°36'E, February 1948, G. Chamberlain, MONZ, AS.001318. **BR.** 1 ♀, Saint James Walkway, 42º22.65'S, 172º24.2'E, 13 February 2008, J. Malumbres-Olarte, LUNZ, 00012801. **MB.** 1 ♀, near Canvastown, 41°17.432'S, 173°40.737'E, 24 March 2009, CJV, S.J. Crampton, M.W. Crampton, LUNZ, 00012802; 1 ♀, near Canvastown, 41°17.432'S, 173°40.737'E, 24 March 2009, CJV, S.J. Crampton, M.W. Crampton, LUNZ, 00012803; 1 ♀, near Canvastown, 41°17.432'S, 173°40.737'E, 24 March 2009, CJV, S.J. Crampton, M.W. Crampton, LUNZ, 00012804;

1 ♀, Island Pass, 42°11.0’S, 172°47.9’E, 1 February 1988, S. Reid, LUNZ, 00012776. **KA.** 1 ♀, near Meriburn, 42°10.995’S, 173°53.588’E, 24 March 2009, CJV, S.J. Crampton, M.W. Crampton, LUNZ, 00012805. **NC.** 1 ♀, Waipara River Mouth, 43°09.3’S, 172°47.6’E, 17 February 2009, A.J.D. Tennyson, MONZ, AS.001401. **WD.** 1 ♂, Hokitika, 42°43.4’S, 170°58.2’E, 3 May 1995, M.M. Davidson, LUNZ, 00012777; 2 ♂, Saltwater Forest, 43°08?S, 170°25?E, 25 February 1991, P. Walsh, MONZ, AS.001377; 1 ♀, Hende’s Ferry, 43°09’S, 170°34’E, 25 December 1915, J.W. Hende, BMNH 1924.3.1.968; 1 ♂, Okarito, 43°13’S, 170°09’E, 2 March 1991, P. Walsh, MONZ, AS.001349; 1 ♂, Okarito Swamp, 43°14’S, 170°12’E, March 2001, D. Slaney, MONZ, AS.001326; 1 ♀, Pakihi Track, 43°14.9’S, 170°12.4’E, 19 November 1995, CJV, LUNZ, 00012778; 1 ♀, Okarito Swamp, 43°14.9’S, 170°12.4’E, 27 January 2009, G. Hall & R.J.B. Hoare, NZAC; 1 ♀, Fox Glacier, 43°28’S, 170°01’E, 20 January 1971, R.R. Forster, OMNZ, IV31832; 1 ♀, Random Creek, 43°43.9’S, 169°24.4’E, 13 December 1994, CJV, LUNZ, 00012779; 1 ♀, Ship Creek, 43°45.5’S, 169°8.8’E, 12 December 1994, A.D. Blest, LUNZ, 00012780; 1 ♀, Haast, 43°53’S, 169°03’E, 15 March 1966, R.R. Forster, OMNZ, IV31793; 1 ♂, 1 ♀, Woodhen Creek, 44°10’S, 168°29’E, , MONZ, AS.001385. **MC.** 1 ♀, Mt Algidus, 43°15’S, 171°21’E, November 1913, J. Hall, BMNH 1924.3.1.972; 1 ♀, Redwood, 43°28.320’S, 172°36.606’E, 5 April 2009, CJV, LUNZ, 00012806; 1 ♀, Travis Marsh, 43°29.2’S, 172°41.2’E, 20 December 1995, R.P. Macfarlane, LUNZ, 00012781; 1 ♂, Christchurch, 43°33’S, 172°36’E, 30 June 1943, OMNZ, IV31861; 1 ♀, Christchurch, 43°33’S, 172°36’E, 18 November 1991, G.K. Thompson, LUNZ, 00012782; 1 ♀, Christchurch, 43°33’S, 172°36’E, 4 August 1996, LUNZ, 00012783; 1 ♀, Quail Island, 43°37.6’S, 172°41.5’E, January 1913, G.E. Archer, BMNH 1924.3.1.969; 1 ♀, Kennedys Bush Scenic Reserve, 43°37.9’S, 172°37.4’E, 29 March 2008, CJV & P. Paquin, LUNZ, 00012807; 1 ♀, Springston, 43°38.6’S, 172°25.6’E, 28 November 1991, CJV, LUNZ, 00012784; 1 ♀, Lincoln, 43°38.665’S, 172°29.314’E, 4 April 2009, CJV, LUNZ, 00012808; 2 ♂, Lincoln University, 43°38.9’S, 172°27.0’E, 6-13 December 1990, A.M. Henwood, LUNZ, 00012785; 1 ♀, Lake Ellesmere, 43°42.8’S, 172°27.2’E, 20 August 1992, CJV, LUNZ, 00012786; 1 ♀, Lake Ellesmere, 43°43’S, 172°30’E, 20 November 1999, R.M. Emberson, LUNZ, 00012787; 1 ♂, Lake Forsyth, 43°47.4’S, 172°45.5’E, 8 January 1996, A.D. Blest, LUNZ, 00012788; 1 ♂, Kaitorete Spit, 43°49.3’S, 172°41.3’E, February 1993, CJV & A.B. Freeman, LUNZ, 00012789; 3 ♂, Hinewai Reserve, 43°48.6’S, 173°1.7’E, 2000, H.D. Wilson, LUNZ, 00012790, 00012853–00012854; 2 ♂, Hinewai Reserve, 43°49.5’S, 173°2.5’E, 11-21 November 1997, J.B. Ward, LUNZ, 00012791. **SC.** 1 ♂, Peel Forest, 43°53’S, 171°16’E, January 1998, A.D. Blest, LUNZ, 00012792; 1 ♂, Peel Forest, 43°55’S, 171°16’E, 25 March 2000, CJV, LUNZ, 00012793; 1 ♀, near Kimbell, 44°03.492’S, 170°46.33’E, 1 March 2009, CJV, LUNZ, 00012809; 1 ♀, near Kimbell, 44°03.492’S, 170°46.33’E, 1 March 2009, CJV, LUNZ, 00012810; 1 ♀, Waihao Downs, 44°47.5’S, 170°54.9’E, 7 April 1985, S. Leslie, CMNZ. **MK.** 1 ♀, Glen Eyrie, 44°24’S, 171°15’E, 11 February 1984, C. Butts, OMNZ, IV31742; 1 ♀, Glen Eyrie, 44°24’S, 171°15’E, 11 February 1984, C. Butts, OMNZ, IV31808. **OL.** 1 ♀, Cascade Creek, 44°13’S, 169°24’E, 15 February 1966, R.R. Forster & C.L. Wilton, OMNZ, IV31797; 1 ♂, nr Mt Aspiring Station, 44°30’S, 168°50’E, 7 February 1970, C.L. Wilton, OMNZ, IV31849; 1 ♂, Temple Peak Station, 44°46.693’S, 168°26.697’E, 24-27 February 2003, CJV, LUNZ, 00012794; 1 ♀, Te Anau Station, 45°24’S, 167°45’E, 17 February 1966, C.L. Wilton, OMNZ, IV31776; 1 ♀, Te Anau, 45°24’S, 167°45’E, 12 February 1983, R.R. Forster, OMNZ, IV31726. **FD.** 1 ♀, Kepler Track, 45°24.982’S, 167°31.711’E, 22 March 2008, J. Malumbres-Olarte, LUNZ, 00012811; 1 ♀, near Te Anua, 45°26.499’S, 167°41.297’E, 24 March 2008, J. Malumbres-Olarte, LUNZ, 00012812; 1 ♀, near Te Anua, 45°26.499’S, 167°41.297’E, 24 March 2008, J. Malumbres-Olarte, LUNZ, 00012813; 1 ♀, near Redcliff, 45°40.23’S, 167°40.37’E, 16 February 2008, J. Malumbres-Olarte, LUNZ, 00012814; 1 ♀, Prices Point, 46°13’S, 166°56’E , 9 March 2009, R. Buxton, NZAC. **CO.** 1 ♀, Morven Hills Station, 44°36’S, 169°38’E, 27 January 2004, C.A. McGuinness, MONZ, AS.001400; 1 ♀, Pigroot, 45°12’S, 170°25’E, 25 December 1965, C.L. Wilton, OMNZ, IV31841; 1 ♀, Lammermoor Range, 45°37.535’S, 169°52.82’E, 27 February 2009, CJV & J. Malumbres-Olarte, LUNZ, 00012815; 1 ♂, Millers Flat, 45°40.3’S, 169°30.0’E, March 1978, B.I.P. Barratt, OMNZ, IV31812; 2 ♂, Millers Flat, 45°40.3’S, 169°30.0’E, March 1978, B.I.P. Barratt, OMNZ, IV31813; 1 ♂, Millers Flat, 45°40.3’S, 169°30.0’E, November 1978, B.I.P. Barratt, OMNZ, IV31816; 3 ♂, Millers Flat, 45°40.3’S, 169°30.0’E, December 1978, B.I.P. Barratt, OMNZ, IV31823; 1 ♂, Millers Flat, 45°40.3’S, 169°30.0’E, February 1979, B.I.P. Barratt, OMNZ, IV31817; 4 ♂, Waipori, 45°48.5’S, 169°45.5’E, 31 January - 16 February

