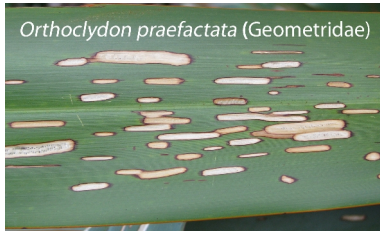


New Zealand flax – *Phormium tenax* (live plants)

Leaf



Orthoclydon praefactata (Geometridae)
Windows, holes covered on one side by leaf skin, made by caterpillars of flax looper moth.
Moth (Geometridae) **1884**



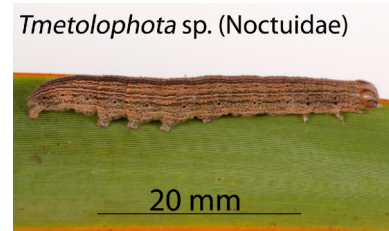
Liothula omnivora (Psychidae)
Windows and holes in leaves made by case moth caterpillars.
Moth (Psychidae) **1275**



Tmetolophota sp. (Noctuidae)
Notches made in leaves by caterpillars. Notches usually with straight sides and bottom.
Moth (Noctuidae) **4858 H**



Liothula omnivora (Psychidae)
Case moth caterpillar shelter and holes made in leaves.
Moth (Psychidae) **1275**



Tmetolophota sp. (Noctuidae)
Caterpillar that makes notches usually with straight sides and bottom.
Moth (Noctuidae) **4858 H**



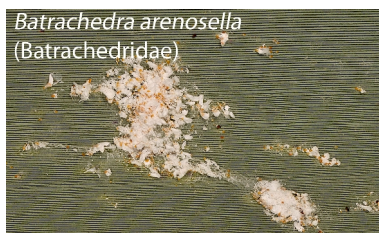
Poliaspis floccosa (Diaspididae)
Colonies of flocculent white scale insects on underside of leaves. Yellow areas on upper side of leaf.
Scale insect (Diaspididae) **465**



Poliaspis floccosa (Diaspididae)
Patches of flocculent white scale insects on undersides of leaves. Yellow areas on upper side of leaf.
Scale insect (Diaspididae) **465**



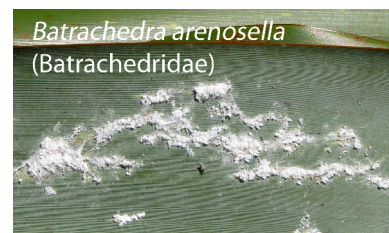
Rhyzobius fagus (Coccinellidae)
Black hairy adult ladybird feeds on flocculent flax scale. Present all year.
Ladybird (Coccinellidae) **282 PR**



Batrachedra arenosella (Batrachedridae)
Webbing amongst colonies of scale insects made by scale-eating caterpillars.
Moth (Batrachedridae) **79 PP**



Rhyzobius fagus (Coccinellidae)
Bicoloured hairy ladybird larva feeds on flocculent flax scale. Present all year.
Ladybird (Coccinellidae) **282 PR**



Batrachedra arenosella (Batrachedridae)
Webbing amongst colonies of scale insects made by scale-eating caterpillars.
Moth (Batrachedridae) **79 PP**



Pseudococcus longispinus (Pseudococcidae)
* Long tailed mealybugs on underside of leaf. Note lateral white fringe and long tail.
Mealybug (Pseudococcidae) **719**



Paracoccus glaucus (Pseudococcidae)
Adult female mealybug and nymphs on underside of leaves. Note short lateral fringe and short tail.
Mealybug (Pseudococcidae) **701**



Paracoccus glaucus (Pseudococcidae)
Adult female mealybug making egg sac and newly hatched nymphs.
Mealybug (Pseudococcidae) **701**



Balanococcus diminutus (Pseudococcidae)
Oval mealybugs between base flower stem leaves. Covered in white flocculent wax.
Mealybug (Pseudococcidae) **652**

More on next page

Landcare Research Plant-SyNZ, invertebrate identification chart, standard level
(demonstration) 2015



