### Māwhitiwhiti Aotearoa: Phylogeny and synonymy of the silent alpine grasshopper radiation of New Zealand (Orthoptera: Acrididae)

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Supplementary material

|  |  |  |  |  |  |  |  |
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| ***Genus*** | ***Species*** | **Code** | **Location** | **type** | **GenBank** | **Latitude** | **Longitude** |
| *Paprides* | *nitidus* | CA300 | Sugar Loaf | cox1 | AY042364 | -43.036399 | 171.785231 |
|  |  | PN7 | Mt Fyffe | cox1 | AY042368 | -42.318320 | 173.599091 |
|  |  | PN8 | Lewis Pass Tops | cox1 | AY042369 | -42.380485 | 172.388277 |
|  |  | PN33 | Mt Peel | cox1 | AY042367 | -41.142015 | 172.593412 |
|  |  | PN128 | Fog Peak | cox1 | AY042366 | -43.284579 | 171.748238 |
|  |  | PN368 | Mt Terako | cox1 | AY042365 | -42.445438 | 173.145733 |
|  |  | PN369 | Mt Terako | cox1 | OQ629726 | -42.445438 | 173.145733 |
|  |  | GH107 | Red Spur, Inland Kaikoura Ra. | cox1 | OQ629727 | -41.963064 | 173.752899 |
|  |  | GH1407 | Hamilton Pk | mito | MN25311 | -43.109192 | 171.698112 |
|  |  | GH3540 | Rainbow skifield | cox1 | OQ629725 | -41.867995 | 172.859745 |
|  |  |  |  |  |  |  |  |
| *Sigaus* | *minutus* | SM5 | Tekapo | cox1 | OQ629732 | -43.964156 | 170.525665 |
|  |  | GH31 | Tekapo terrace | cox1 | OQ629730 | -43.964156 | 170.525665 |
|  |  | GH32 | Ahuriri | cox1 | OQ629731 |  |  |
|  |  | GH433 | Edward Stream | mito | MN25311 | -44.043180 | 170.522747 |
|  |  | GH3037 | Edward Stream | cox1 | OQ629729 | -44.043180 | 170.522747 |
|  |  | GH3023 | L. Tekapo east | cox1 | OQ629728 | -43.964156 | 170.525665 |
|  |  |  |  |  |  |  |  |
| *Paprides* | *dugdali* | PD87 | Mt Teviot | cox1 | AY042361 | -45.590618 | 169.536037 |
|  |  | PD206 | Maungatua | cox1 | AY042360 | -45.876834 | 170.123892 |
|  |  | PD387 | Blue Mnts | cox1 | AY042362 | -45.905778 | 169.373646 |
|  |  | PD115 | Summit Rock | cox1 | AY042363 | -45.425480 | 170.070860 |
|  |  | GH830 | Mt Teviot | mito | MN253110 | -45.590618 | 169.536037 |
|  |  | GH2118 | Tin Range | cox1 | OQ629733 | -47.119640 | 167.758300 |
|  |  | GH2119 | Tin Range | cox1 | OQ629734 | -47.119640 | 167.758300 |
|  |  |  |  |  |  |  |  |
| *Alpinacris* | *crassicauda* | AC24 | Mt Roberts | cox1 | OQ629741 | -41.830497 | 172.811337 |
|  |  | AC25 | Mt Peel | mito | MN253105 | -41.142015 | 172.593412 |
|  |  | AC26 | Mt Peel | cox1 | OQ629736 | -41.142015 | 172.593412 |
|  |  | AC28 | Mt Peel | cox1 | AY042337 | -41.142015 | 172.593412 |
|  |  | AC147 | Mt Roberts | cox1 | OQ629743 | -41.830497 | 172.811337 |
|  |  | AC149 | Mt Roberts | cox1 | AY042338 | -41.830497 | 172.811337 |