1979, B.I.P. Barratt, OMNZ, IV31815; 1 ♀, Waipori, 45°48.5’S, 169°45.5’E, 28 February - 14 March 1979, B.I.P. Barratt, OMNZ, IV31822. **DN.** 1 ♀, Nenthorn Stream, 45°27’S, 170°21’E, 23 April 1967, C.L. Wilton, OMNZ, IV31837; 1 ♀, Kilmog, 45°42’S, 170°34’E, 15 November 1966, C. Robertson, OMNZ, IV31858; 1 ♂, Leith Saddle, 45°48’S, 170°31’E, 20 April 1968, R.R. Forster, OMNZ, IV31863; 1 ♀, Leith Valley, 45°50’S, 170°30’E, , OMNZ, IV31767; *Dolomedes tridentatus* type ♀, Dunedin, 45°53’S, 170°30’E, G.M. Thomson, BMNH 1924.3.1.973; 1 ♀, Dunedin, 45°53’S, 170°30’E, April 1966, B. Weston, OMNZ, IV31791; 1 ♀, Dunedin, 45°53’S, 170°30’E, 12 February 1981, OMNZ, IV31765; 1 ♀, Dunedin, 45°53’S, 170°30’E, 23 September 1992, A.C. Harris, OMNZ, IV31866; 1 ♀, Dunedin, 45°53’S, 170°30’E, 19 March 1998, A.C. Harris, OMNZ, IV31750; 1 ♂, Saddle Hill, 45°54.6’S, 170°21.8’E, May 1996, R.R. Forster, OMNZ, IV31761; 1 ♀, Saddle Hill, 45°54.6’S, 170°21.8’E, May 1996, R.R. Forster, OMNZ, IV31760; 1 ♂, Saddle Hill, 45°54.6’S, 170°21.8’E, 10 February 1997, R.R. Forster, OMNZ, IV31751; 1 ♀, Waipori River and Taieri River junction, 45°59.4’S, 170°08.8’E, 20 September 1980, OMNZ, IV31737; 1 ♀, near Toko Mouth, 46°13’S, 170°02’E, 25 December 1967, C.L. Wilton, OMNZ, IV31781. **SL.** 1 ♀, near Bald Hill, 46°10.563’S, 167°54.776’E, 18 March 2008, P. Paquin & J. Malumbres-Olarte, LUNZ, 00012816; 1 ♀, near Bald Hill, 46°10.563’S, 167°54.776’E, 18 March 2008, P. Paquin & J. Malumbres-Olarte, LUNZ, 00012817; 1 ♀, Pahia, 46°19.8’S, 167°42.8’E, 25 May 1947, R. Kennedy, MONZ, AS.001399; 1 ♀, Colac Bay, 46°21’S, 167°53’E, 24 November 1970, R.R. Forster & C.L. Wilton, OMNZ, IV31835; 1 ♀, Lake Wilkie, 46°34.8’S, 169°26.3’E, A.F. Mark, OMNZ, IV31855. **Unknown locality.** 1 ♀, illegible label, 13 April 1958, CMNZ.

Dolomedes aquaticus

TK. 1 ♂, Stony River, 39°15’S, 173°57’E, 13 November 1994, CJV, LUNZ, 00012818. **RI.** 1 ♂, Rangitikei River, Vinegar Hill Reserve, 39°56.1’S, 175°38.5’E, 21 January 1962, R.R. & D.R. Forster, OMNZ, IV31775; 1 ♀, Apiti, 39°58.4’S, 175°52.3’E, 29 December 1966, D.R. & R.R. Forster, OMNZ, IV31802; 1 ♂, Pohangina River, 40°03’S, 176°00’E, 26 December 1966, D.R. Forster, OMNZ, IV31790. **WI.** 1 ♂, Oroua River, 40°14’S, 175°35’E, 2 January 1967, R.R. & D.R. Forster, OMNZ, IV31836. **WA.** 1 ♂, Waipoua River, 40°57.5’S, 175°40.5’E, 17 February 2009, A. McEwan, LUNZ, 00012839. **WN.** 1 ♂, Otaki Forks, 40°52’S, 175°14’E, 18 February 1999, J.W. Early & K.A.J. Wise, AMNZ, 6604; 1 ♂, Orongorongo Valley, 41°21’S, 174°58’E, 4 March 1997, B.M. Fitzgerald, MONZ, AS.001340. **NN.** 1 ♀, Kelly Creek, 41°15.000’S, 172°12.682’E, 4 May 2002, CJV, LUNZ, 00012819; 1 ♂, Maitai River, 41°16’S, 173°18’E, 29 March 1966, C.L. Wilton, OMNZ, IV31845; 1 ♀, Maitai River, 41°16’S, 173°18’E, 29 March 1966, C.L. Wilton, OMNZ, IV31844; 1 ♂, Motueka River, 41°16.780’S, 172°48.435’E, 23 March 2009, CJV, S.J. Crampton, M.W. Crampton, LUNZ, 00012840; 1 ♀, Motueka River, 41°16.780’S, 172°48.435’E, 23 March 2009, CJV, S.J. Crampton, M.W. Crampton, LUNZ, 00012841; 1 ♀, Motueka River, 41°16.780’S, 172°48.435’E, 23 March 2009, CJV, S.J. Crampton, M.W. Crampton, LUNZ, 00012842. **BR.** 1 ♀, Murchison, 41°48’S, 172°20’E, January 2006, A. & S. James, MONZ, AS.001325; 1 ♂, Caledonian Creek, 42°19.193’S, 171°30.223’E, 2 December 2007, CJV & H.P. Hudson Vink, LUNZ, 00012843; 1 ♂, Caledonian Creek, 42°19.193’S, 171°30.223’E, 2 December 2007, CJV & H.P. Hudson Vink, LUNZ, 00012844; 1 ♂, Ford Creek, 42°22.81’S, 171°24.73’E, 24 November 2001, CJV, LUNZ, 00012820; 1 ♂, Boyle River, 42°31.111’S, 172°23.423’E, 6 February 2009, M.A. Hudson & CJV, LUNZ, 00012845; 1 ♀, Boyle River, 42°31.111’S, 172°23.423’E, 6 February 2009, CJV & M.A. Hudson, LUNZ, 00012846; 1 ♀, Boyle River, 42°30.897’S, 172°23.128’E, 7 February 2009, CJV, LUNZ, 00012847; 1 ♀, Nemona State Forest, 42°30.479’S, 171°21.268’E, 24 November 2001, CJV, LUNZ, 00012821; 1 ♂, Moana, 42°34’S, 171°29’E, 28 January 2001, A.M. Paterson, LUNZ, 00012822. **NC.** 1 ♀, Lake Sumner, 42°42’S, 172°9’E, 9 December 1967, J. McIlroy, LUNZ, 00012823; 1 ♀, Waimakariri River, near confluence with Bealey River, 43°01’S, 171°36’E, 29 September 1966, R.R. Forster, OMNZ, IV31782; 1 ♀, Cass, 43°02’S, 171°45’E, 12 April 1920, CMNZ; 1 ♂, Waipara River Gorge, 43°03.2’S, 172°36.9’E, 2 January 2000, S.J. Crampton & CJV, LUNZ, 00012824; 1 ♀, Waipara River, 43°03.57’S, 172°35.41’E, 1 January 2008, CJV, LUNZ, 00012848; 1 ♂, Waipara River, 43°03.57’S, 172°35.41’E, 1 January 2008, CJV, LUNZ, 00012849. **WD.** 1 ♀, Taramakau Valley, 42°41.3’S, 171°14.1’E, April 1998, A.J. MacDonald, LUNZ, 00012825; 1 ♂, Big Wainihinihi River, 42°46’S, 171°20’E, 29 September 1966, C.L. Wilton, OMNZ, IV31796; 1 ♀, Big Wainihinihi River, 42°46’S, 171°20’E, 29 September 1966, R.R. Forster, OMNZ, IV31799; 1 ♀, Saltwater Creek, 43°08?S, 170°25?E, 27 September 1966, R.R. Forster, OMNZ, IV31783; 1 ♀, Franz Josef Glacier, 43°25.3’S, 170°10.2’E, 16 November 1995, CJV, LUNZ, 00012826; 1 ♀, Rough