* Black and brown adult ladybird feeds on mealybugs in spring and summer.
Ladybird (Coccinellidae) **10 PR**



* White waxy ladybird larvae feed on mealybugs in spring and summer.
Ladybird (Coccinellidae) **10 PR**



* White waxy ladybird larvae feed on mealybugs in spring and summer.
Ladybird (Coccinellidae) **10 PR**



* Adult steelblue ladybird. Feeds on flocculent wax scale in spring and summer.
Ladybird (Coccinellidae) **8 PR**



* Larva of steelblue ladybird. Has branching hairs, feeds on flocculent wax scale in spring and summer.
Ladybird (Coccinellidae) **8 PR**



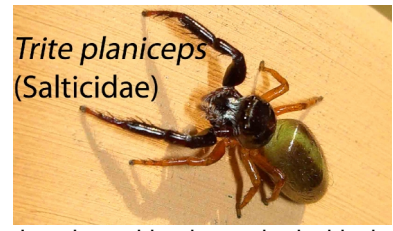
Jumping spider; brown body, black head, long black front legs; lives on flax plants.
Spider (Salticidae) **189 PR**



* Black and white adult passion vine hopper. Adults usually on the underside of leaves in summer.
Sucking bug (Ricanidae) **1888**



* Passion vine hopper nymphs usually on the underside of leaves in summer. Note erect fluffy tails.
Sucking bug (Ricanidae) **1888**



Jumping spider; brown body, black head, long black front legs; lives on flax plants.
Spider (Salticidae) **189 PR**



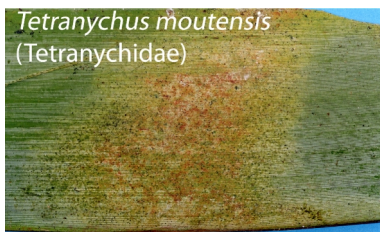
* Green plant hoppers usually on underside of leaves in summer.
Sucking bug (Flatidae) **2710**



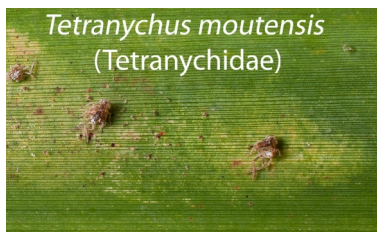
* Green plant hopper nymph usually on underside of leaves in summer.
Sucking bug (Flatidae) **2710**



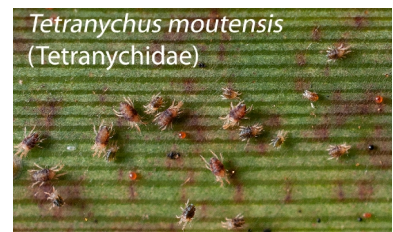
* Green plant hopper nymph usually on underside of leaves in summer.
Sucking bug (Flatidae) **2710**



Feeding damage from web-spinning mite on underside of leaf.
Mite (Tetranychidae) **908**

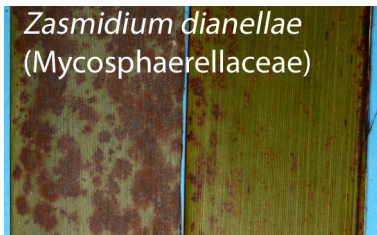


Feeding damage from web-spinning mite on underside of leaf and around moulted skins of passion vine hoppers.
Mite (Tetranychidae) **908**



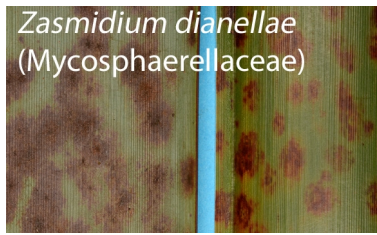
Web-spinning mites and their orange eggs on underside of leaf.
Mite (Tetranychidae) **908**

More on next page



Zasmidium dianellae
(Mycosphaerellaceae)

Colonies of dark brown fungus on underside of leaves.
Fungus (Mycosphaerellaceae)
1 F



Zasmidium dianellae
(Mycosphaerellaceae)