|  |  | GH748 | Denniston Plateau | cox1 | OQ629737 | -41.749319 | 171.792526 |
|  |  | GH749 | Denniston Plateau | mito | MN253103 | -41.749319 | 171.792526 |
|  |  | GH2309 | Mount McRae, St Arnaud Range | cox1 | OQ629742 | -41.867995 | 172.859745 |
|  |  | GH2311 | Mount McRae, St Arnaud Range | cox1 | OQ629739 | -41.867995 | 172.859745 |
|  |  | GH2622 | Denniston Plateau | cox1 | OQ629738 | -41.749319 | 171.792526 |
|  |  | GH3547 | Mt Arthur | cox1 | OQ629744 | -41.211076 | 172.700615 |
|  |  | GH3550 | Mt Arthur | cox1 | OQ629740 | -41.211076 | 172.700615 |
|  |  |  |  |  |  |  |  |
| *Alpinacris* | *tumidicauda* | AT9 | Old Man Ra. | cox1 | AY042334 | -45.32306 | 169.207140 |
|  |  | AT257 | Carrick Ra. | cox1 | AY042335 | -45.164248 | 169.074268 |
|  |  | AT258 | Carrick Ra. | cox1 | OQ629695 | -45.164248 | 169.074268 |
|  |  | AT264 | Carrick Ra. | cox1 | OQ629692 | -45.164248 | 169.074268 |
|  |  | AT403 | Borland Saddle | cox1 | AY042336 | -45.744048 | 167.372761 |
|  |  | GH1222 | Mt Cardrona | cox1 | OQ629696 | -44.871808 | 168.943634 |
|  |  | GH1223 | Mt Cardrona | cox1 | OQ629688 | -44.871808 | 168.943634 |
|  |  | GH1234 | Mt Cardrona | cox1 | OQ629693 | -44.871808 | 168.943634 |
|  |  | GH1295 | Mt Cardrona | mito | MN253104 | -44.871808 | 168.943634 |
|  |  | GH2700 | Mt Pisa | cox1 | OQ629699 | -44.87207 | 169.190790 |
|  |  | GH2772 | Old Woman Ra. | cox1 | OQ629689 | -45.208408 | 169.076500 |
|  |  | GH3504 | Umbrella Mnts | cox1 | OQ629691 | -45.574519 | 169.101734 |
|  |  | GH3516 | Mt Luxmore | cox1 | OQ629690 | -45.38617 | 167.590460 |
|  |  | GH3517 | Mt Luxmore | cox1 | OQ629697 | -45.38617 | 167.590460 |
|  |  | GH2699 | Mt Pisa | cox1 | OQ629694 | -44.87207 | 169.190790 |
|  |  | GH1220 | Mt Cardrona | cox1 | OQ629698 | -44.871808 | 168.943634 |
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| *Brachaspis* | *collinus* | BC3 | Lewis Pass Tops | cox1 | AY042373 | -42.380485 | 172.388277 |
|  |  | BC48 | Mt Robert | cox1 | AY042370 | -41.830497 | 172.811337 |
|  |  | BC311 | Mt Terako | cox1 | AY042371 | -42.445438 | 173.145733 |
|  |  | BC314 | Mt Patriarch | cox1 | OQ629747 | -41.604918 | 173.235083 |
|  |  | BC334 | Mt Terako | cox1 | AY042372 | -42.445438 | 173.145733 |
|  |  | BC401 | Mt Peel | cox1 | OQ629746 | -41.142015 | 172.593412 |
|  |  | BC402 | Mt Peel | cox1 | OQ629745 | -41.142015 | 172.593412 |
|  |  | GH1405 | Rainbow skifield | mito | MN253106 | -41.867995 | 172.859745 |
|  |  | GH4369 | Temple Basin | cox1 | OQ804198 | -42.907010 | 171.579410 |
|  |  | GH4370 | Temple Basin | cox1 | OQ804199 | -42.907010 | 171.579410 |
|  |  | GH4368 | Temple Basin | cox1 | OQ804200 | -42.907010 | 171.579410 |