Creek, 43°35.5’S, 169°48.8’E, 13 December 1994, CJV, LUNZ, 00012827; 1 ♀, near Ward Hill, 43°42.5’S, 169°27.4’E, 15 April 2008, J.L. Monk, LUNZ, 00012850; 1 ♀, Paringa River, 43°43’S, 169°29’E, 27 September 1966, R.R. Forster, OMNZ, IV31801; 1 ♂, Waita River, 43°47’S, 169°07’E, 3 May 1982, OMNZ, IV31741; 1 ♂, Thomas River, 43°54’S, 169°11’E, 16 March 1966, R.R. Forster, OMNZ, IV31784; 1 ♂, Halfway Bluff, 43°58.2’S, 169°12.4’E, 16 March 1966, R.R. Forster, OMNZ, IV31792. **MC.** 1 ♀, Broken River, 43°12’S, 171°45’E, 29 September 1966, R.R. Forster, OMNZ, IV31800; 1 ♂, Craigieburn Range, 43°16.4’S, 171°38.6’E, 14 January 1998, J.W. Early, AMNZ, 5140; 1 ♀, Tikao Bay, 43°47.7’S, 172°54.9’E, 1 January 1963, M.G. Blakemore, LUNZ, 00012828; 1 ♂, Rakaia River, 43°44’S, 172°02’E, 31 October 1966, R.R. Forster, OMNZ, IV31779; 1 ♂,. unknown locality, 2006, LUNZ, 00012852. **SC.** 1 ♂, Kowai Stream, 43°54’S, 171°14’E, spring 1998, CJV, LUNZ, 00012829; 1 ♂, Peel Forest, 43°54’S, 171°14’E, spring 1998, CJV, LUNZ, 00012830; 1 ♀, Rangitata River, 43°55’S, 171°17’E, 30 September 1966, R.R. Forster, OMNZ, IV31843; 1 ♀, Waihi Gorge, 44°00’S, 171°09’E, 23 January 1982, R.R. Forster, OMNZ, IV31821; 1 ♂, Opuha River, 44°04.923’S, 170°58.72’E, 1 March 2009, CJV, LUNZ, 00012851; 1 ♀, Orari River, 44°05’S, 171°17’E, 30 September 1966, C.L. Wilton, OMNZ, IV31795; 1 ♂, 2 ♀, Opihi River, 44°06’S, 170°50’E, 19 January 1982, R.R. Forster, OMNZ, IV31788; 2 ♀, Opihi River, 44°06’S, 170°50’E, 19 January 1982, R.R. Forster, OMNZ, IV31789; 2 ♂, 1 ♀, Waihi, 44°06’S, 171°15’E, 22 January 1982, R.R. Forster, OMNZ, IV31787; 1 ♂, 2 ♀, Timaru, 44°24’S, 171°15’E, December 1943, G. Chamberlain, MONZ, AS.001333; 1 ♂, 2 ♀, Timaru, 44°24’S, 171°15’E, January 1944, G. Chamberlain, MONZ, AS.001324; 2 ♀, Timaru, 44°24’S, 171°15’E, January 1944, G. Chamberlain, MONZ, AS.001356; 1 ♀, Gunns Bush, 44°39.8’S, 170°58.5’E, 15 April 1998, M.H. Bowie, LUNZ, 00012831. **MK.** 1 ♀, Mt Cook, 43°44’S, 170°06.’E, OMNZ, IV31772; 1 ♀, Lake Tekapo, 44°00.173’S, 170°28.373’E, 5 January 2001, CJV & M.A. Hudson, LUNZ, 00012832; 1 ♂, 1 ♀, Lake Tekapo, 44°00.173’S, 170°28.373’E, 6 January 2001, CJV & M.A. Hudson, LUNZ, 00012833; 1 ♀, Powerhouse site, Ohau, 44°15.8’S, 170°01.9’E, 11 February 1981, D.F. McFarlane, OMNZ, IV31728; 1 ♀, Lake Ohau, 44°16’S, 169°50’E, 1 January 1984, R. Clarke, OMNZ, IV31747; 3 ♂, Ahuriri River, 44°28’S, 169°59’E, 18 January 1982, R.R. & L.M. Forster, OMNZ, IV31786; 2 ♀, Ahuriri River, 44°28’S, 169°59’E, 18 January 1982, R.R. & L.M. Forster, OMNZ, IV31785. **OL.** 1 ♂, Haast River, Fantail Falls, 44°04.6’S, 169°23.2’E, 18 November 1995, CJV, LUNZ, 00012834; 1 ♀, Siberia Stream, 44°12’S, 169°03’E, 10 April 1969, OMNZ, IV31854; 1 ♂, Cascade Creek, 44°13’S, 169°24’E, 12 January 1971, R.R. Forster, OMNZ, IV31831; 1 ♀, Cascade Creek, 44°13’S, 169°24’E, 13 January 1971, R.R. Forster, OMNZ, IV31830; 1 ♀, Silver Island, Lake Hawea, 44°27.0’S, 169°20.9’E, 9 April 1994, R. Logan & P. Gasson, OMNZ, IV31753; 8 ♂, 2 ♀, Hawea, 44°36’S, 169°18’E, 30 January 1975, R.R. Forster, OMNZ, IV31749; 1 ♂, Cameron Flat, 44°28.8’S, 168°48.5’E, 17 March 1966, R.R. Forster, OMNZ, IV31842; 1 ♀, Cameron Flat, 44°28.8’S, 168°48.5’E, 17 March 1966, R.R. Forster, OMNZ, IV31840; 1 ♂, 5 ♀, near Cameron Flat, 44°28.8’S, 168°48.5’E, 2 January 1988, R.R. & L.M. Forster, OMNZ, IV31730; 1 ♂, Stevensens Island, 44°35.7’S, 169°08.1’E, 25 February 1997, D. Blair, OMNZ, IV31733; 1 ♂, Lake Hawea, 44°34’S, 169°19’E, 9 December 2002, CJV, LUNZ, 00012835; 2 ♂, upper Stony Creek, 44°48.85’S, 168°35.23’E, 25 February 2003, CJV, LUNZ, 00012836; 1 ♀, Jane Peak, 45°20’S, 168°19’E, 24 March 1985, A.C. Harris, OMNZ, IV31865; 2 ♂, Eyre Creek, 45°29.7’S, 168°30.9’E, 12 January 1999, CJV, LUNZ, 00012837; 1 ♀, Eyre Creek, 45°29.7’S, 168°30.9’E, 12 January 1999, CJV, LUNZ, 00012838. **FD.** 1 ♀, Milford Sound, 44°40’S, 167°56’E, 19 December 1944, J.T. Salmon, MONZ, AS.001317. **CO.** 1 ♀, Wharekuri Creek, 44°40’S, 170°22.5’E, 22 April 2006, A.J.D. Tennyson, MONZ, AS.001335; 1 ♀, Manuherikia River, 44°55’S, 169°51’E, 15 January 1966, C.L. Wilton, OMNZ, IV31839; 1 ♀, North Branch Maerewhenua River, junction with Dansey Pass Road, 44°57.7’S, 170°27.7’E, 21 March 2005, NZAC; 1 ♀, Shag Valley Station, 45°19.1’S, 170°32.8’E, 13 September 1966, R.R. Forster, OMNZ, IV31778. **DN.** 1 ♂, 2 ♀, Trotters Gorge, 45°24’S, 170°47’E, 1 September 1980, A.C. Harris, OMNZ, IV31764; 1 ♀, near Waitati, 45°45’S, 170°34’E, 30 April 1984, D.U. H.K, OMNZ, IV31810; 1 ♂, Waitai Stream, south of Waitati, 45°46’S, 170°33’E, 26 September 1995, J. Boutin, MONZ, AS.001319; 1 ♀, Leith River, 45°51.2’S, 170°30.7’E, OMNZ, IV31773; 1 ♀, Dunedin, 45°53’S, 170°30’E, May 1981, OMNZ, IV31766. **SL.** 1 ♀, Oreti River, 45°42’S, 168°25’E, 15 February 1966, R.R. Forster, OMNZ, IV31798. **Unknown locality.** 1 ♂ and 1 ♀, OMNZ, IV31735; 1 ♀, OMNZ, IV31759; 1 ♀, R. Browne, OMNZ, IV31774; 1 ♀, OMNZ, IV31771.

Dolomedes schauinslandi

CH. 1 ♀, Houruakopara Island, 44°05.98'S, 176°30.14'W, 9 February 2005, T. Gregory-Hunt & R. Williams, MONZ, AS.001346; 1 ♀, Mangere Island, 44°16'S, 176°17.4'W, February 1994, K. Schöps, LUNZ, 00012751; 1 ♂, Mangere Island, 44°16'S, 176°17.4'W, 19 January 1984, D. Merton, MONZ, AS.001347; *Dolomedes huttoni* syntype ♀, Pitt Island, 44°17'S, 176°14'W, C.H. Tripp, BMNH 1901.9.20.15-21; *Dolomedes trippi* syntype ♂, Pitt Island, 44°17'S, 176°14'W, C.H. Tripp, BMNH; 1 ♂, South East Island, 44°20.2'S, 176°10.3'W, 18 January 1997, J.W.M. Marris, LUNZ, 00012752; 1 ♂, South East Island, 44°21.0'S, 176°10.5'W, December 2005, E.S. Kennedy, LUNZ, 00012753; 1 ♂, South East Island, 44°21.0'S, 176°10.5'W, 31 January 2007, DoC staff, MONZ, AS.001398; 1 ♀, South East Island, 44°21.0'S, 176°10.5'W, 13 November 1961, I. Hogarth, MONZ, AS.001354; South East Island, 44°21.0'S, 176°10.5'W, 14 November 1961, I. Hogarth, MONZ, AS.001369; 1 ♀, South East Island, 44°21.0'S, 176°10.5'W, 6 February 2007, P.J. Sirvid, MONZ, AS.001394; South East Island, 44°21.0'S, 176°10.5'W, 6 February 2007, P.J. Sirvid, MONZ, AS.001395; 1 ♀, South East Island, 44°21.0'S, 176°10.5'W, 24 January 1983, E.R. Harty, OMNZ, IV31867.