Colonies of dark brown fungus on underside of leaves.
Fungus (Mycosphaerellaceae)
1 F



Zasmidium dianellae
(Mycosphaerellaceae)

Colonies of dark brown fungus on underside of leaves.
Fungus (Mycosphaerellaceae)
1 F



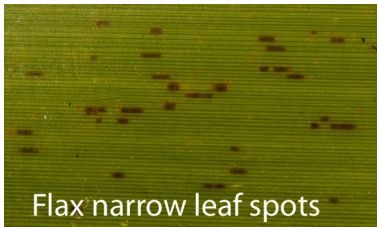
Flax long leaf streak

Long narrow streaks on live leaves.
Present all year.
Cause unknown. **2 F**



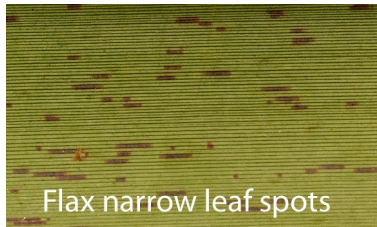
Flax long leaf streak

Long narrow streaks on live leaves.
Present all year.
Cause unknown. **2 F**



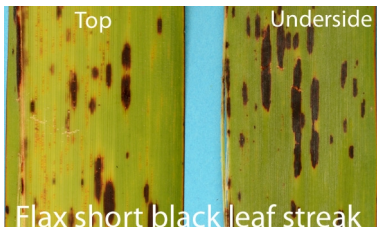
Flax narrow leaf spots

Short spots in space between veins; on both sides of leaf. Present all year. Cause unknown. **15 F**



Flax narrow leaf spots

Short spots in space between veins; on both sides of leaf. Present all year. Cause unknown. **15 F**



Flax short black leaf streak

Short, dark and wide streaks with pointed ends on both sides of leaves. Underside develops central pale. Present all year. Cause unknown. **9 F**



Flax short black leaf streak

Short, dark and wide streaks with pointed ends on both sides of leaves. Underside develops central pale. Present all year. Cause unknown. **9 F**



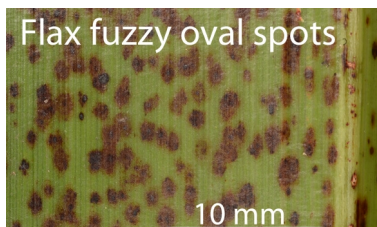
Flax short black leaf streak

Short, dark and wide streaks with pointed ends on both sides of leaves. Underside develops central pale. Present all year. Cause unknown. **9 F**



Flax fuzzy oval spots

Fuzzy oval spots on live and dead leaves. Present all year. Cause unknown. **10 F**



Flax fuzzy oval spots

Fuzzy oval spots on live and dead leaves. Present all year. Cause unknown. **10 F**



Flax fuzzy oval spots

Fuzzy oval spots on live and dead leaves. Present all year. Cause unknown. **10 F**

More on next page

Leaf base



Tetra cookiani (Eriophyidae)
Gall mite feeding on young leaves causes faint V-shaped lines.
Gall mite (Eriophyidae) **975**

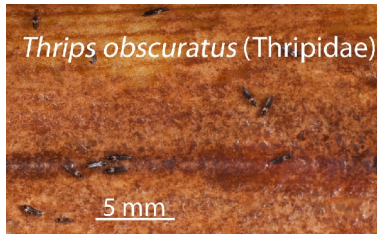


Tetra cookiani (Eriophyidae)
Gall mite feeding on young leaves causes faint V-shaped lines.
Gall mite (Eriophyidae) **975**

Flower bracts/open flowers



Thrips obscuratus (Thripidae)
Thrips, adults black and white and pale nymphs, present under bract covering flower buds and in flowers.
Thrips (Thripidae) **888**



Thrips obscuratus (Thripidae)
Thrips, adults black and white and pale nymphs, present under bract covering flower buds and in flowers.
Thrips (Thripidae) **888**