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| *Brachaspis* | *nivalis sth* | BN1 | St Bathans | cox1 | AY042380 | -44.779520 | 169.796276 |
|  |  | BN2 | Tekapo River | cox1 | AY042386 | -44.038244 | 170.450821 |
|  |  | BN202 | Rocky Top | cox1 | AY042387 | -44.773488 | 170.301476 |
|  |  | BN204 | Rocky Top | cox1 | AY042382 | -44.773488 | 170.301476 |
|  |  | BN265 | Mt Sutton | cox1 | AY042389 | -44.222383 | 169.772673 |
|  |  | BN266 | Mt Sutton | cox1 | AY042390 | -44.222383 | 169.772673 |
|  |  | BN301 | Dobson Pk | cox1 | AY042385 | -43.94369 | 170.664050 |
|  |  | BN319 | Rocky Top | cox1 | AY042383 | -44.773488 | 170.301476 |
|  |  | BN321 | Rocky Top | cox1 | AY042384 | -44.773488 | 170.301476 |
|  |  | BN324 | Rocky Top | cox1 | AY042381 | -44.773488 | 170.301476 |
|  |  | GH52 | Hunter Hills | cox1 | OQ629724 | -44.550112 | 170.848732 |
|  | *nth* | BN108 | Fog Pk | cox1 | AY042374 | -43.284579 | 171.748238 |
|  |  | BN165 | Arrowsmith | cox1 | AY042376 | -43.359960 | 170.976260 |
|  |  | GH100 | Red Spur, Inland Kaikoura Ra. | cox1 | OQ629771 | -41.963064 | 173.752899 |
|  |  | GH101 | Dee Stream, Inland Kaikoura Ra. | cox1 | OQ629768 | **-**41.998510 | 173.719050 |
|  |  | BN332 | Mt Terako | cox1 | AY042377 | -42.445438 | 173.145733 |
|  |  | BN333 | Mt Terako | cox1 | AY042379 | -42.445438 | 173.145733 |
|  |  | BN335 | Mt Terako | cox1 | AY042378 | -42.445438 | 173.145733 |
|  |  | GH51 | Porter River | cox1 | OQ629769 | -43.28954 | 171.648420 |
|  |  | GH105 | Red Spur, Inland Kaikoura Ra. | cox1 | OQ629770 | -41.963064 | 173.752899 |
|  |  | GH1371 | Fox Pk | mito | MN253107 | -43.850189 | 170.802212 |
|  |  | GH1404 | Mt Hutt | mito | MN253108 | -43.490292 | 171.539154 |
|  |  | GH3538 | Hamilton Pk, Craigieburn Ra. | mito | OQ629767 | -43.109192 | 171.698112 |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| *Sigaus* | *piliferus* | GH4 | Te Araroa | cox1 | OQ629718 | -37.694688 | 178.455048 |
|  |  | GH5 | Aniwaniwa, L. Waikaremoana | mito | MN253120 | -38.746252 | 177.161965 |
|  |  | GH6 | Te Araroa | cox1 | OQ629712 | -37.694688 | 178.455048 |
|  |  | GH7 | Sunset ridge, Mt Ruapehu | cox1 | OQ629705 | -39.304351 | 175.530281 |
|  |  | GH11 | Sunset ridge, Mt Ruapehu | cox1 | OQ629720 | -39.304351 | 175.530281 |
|  |  | GH16 | Rangipo | cox1 | OQ629719 | -39.374649 | 175.729408 |
|  |  | GH26 | Pirongia mountain, Waikaato | cox1 | OQ629709 | -37.99281 | 175.097940 |
|  |  | GH27 | Whenuakura plain, Pureora | cox1 | OQ629723 | -38.789683 | 175.605469 |
|  |  | GH28 | Whenuakura flat | cox1 | OQ629704 | -38.789683 | 175.605469 |
|  |  | GH34 | Makahu Spur, Kaweka Ra. | cox1 | OQ629721 | -39.27971 | 176.389090 |