Dolomedes dondalei

ND. 1 ♂ paratype, 1 immature, Kaitaia, 35°07'S, 173°16'E, 30 January 1981, R.R. Forster, OMNZ, IV31722. **CL.** 1 ♂ paratype, Whangapoua, 36°42.8'S, 175°36.0'E, 25 January 2000, CJV, LUNZ, 00012754; 1 subadult ♂, 1 subadult ♀, by creek 76, near Tapu-Coroglen Rd, 36°59'S, 175°36'E, November 1995, A. Styche, MONZ, AS.001341. **WO.** 1 subadult ♀, Te Rapa, 37°44.3'S, 175°14.8'E, 2 February 2009, B.N. McQuillan, LUNZ, 00012762; 1 ♀ paratype, Te Rapa, 37°44.3'S, 175°14.8'E, 2 March 2009, B.N. McQuillan, LUNZ, 00012763. **BP.** 1 immature, Waiorongoma Stream, 37°33.5'S, 175°45.4'E, 9 November 2008, J.C. Banks, LUNZ, 00012764. **GB.** 1 ♀ paratype, Marumaru, Possum Cave, 38°53'S, 177°28'E, December 1959, A. Morgrove, NZAC. **WA.** 1 subadult ♀, Waipoua River, 40°57.5'S, 175°40.5'E, 17 February 2009, A. McEwan, LUNZ, 00012765. **WN.** 1 immature, Mangaore Stream, 40°36.4'S, 175°26.1'E, 25 February 2009, A. McEwan, LUNZ, 00012766; 3 ♀ paratypes, Maungakotukutuku Valley, 40°56'S, 175°03'E, 27 February 1965, R.G. Ordish, MONZ, AS.001357; 1 ♂ paratype, Stokes Valley Creek, 41°11'S, 174°59'S, 1 March 2001, J.J. & I.R. Prentice, MONZ, AS.001348; 1 immature, Stokes Valley Creek, 41°11'S, 174°59'S, March 2001, B.M. Fitzgerald, MONZ, AS.001337; 1 ♂ paratype, Stokes Valley, 41°11.2'S, 174°58.77'E, May 1996, B.M. Fitzgerald, MONZ, AS.001330. **NN.** 1 subadult ♀, Oparara River, 41°12.668'S, 172°09.284'E, 9 December 2001, CJV, LUNZ, 00012755; 1 ♀ paratype, Karamea River, 41°14.910'S, 172°12.784'E, 8 December 2001, CJV, LUNZ, 00012756. **SD.** 1 subadult ♀, Otatara Bay, 41°04.8'S, 174°02.5'E, 23 January 2009, S.J. Crampton, LUNZ, 00012767; 1 ♂ paratype, Otatara Bay, 41°04.8'S, 174°02.5'E, 23 January 2009, S.J. Crampton, LUNZ, 00012768; 1 subadult ♀, Cullen Creek, 41°18.9'S, 173°51.25'E, 16 March 2002, CJV & S.J. Crampton, LUNZ, 00012757. **BR.** 1 subadult ♂, Metro Cave, Charleston, 41°55'S, 171°26'E, 2 September 1971, P.M. Johns, MONZ, AS.001327. **NC.** 1 ♀ paratype, Horsley Downs Road, near Hawarden, 42°55'S, 172°38'E, 18 March 2003, A. Heta, LUNZ, 00012758; 1 ♀, Genmark, 43°03.3'S, 172°45.5'E, 4 August 1960, F.M. Stoddart, CMNZ; 1 immature, Coopers Creek, 43°16.18'S, 172°05.56'E, 1 January 2010, CJV, NZAC. **MC.** allotype ♀, Kaituna Valley, 43°43'S, 172°45'E, 22 January 1995, V.A. Parr, LUNZ, 00012759; holotype ♂, Barrys Bay Valley, 43°45.265'S, 172°52.880'E, 24 January 2003, CJV, LUNZ, 00012760; 1 ♂ paratype, Narbey Stream, 43°49.5'S, 173°2.5'E, 1 April 1997, J.B. Ward, CMNZ. **SC.** 1 ♀ paratype, Gunns Bush, 44°39.8'S, 170°58.5'E, 15 April 1998, M.H. Bowie, LUNZ, 00012761. **OL.** 1 immature, near Cameron Flat, 44°28.8'S, 168°48.5'E, 2 January 1988, R.R. & L.M. Forster, OMNZ, IV31730. **DN.** 1 ♀ paratype, Taieri, 45°53'S, 170°15'E, 1 July 1979, J.E. Carico, OMNZ, IV31748; 1 ♀ paratype, Waipori River, 45°56'S, 170°04'E, 9 June 1967, Dunedin Training College, OMNZ, IV31838. **SL.** 1 ♀ paratype, Winton, 46°08.5'S, 168°19.5'E, 10 November 1981, W.M. Jukes, OMNZ, IV31746; 1 ♀ paratype, Owaka, 46°27'S, 169°39'E, 1 March 1995, M. Gunion, OMNZ, IV31724. **Unknown locality.** 1 ♀, OMNZ, IV31762.

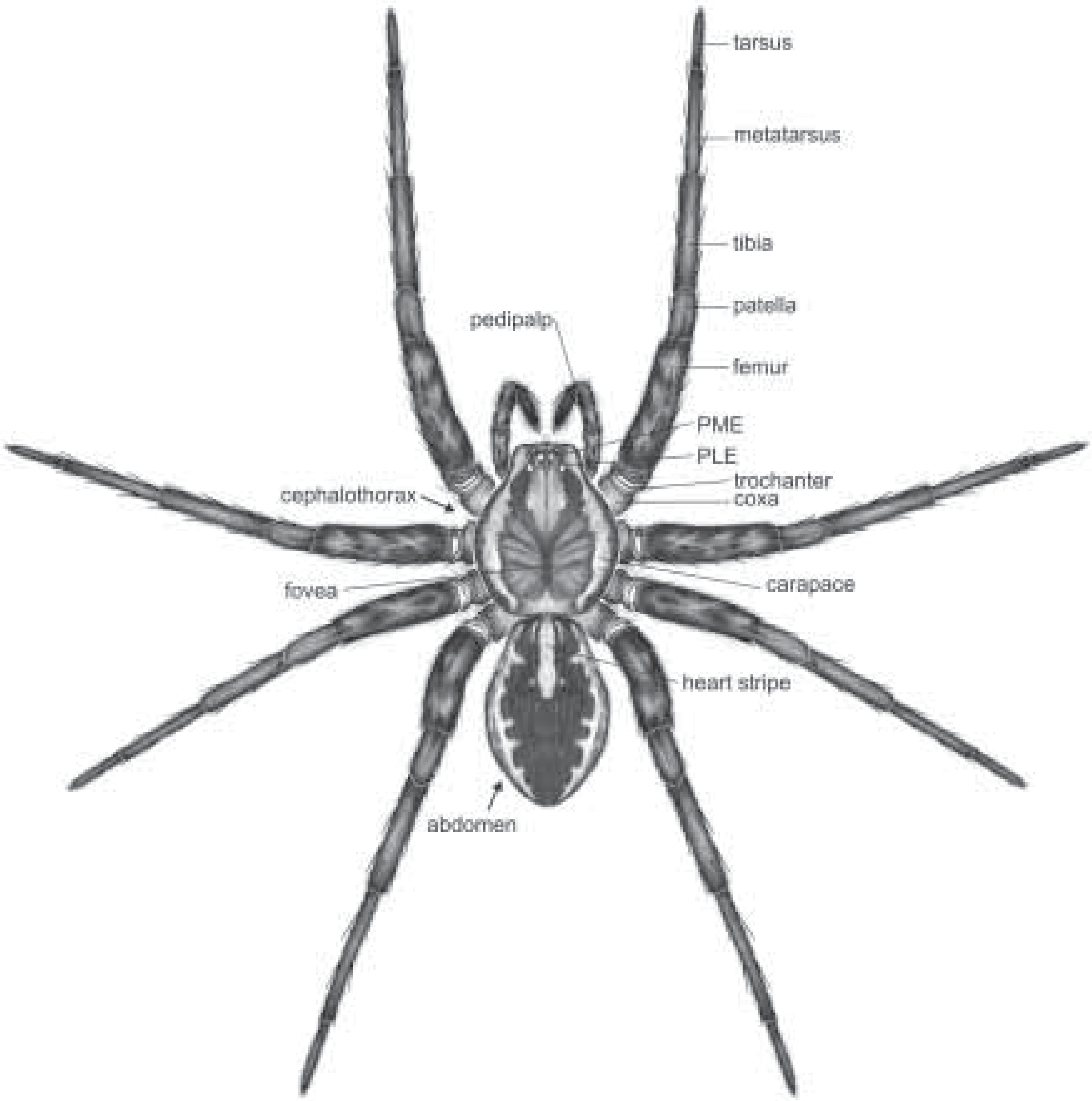


Fig. 1 Schematic dorsal view, *Dolomedes dondalei*, female (PLE – posterior lateral eye; PME – posterior median eye)

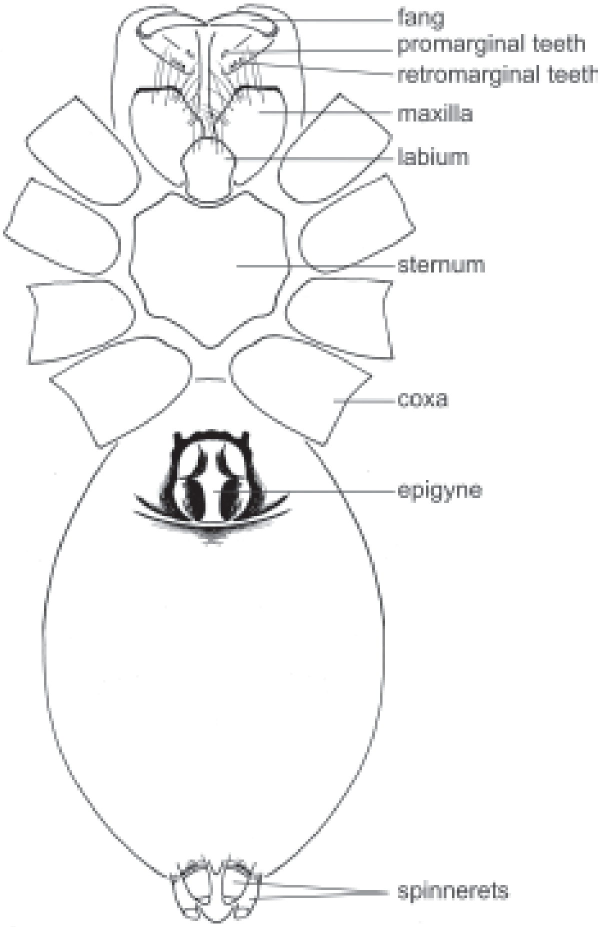


Fig. 2 Schematic ventral view, *Dolomedes dondalei*, female.