Other plant damage symptoms and invertebrates that may be seen
Leaf



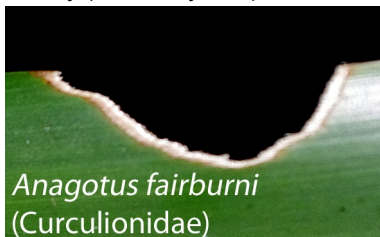
Resseliella sp. (Cecidomyiidae)
Ragged holes in leaves caused by gall fly larvae.
Gall fly (Cecidomyiidae) **1892**



Resseliella sp. (Cecidomyiidae)
Ragged holes in leaves caused by gall fly larvae.
Gall fly (Cecidomyiidae) **1892**



Resseliella sp. (Cecidomyiidae)
Red gall fly larvae feeding on young emerging leaves.
Gall fly (Cecidomyiidae) **1892**



Anagotus fairburni (Curculionidae)
Curved notches in leaf edge made by adult flax weevils.
Weevil (Curculionidae) **1766**



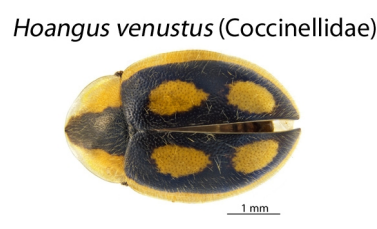
Anagotus fairburni (Coleoptera)
Adult flax weevil on leaf with curved notches in leaf edge.
Weevil (Curculionidae) **1766**



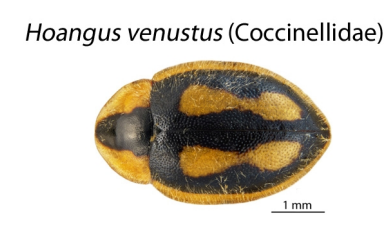
Anagotus fairburni (Curculionidae)
Adult flax weevil on leaf with curved notches in leaf edge.
Weevil (Curculionidae) **1766**



Dryinus koebeleri (Dryinidae)
Parasitoid larva protruding between wing buds on one side of green plant hopper nymph.
Wasp (Dryinidae) **994 PA**

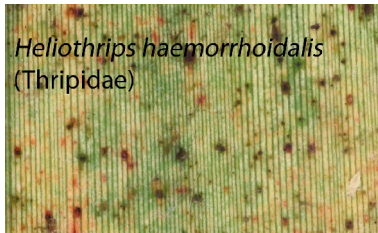


Hoangus venustus (Coccinellidae)
Black and yellow adult ladybird found on flax.
Ladybird (Coccinellidae) **287 PP**



Hoangus venustus (Coccinellidae)
Black and yellow adult ladybird found on flax.
Ladybird (Coccinellidae) **287 PP**

More on next page



Heliethrips haemorrhoidalis
(Thripidae)

* Silvering and black faecal droplets on leaves in summer and autumn. Black & white adults and pale larvae. Thrips (Thripidae) **997**



Heliethrips haemorrhoidalis
(Thripidae)

* Silvering and black faecal droplets on leaves in summer and autumn. Black & white adults and pale larvae. Thrips (Thripidae) **997**



Heliethrips haemorrhoidalis
(Thripidae)

* Silvering and black faecal droplets on leaves in summer and autumn. Black & white adults and pale larvae. Thrips (Thripidae) **997**



Thripobius javae (Eulophidae)

* Naked black parasitoid pupae in thrips colonies on underside of leaves in summer and autumn. Wasp (Eulophidae) **609 PA**



Anzaspis cordylinidis
(Diaspididae)

Narrow white scale insect with grey or dark cap. On top or underside of leaves. Scale insect (Diaspididae) **403**



Anzaspis cordylinidis
(Diaspididae)

Narrow white scale insect with grey or dark cap. On top or underside of leaves. Scale insect (Diaspididae) **403**



Leucaspis sp. 'flax' (Diaspididae)

Scale insect usually living in groove of leaf. Scale insect (Diaspididae) **1833**



Fungus growing on *Leucaspis* sp. 'flax' (Diaspididae)

Fungus living on scale insects in groove of leaf. Scale insect (Diaspididae) **1833**



Aphenochiton sp. (Coccidae)