|  |  | GH41 | Makahu Spur, Kaweka Ra. | cox1 | OQ629701 | -39.27971 | 176.389090 |
|  |  | GH44 | Whanahuia Ra. | cox1 | OQ629711 | -39.897489 | 176.049986 |
|  |  | GH45 | Whanahuia Ra. | cox1 | OQ629703 | -39.897489 | 176.049986 |
|  |  | GH46 | Whanahuia Ra. | cox1 | OQ629710 | -39.897489 | 176.049986 |
|  |  | GH57 | Mt Holdsworth | cox1 | OQ629713 | -40.871079 | 175.423594 |
|  |  | GH59 | Mt Holdsworth | cox1 | OQ629706 | -40.871079 | 175.423594 |
|  |  | GH60 | Mt Holdsworth | mito | MN253119 | -40.871079 | 175.423594 |
|  |  | GH61 | Mt Holdsworth | cox1 | OQ629714 | -40.871079 | 175.423594 |
|  |  | GH70 | Aniwaniwa, L. Waikaremoana | cox1 | OQ629707 | -38.746252 | 177.161965 |
|  |  | GH94 | Arete | cox1 | OQ629708 | -40.74652 | 175.433820 |
|  |  | GH95 | Arete | cox1 | OQ629702 | -40.74652 | 175.433820 |
|  |  | GH97 | Arete | cox1 | OQ629717 | -40.74652 | 175.433820 |
|  |  | GH110 | Karioi | cox1 | OQ629722 | -37.86485 | 174.801710 |
|  |  | GH716 | Sunset ridge, Mt Ruapehu | cox1 | OQ629715 | -39.304351 | 175.530281 |
|  |  | GH732 | Sunset ridge, Mt Ruapehu | cox1 | OQ629700 | -39.304351 | 175.530281 |
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| *Sigaus* | *campestris* | SC74 | Old Man Ra. | cox1 | OQ629760 | -45.32306 | 169.207140 |
|  |  | SC78 | Old Man Ra. | cox1 | OQ629754 | -45.32306 | 169.207140 |
|  |  | SC79 | Maungatua | cox1 | OQ629755 | -45.876834 | 170.123892 |
|  |  | SC81 | Maungatua | cox1 | OQ629762 | -45.876834 | 170.123892 |
|  |  | SC125 | Danseys Pass | cox1 | OQ629764 | -44.95301 | 170.372480 |
|  |  | SC176 | Flagstaff, Dunedin | cox1 | OQ629763 | -45.831072 | 170.470648 |
|  |  | SC191 | Old Man Ra. | cox1 | OQ629766 | -45.32306 | 169.207140 |
|  |  | SC280 | Mt Ida | cox1 | OQ629750 | -44.950160 | 170.121746 |
|  |  | SC392 | Dobson Pk | cox1 | OQ629765 | -43.94369 | 170.664050 |
|  |  | GH285 | Old Woman Ra. | cox1 | OQ629749 | -45.208408 | 169.076500 |
|  |  | GH1036 | Lake Tekapo | mito | MN253118 | -43.964156 | 170.525665 |
|  |  | GH1474 | Lake Pukaki | cox1 | OQ629752 | -44.180357 | 170.161915 |
|  |  | GH1799 | Fox Pk | cox1 | OQ629758 | -43.850189 | 170.802212 |
|  |  | GH1807 | Fox Pk | cox1 | OQ629759 | -43.850189 | 170.802212 |
|  |  | GH3027 | Burkes Pass | cox1 | OQ629756 | -44.091531 | 170.606689 |
|  |  | GH3028 | Burkes Pass | cox1 | OQ629757 | -44.091531 | 170.606689 |
|  |  | GH3029 | Burkes Pass | cox1 | OQ629761 | -44.091531 | 170.606689 |
|  |  | GH4072 | Port Hills, Chch | cox1 | OQ629753 | -43.608643 | 172.644095 |
|  |  | GH4073 | Port Hills, Chch | cox1 | OQ629751 | -43.608643 | 172.644095 |
|  |  | GH4380 | Swampy Summit, DN | cox1 | OQ804201 | -45.801371 | 170.488544 |