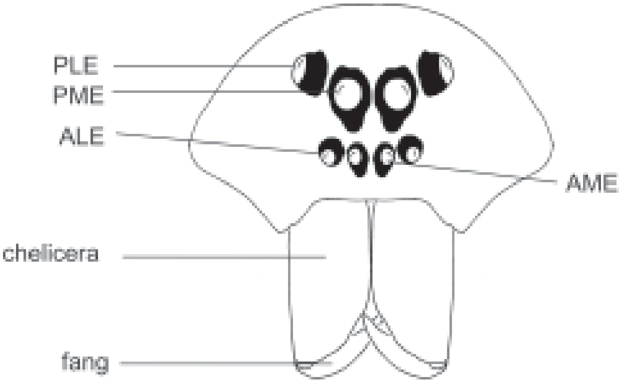
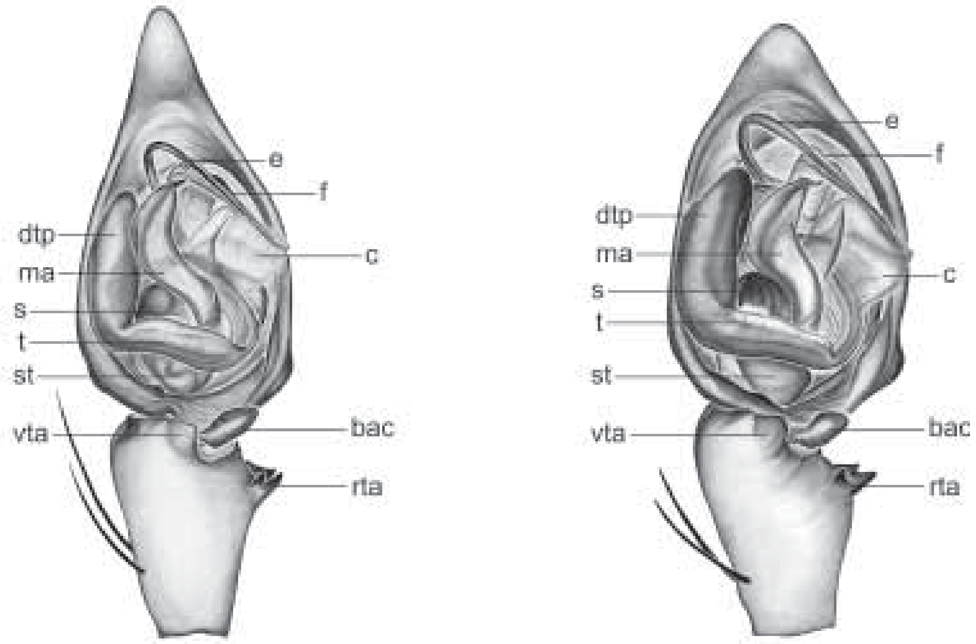
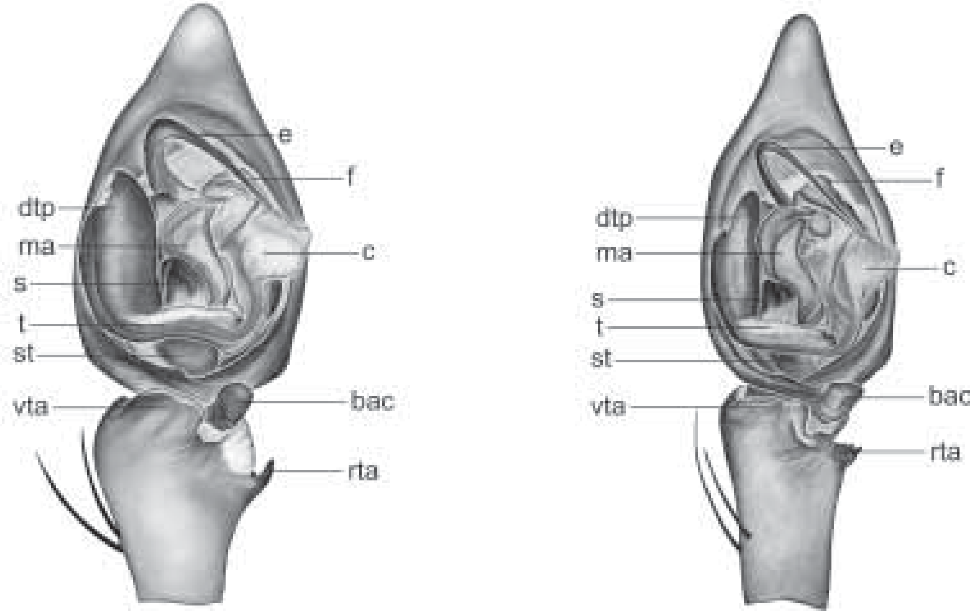


Fig 3 Anterior view of cephalothorax, *Dolomedes dondalei*, female (PLE – posterior lateral eye; PME – posterior median eye; ALE – anterior lateral eye; AME – anterior median eye).



(4) *Dolomedes minor*
MC, Hinewai Reserve

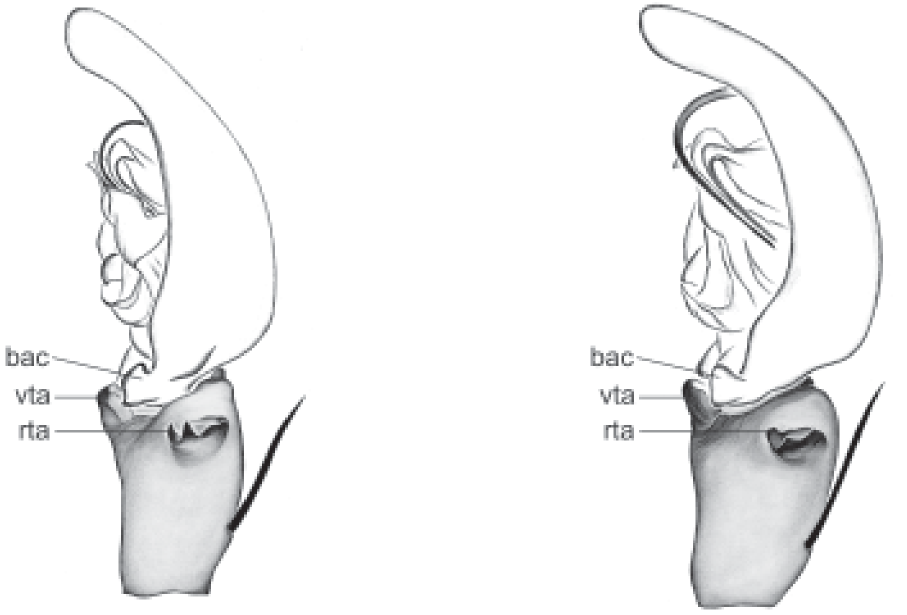
(5) *Dolomedes aquaticus*
OL, Eyre Creek



(6) *Dolomedes schauinslandi*
CH, South East Island

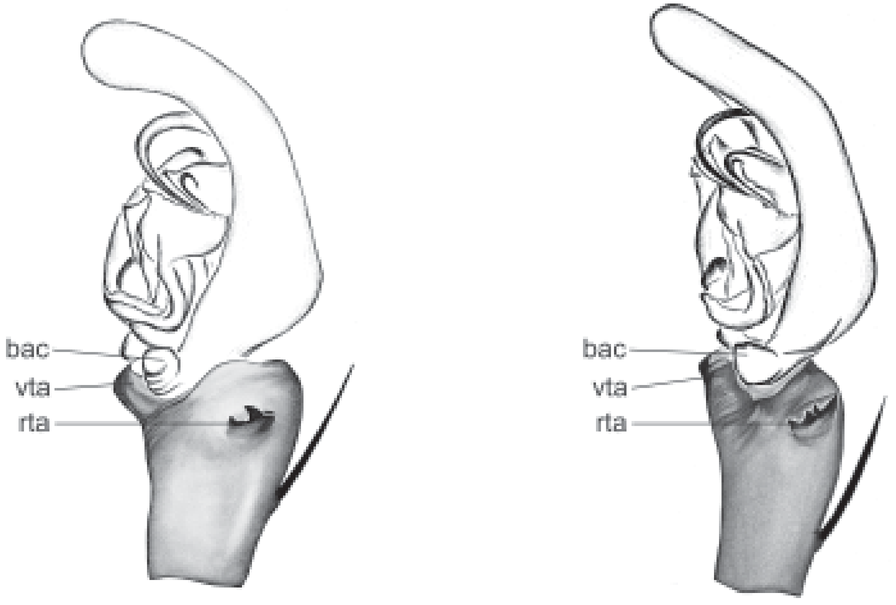
(7) *Dolomedes dondalei*
MC, Barrys Bay Valley

Fig. 4–7 Ventral view of left male pedipalps (e – embolus; f – fulcrum; t – tegulum; dtp – distal tegular projection; c – conductor; ma – median apophysis; s – saddle; st – subtegulum; bac – basal apophysis of the cymbium; vta – ventral tibial apophysis; rta – retrolateral tibial apophysis).



(8) *Dolomedes minor*
MC, Hinewai Reserve

(9) *Dolomedes aquaticus*
OL, Eyre Creek



(10) *Dolomedes schauinslandi*
CH, South East Island

(11) *Dolomedes dondalei*
MC, Barrys Bay Valley

Fig. 8–11 Retrolateral view of left male pedipalps (bac – basal apophysis of the cymbium; vta – ventral tibial apophysis; rta – retrolateral tibial apophysis).

(12) *Dolomedes minor* MC, Hinewai Reserve

(13) *Dolomedes minor* MC, Hinewai Reserve

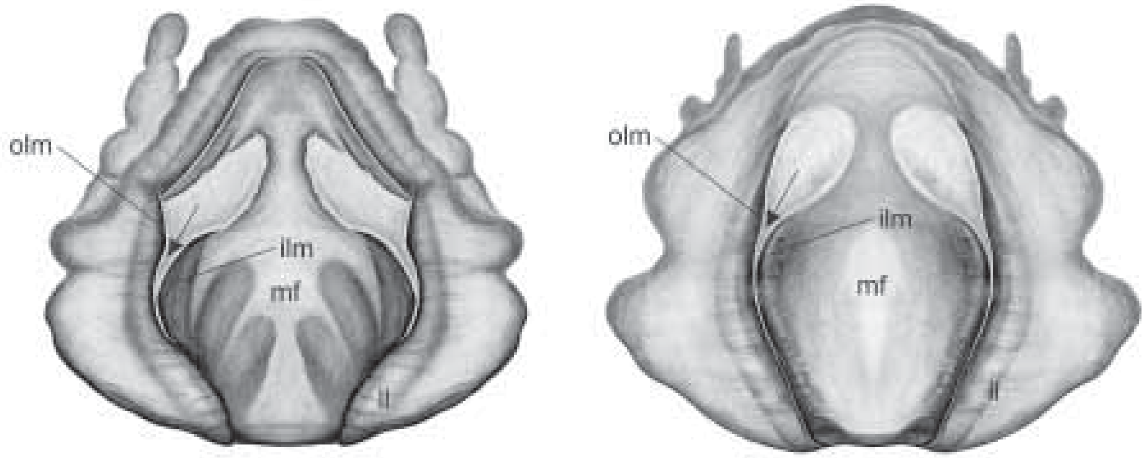
(14) *Dolomedes minor* CO, Millers Flat

(15) *Dolomedes minor* SC, Peel Forest

(16) *Dolomedes aquaticus* OL, Lake Hawea

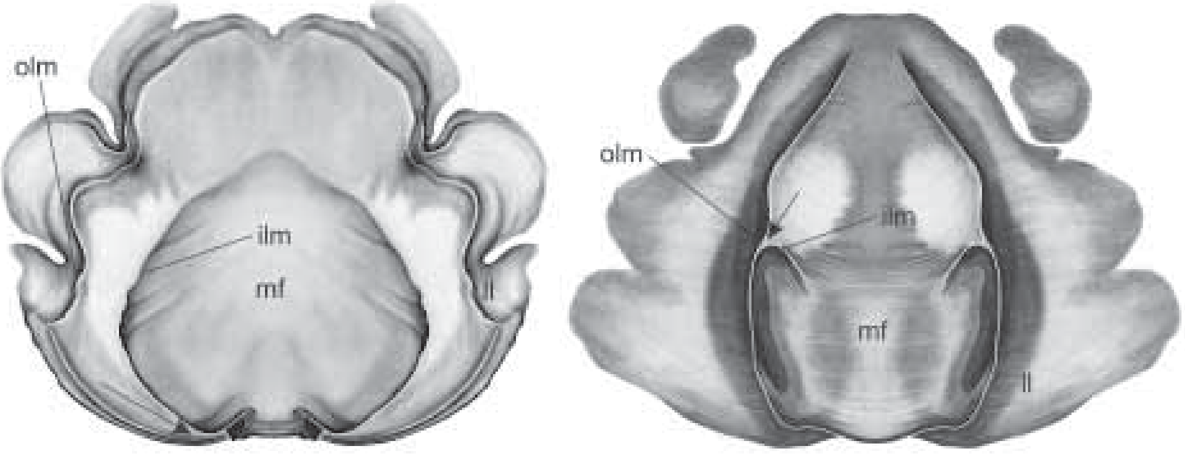
(17) *Dolomedes schauinslandi* CH, Mangere Island

Fig. 12–17 Retrolateral view of left male pedipalpal tibia, showing variation in the retrolateral tibial apophysis.



(18) *Dolomedes minor*
MC, Springston

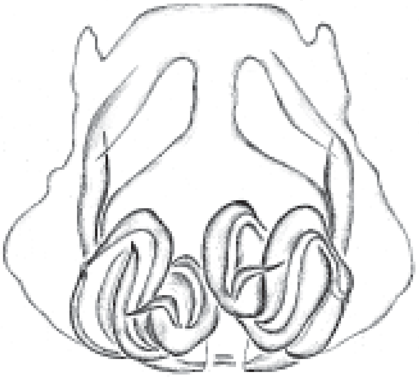
(19) *Dolomedes aquaticus*
SC, Gunns Bush



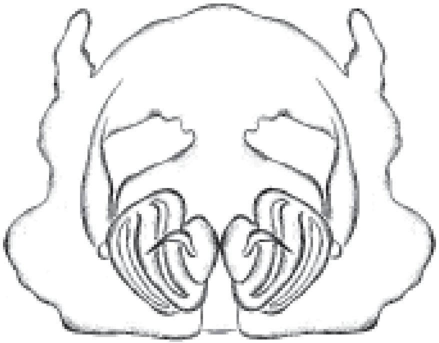
(20) *Dolomedes schauinslandi*
CH, Mangere Island

(21) *Dolomedes dondalei*
MC, Kaituna Valley

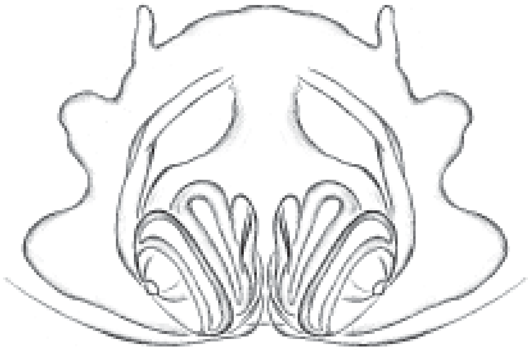
Fig. 18–21 Ventral view of epigynes (arrow – epigynal fold and opening to copulatory duct; mf – middle field; ll – lateral lobe; olm – outer lateral margin; ilm – internal lateral margin).



(22a) *Dolomedes minor*
MC, Springston

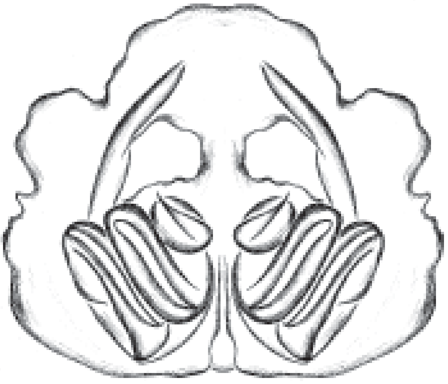


(22b) *Dolomedes minor*
AK, near Cornwallis



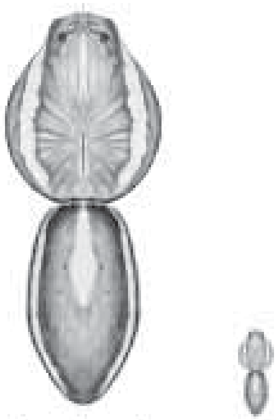
(23) *Dolomedes aquaticus*
SC, Gunns Bush

(24) *Dolomedes schauinslandi*
CH, Mangere Island

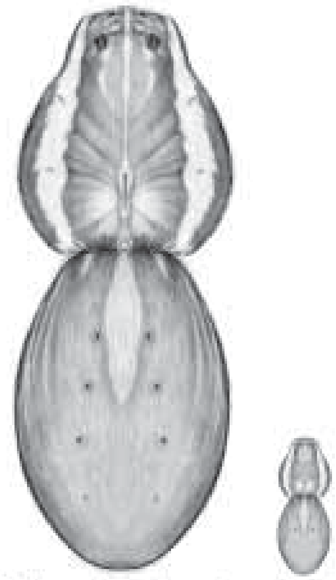


(25) *Dolomedes dondalei*
MC, Kaituna Valley

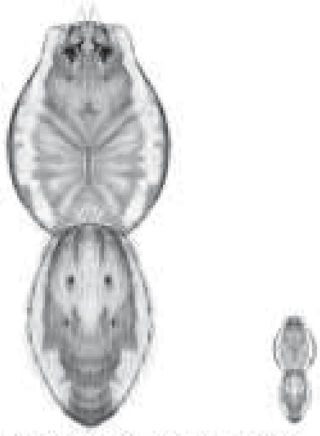
Fig. 22–25 Epigyna, cleared to show internal genitalia; 22a–b show variation in *Dolomedes minor*.