|  |  | GH4379 | Swampy Summit, DN | cox1 | OQ804202 | -45.801371 | 170.488544 |
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| *Sigaus* | *australis* | SA12 | Conical Hill | cox1 | EF544548 | -44.722040 | 168.169699 |
|  |  | SA13 | Kakanui Pk | cox1 | EF544532 | -45.138219 | 170.433311 |
|  |  | SA35 | Mt St Bathans | cox1 | EF544538 | -44.779520 | 169.796276 |
|  |  | SA37 | Mt St Bathans | cox1 | KM576268 | -44.779520 | 169.796276 |
|  |  | SA57 | Danseys Pass | cox1 | EF544530 | -44.95301 | 170.372480 |
|  |  | SA67 | Danseys Pass | cox1 | EF544535 | -44.95301 | 170.372480 |
|  |  | SA70 | Danseys Pass | cox1 | EF544536 | -44.95301 | 170.372480 |
|  |  | SA73 | Lake Harris | cox1 | OQ629773 | -44.728199 | 168.180599 |
|  |  | SA110 | Summit Rock | cox1 | EF544529 | -45.425480 | 170.070860 |
|  |  | SA174 | Flagstaf, Dunedin | cox1 | EF544531 | -45.831072 | 170.470648 |
|  |  | SA183 | Little Valley Rd | cox1 | EF544554 | -45.259603 | 169.431324 |
|  |  | SA251 | Carrick Ra. | cox1 | EF544544 | -45.164248 | 169.074268 |
|  |  | SA274 | Mt Sutton | cox1 | EF544539 | -44.222383 | 169.772673 |
|  |  | SA277 | Sealy Tarns | cox1 | EF544524 | -43.714449 | 170.073595 |
|  |  | SA288 | Sealy Tarns | cox1 | EF544525 | -43.714449 | 170.073595 |
|  |  | SA291 | Mt Sutton | cox1 | EF544542 | -44.222383 | 169.772673 |
|  |  | SA292 | Mt Sutton | cox1 | EF544560 | -44.222383 | 169.772673 |
|  |  | SA340 | Dobsonn Pk | cox1 | EF544523 | -43.94369 | 170.664050 |
|  |  | SA347 | Rocky Top | cox1 | EF544537 | -44.773488 | 170.301476 |
|  |  | SA351 | Rocky Top | cox1 | EF544543 | -44.773488 | 170.301476 |
|  |  | SA360 | L Alta | cox1 | EF544527 | -45.061942 | 168.815145 |
|  |  | GH48 | Mt Aspiring | cox1 | OQ629777 | -44.507953 | 168.817720 |
|  |  | GH1387 | Mount Hutt | mito | MN253117 | -43.490292 | 171.539154 |
|  |  | GH3167 | Summit Rock | mito | OQ804204 | -45.425480 | 170.070860 |
|  |  | GH245 | Alexandra airport | cox1 | KM576289 | -45.212762 | 169.372787 |
|  |  | GH246 | Alexandra airport | cox1 | OQ629787 | -45.212762 | 169.372787 |
|  |  | GH254 | Lake Alta | cox1 | KM576257 | -45.061942 | 168.815145 |
|  |  | GH255 | Lake Alta | cox1 | KM576255 | -45.061942 | 168.815145 |
|  |  | GH267 | Lake Alta | cox1 | KM576259 | -45.061942 | 168.815145 |
|  |  | GH4378 | Swampy Summit, DN | cox1 | OQ804203 | -45.801371 | 170.488544 |
|  | *childi* | SCH179 | Earnscleugh tailings | cox1 | OQ629788 | -45.232410 | 169.359140 |
|  | *childi* | SCH201 | Little Valley Rd | cox1 | OQ629772 | -45.259603 | 169.431324 |
|  | *childi* | SCH388 | Earnscleugh tailings | cox1 | OQ629782 | -45.232410 | 169.359140 |
|  | *childi* | GH93 | Earnscleugh tailings | cox1 | OQ629779 | -45.232410 | 169.359140 |