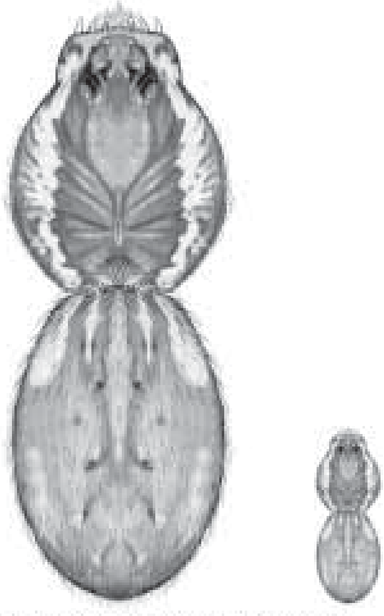
(26) *Dolomedes minor*, male
MC, Hinewai Reserve



(27) *Dolomedes minor*, female
MC, Springston

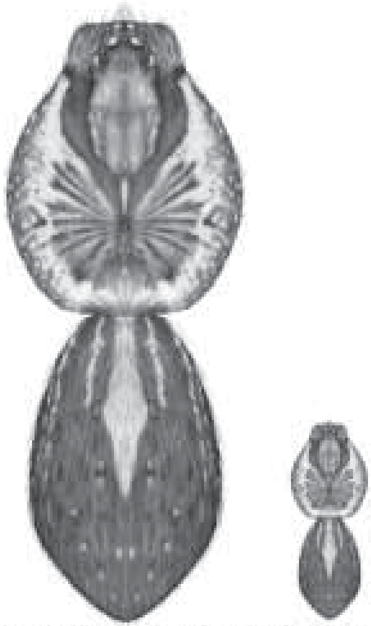


(28) *Dolomedes aquaticus*, male
OL, Eyre Creek



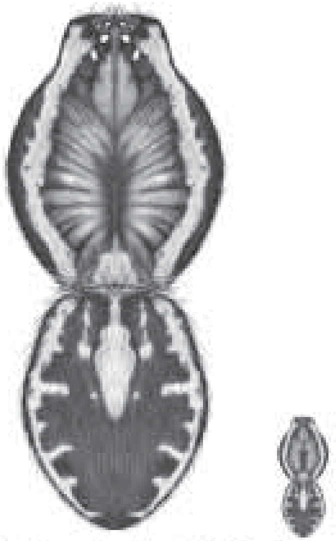
(29) *Dolomedes aquaticus*, female
SC, Gunns Bush

Fig. 26–33 Habitus images of Pisauridae known from New Zealand. Actual size on the right.

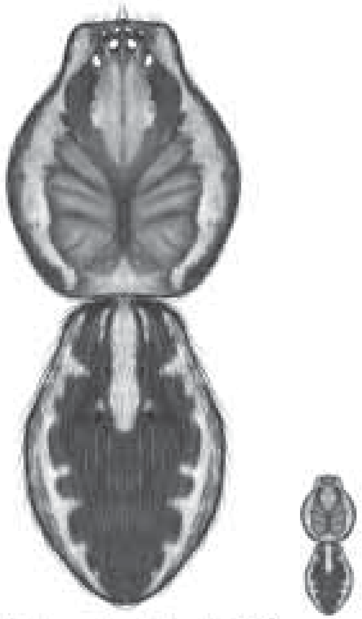


(30) *Dolomedes schauinslandi*, male
CH, South East Island

(31) *Dolomedes schauinslandi*, female
CH, Mangere Island



(32) *Dolomedes dondalei*, male
MC, Barrys Bay Valley



(33) *Dolomedes dondalei*, female
MC, Kaituna Valley

(34) *Dolomedes minor*

(35) *Dolomedes minor*

Fig. 34, 35 Photographs of *Dolomedes minor*. 34, female; with eggsac (photographer: Bryce McQuillan); 35, female guarding nurseryweb (photographer: Matthew Crampton).

(36) *Dolomedes aquaticus*

(37) *Dolomedes aquaticus*

Fig. 36, 37 Photographs of *Dolomedes aquaticus*. 36, female with legs on water surface (photographer: Alton Perrie); 37, female under water (photographer: Matthew Crampton).

(38) *Dolomedes schauinslandi*

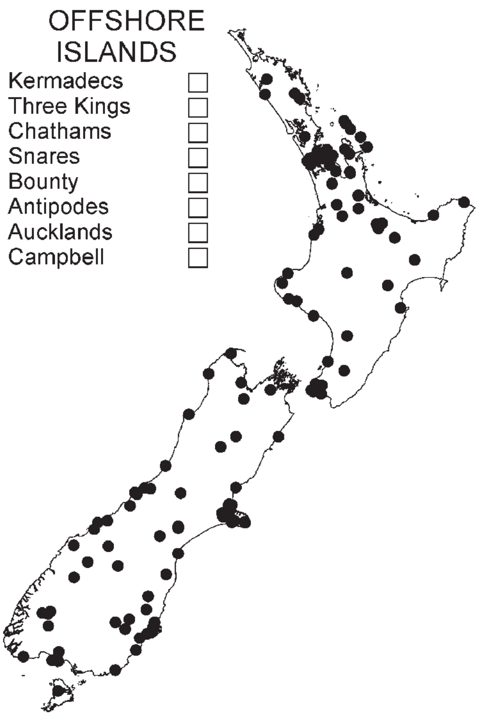
(39) *Dolomedes schauinslandi*

Fig. 38, 39 Photographs of *Dolomedes schauinslandi*. 38, female with eggsac (photographer: John Marris); 39, female guarding nurseryweb (photographer: Euan Kennedy).

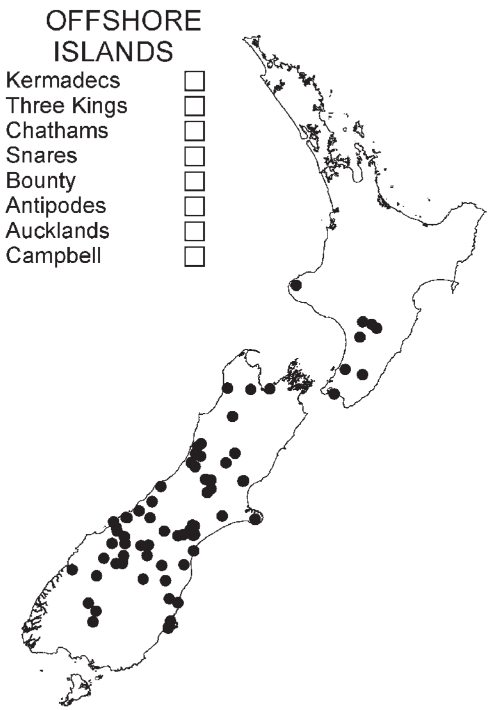
(40) *Dolomedes dondalei*

(41) *Dolomedes dondalei*

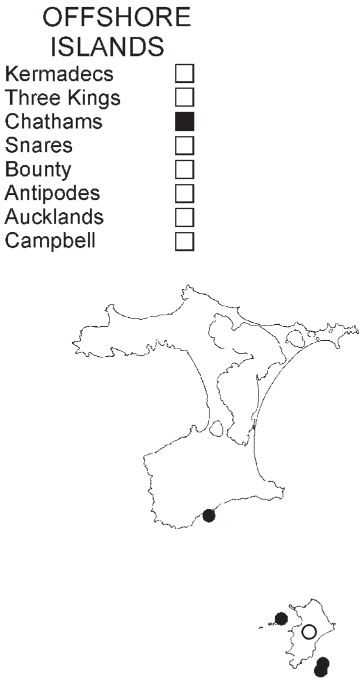
Fig. 40, 41 Photographs of *Dolomedes dondalei*. 40, female with legs on water surface (photographer: Bryce McQuillan); 41, female (photographer: Bryce McQuillan).



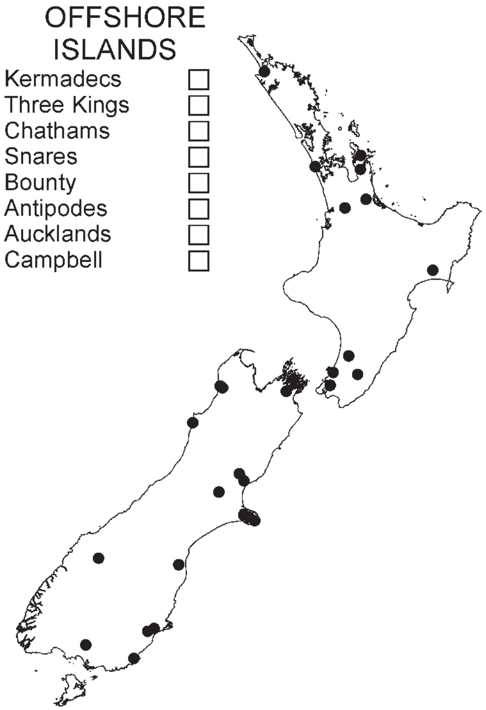
Map 1 Collection localities, *Dolomedes minor*.



Map 2 Collection localities, *Dolomedes aquaticus*.



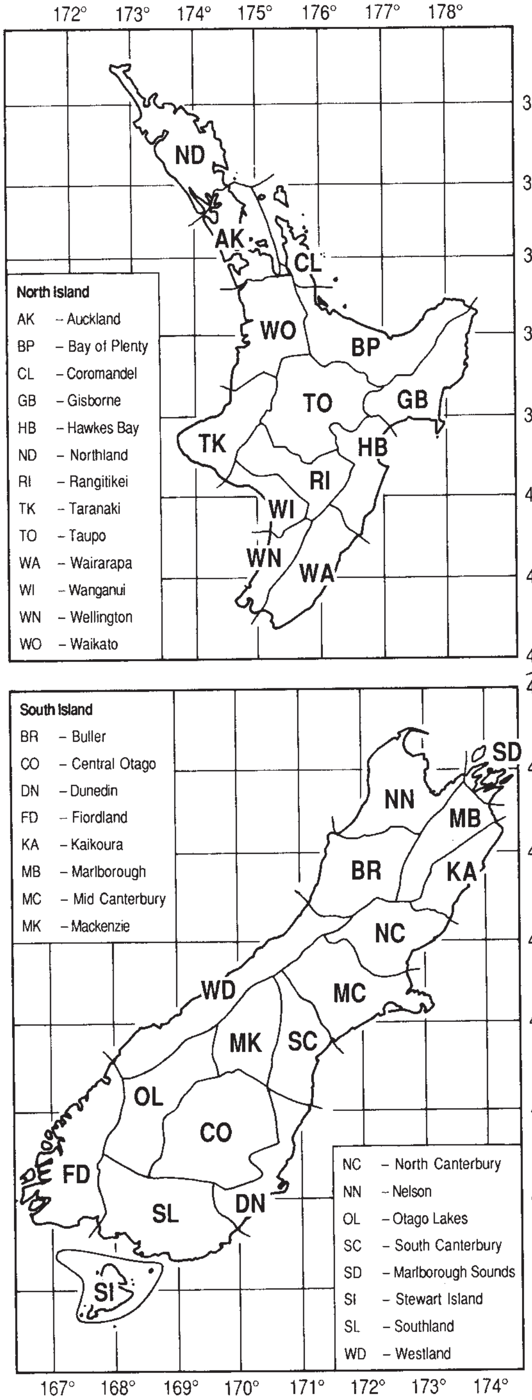
Map 3 Collection localities, *Dolomedes schauinslandi*, open circle denotes historical locality.



Map 4 Collection localities, *Dolomedes dondalei*.

Taxonomic index

Page numbers in **bold** type denote a description, and in italic type illustrations. A suffixed letter 'k' indicates a key, and 'm' a map.



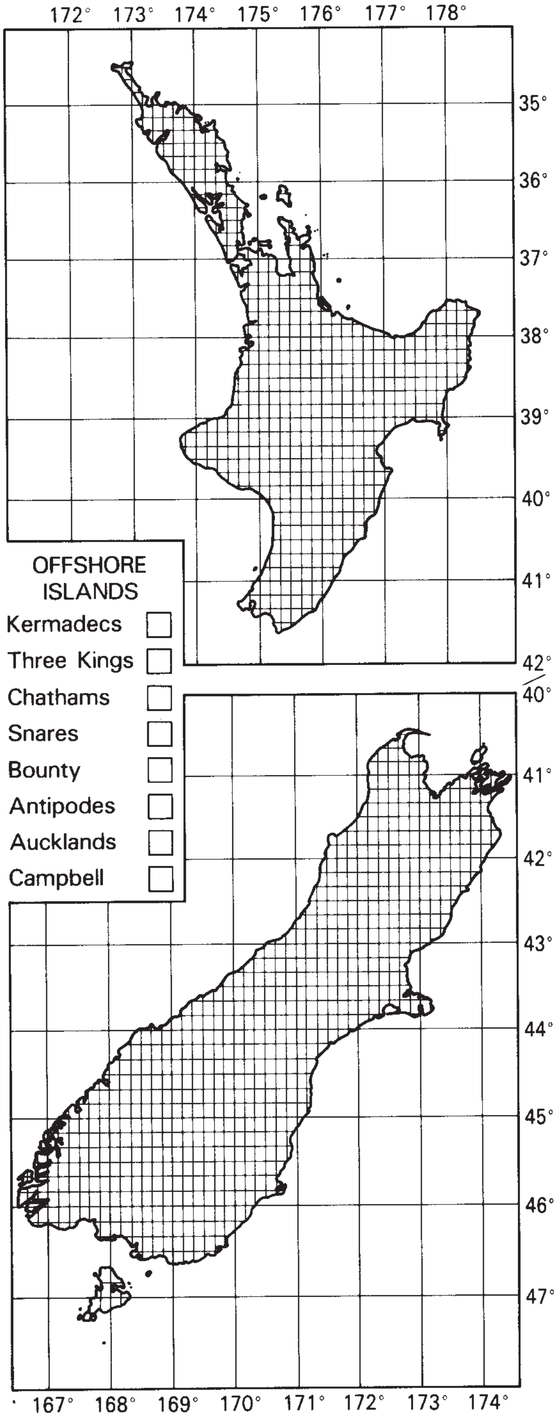
North Island

AK	– Auckland
BP	– Bay of Plenty
CL	– Coromandel
GB	– Gisborne
HB	– Hawkes Bay
ND	– Northland
RI	– Rangitikei
TK	– Taranaki
TO	– Taupo
WA	– Wairarapa
WI	– Wanganui
WN	– Wellington
WO	– Waikato

South Island

BR	– Buller
CO	– Central Otago
DN	– Dunedin
FD	– Fiordland
KA	– Kaikoura
MB	– Marlborough
MC	– Mid Canterbury
MK	– Mackenzie
NC	– North Canterbury
NN	– Nelson
OL	– Otago Lakes
SC	– South Canterbury
SD	– Marlborough Sounds
SI	– Stewart Island
SL	– Southland
WD	– Westland

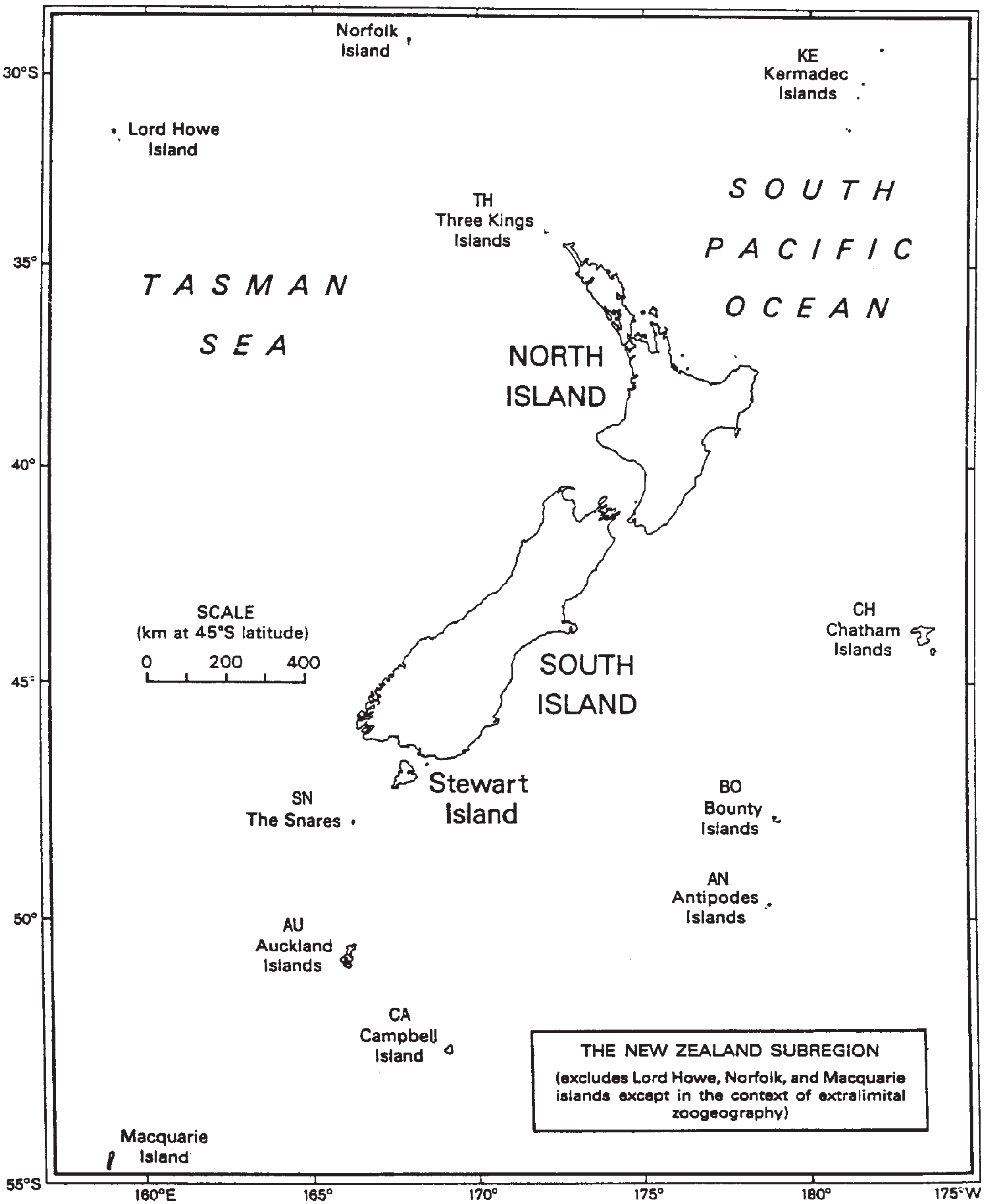
Area codes and boundaries used to categorise specimen locality data (after Crosby *et al.* 1976)



OFFSHORE ISLANDS

Kermadecs ☐
Three Kings ☐
Chathams ☐
Snares ☐
Bounty ☐
Antipodes ☐
Aucklands ☐
Campbell ☐

Base-map for plotting collection localities; this may be photocopied without copyright release



The New Zealand subregion with area codes (from Crosby *et al.* 1998).

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Ka āhei te tangata ki te **whakauru tuhituhinga** mehemea kei a ia ngā tohungatanga me ngā rauemi e tutuki pai ai tana mahi. Heoi anō, e wātea ana te Kohinga Angawaho o Aotearoa hei āta tirotiro mā te tangata mehemea he āwhina kei reira.

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Ko te hunga pīrangi **hoko pukapuka**, me tuhi ki *Fauna of N.Z.*, Manaaki Whenua Press, Manaaki Whenua, Pouaka Poutāpeta 40, Lincoln 8152, Aotearoa.

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Te utu (tirohia "Titles in print", whārangi 57). Ko te kōpaki me te pane kuini kei roto i te utu. Me utu te hunga e noho ana i Aotearoa me Ahitereiria ki ngā tāra o Aotearoa. Ko ētahi atu me utu te moni kua tohua, ki ngā tāra Merikana, ki te nui o te moni rānei e rite ana.

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