|  | *childi* | GH118 | Graveyard Gully | cox1 | OQ629786 | -45.266430 | 169.396992 |
|  | *childi* | GH247 | Crawford Hills | cox1 | OQ629781 | -45.205989 | 169.508443 |
|  | *childi* | GH248 | Crawford Hills | cox1 | OQ629778 | -45.205989 | 169.508443 |
|  | *childi* | GH249 | Crawford Hills | cox1 | OQ629776 | -45.205989 | 169.508443 |
|  | *childi* | GH314 | Manor Burn | cox1 | OQ629774 | -45.239965 | 169.453125 |
|  | *childi* | GH316 | Manor Burn | cox1 | OQ629780 | -45.239965 | 169.453125 |
|  | *childi* | GH323 | Manor Burn | cox1 | OQ629775 | -45.239965 | 169.453125 |
|  | *homerensis* | GH89 | Homer Tunnel | cox1 | KM576276 | -44.762459 | 167.984819 |
|  | *homerensis* | GH91 | Homer Tunnel | cox1 | KM576277 | -44.762459 | 167.984819 |
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| *Sigaus* | *villosus* | SV156 | Porter Heights | cox1 | OQ629686 | -43.263206 | 171.631336 |
|  |  | SV305 | Dobson Pk | cox1 | EF544562 | -43.94369 | 170.664050 |
|  |  | SV306 | Dobson Pk | cox1 | OQ629681 | -43.94369 | 170.664050 |
|  |  | GH1374 | Fox Pk | mito | MN253121 | -43.850189 | 170.802212 |
|  |  | GH1949 | Fox Pk | cox1 | OQ629679 | -43.850189 | 170.802212 |
|  |  | GH2783 | Tapuae-O-Uenuku | cox1 | OQ629684 | -41.99593 | 173.662840 |
|  |  | GH3936 | Hamilton Pk | cox1 | OQ629685 | -43.109192 | 171.698112 |
|  |  | GH3937 | Hamilton Pk | cox1 | OQ629687 | -43.109192 | 171.698112 |
|  |  | GH4064 | Travers Ra. | cox1 | OQ629683 | -41.969255 | 172.719154 |
|  |  | GH4162 | Mt Hutt | cox1 | OQ629682 | -43.490292 | 171.539154 |
|  |  | GH4163 | Mt Hutt | cox1 | OQ629680 | -43.490292 | 171.539154 |
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Supplementary Table S2. Within and between mtDNA COI haplotype diversity among species among endemic New Zealand grasshoppers of the alpine radiation (details of data in Supplementary Table S1).

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| --- | --- | --- | --- | --- |
| Species | Closest species | Intra Dist | Inter Dist - Closest | Intra/Inter |
| *tumidicauda* | *minutus* | 0.034 | 0.076 | 0.45 |
| *minutus* | *tumidicauda* | 0.016 | 0.076 | 0.21 |
| *australis* | *minutus* | 0.048 | 0.078 | 0.62 |
| *dugdali* | *minutus* | 0.028 | 0.090 | 0.31 |
| *nitidus* | *crassicauda* | 0.028 | 0.077 | 0.36 |
| *crassicauda* | *nitidus* | 0.039 | 0.077 | 0.51 |
| *nivalis* north | *collinus* | 0.029 | 0.066 | 0.44 |
| *collinus* | *nivalis* north | 0.016 | 0.066 | 0.24 |
| *nivalis* south | *collinus* | 0.016 | 0.067 | 0.24 |
| *campestris* | *villosus* | 0.056 | 0.083 | 0.68 |
| *piliferus* | *villosus* | 0.030 | 0.083 | 0.37 |
| *villosus* | *minutus* | 0.037 | 0.079 | 0.47 |