Oval scale insect with glassy wax plates. Sucking insect (Coccidae) **1229**



Aspidiotus nerii
(Diaspididae)

* Circular tan coloured scale insects with darker central cap. On underside of leaves. Scale insect (Diaspididae) **1047**



Hemiberlesia rapax
(Diaspididae)

* Light brown scale insect with dark brown cap on one end. On underside of leaves. Scale insect (Diaspididae) **546**



Saissetia coffeae (Coccidae)

* Oval brown scale, convex, rounded, light brown. Young scale with H-pattern. Scale insect (Coccidae) **1048**



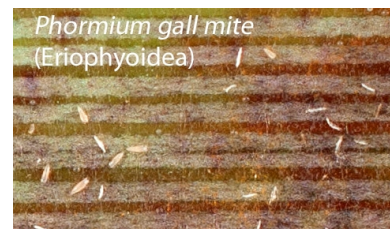
Melanophthalma sp. (Lathridiidae)

Small brown beetle feeding on brown fungus growing on underside of leaves. Beetle (Lathridiidae) **4475**



Melanophthalma sp. (Lathridiidae)

Small pale, hairy beetle larvae feeding on brown fungus growing on underside of leaves. Beetle (Lathridiidae) **4475**



Phormium gall mite
(Eriophyoidea)

Tiny gall mites on underside of leaves, associated with areas of brown fungus. White mite skins present. Mite (Eriophyoidea) **4256**

More on next page



Phytoseiulus persimilis
(Phytoseiidae)
* Red mites and orange-red eggs in colonies of web-spinning mite.
Mite (Phytoseiidae) **126 PR**



Stethorus sp. (Coccinellidae)
Small ladybird larva, dark or pale, in colonies of web-spinning mites.
Ladybird (Coccinellidae) **163 PR**



Stethorus sp. (Coccinellidae)
Small ladybird larva, dark or pale, in colonies of web-spinning mites.
Ladybird (Coccinellidae) **163 PR**



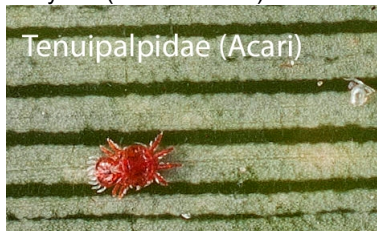
Stethorus sp. (Coccinellidae)
Black pupa of ladybird that feeds on web-spinning mites.
Ladybird (Coccinellidae) **163 PR**



Stethorus sp. (Coccinellidae)
Small black ladybird in colony web-spinning mites.
Ladybird (Coccinellidae) **163 PR**



Tenuipalpidae (Acari)
Tiny flat red mites and round red eggs, mite skins and eggs shells.
Flat mites (Tenuipalpidae) **1014**



Tenuipalpidae (Acari)
Tiny flat red mites and round red eggs, mite skins and eggs shells.
Flat mites (Tenuipalpidae) **1014**



Cicada egg scars (Cicadidae)
Scars in leaves made by female cicadas for their eggs.
Cicada (Cicadidae) **4133**

Leaf base



Balanococcus diminutus
(Pseudococcidae)
Oval mealybugs between base of outer leaves. Covered in white flocculent wax.
Mealybug (Pseudococcidae) **652**

Plant hoppers living at base of plants. Feeding nymphs are surrounded by flocculent white wax.

Flax planthopper. 1887

Thrips feeding on base of young leaves.

New Zealand flax thrips. 889

Green fruit



Phormium seed pod fly
(Cecidomyiidae)
Seed pods with discoloured and soft areas. White fly maggots inside.
Gall fly (Cecidomyiidae) **1891**

* = adventive species (invertebrates from other countries)

Other host associations are in the Plant-SyNZ database (August 2015)

All plant-herbivore host associations are recorded in the database plant-syNZ.landcareresearch.co.nz/SearchForm.aspx.

Plant-predator or parasitoid association are not yet available on the internet.

New associations

The host associations illustrated and listed here are those known when this identification guide was compiled. New host associations are likely to be discovered. If invertebrates and/or plant damage are found that may be a new association, send specimens of the insects and plants to Dr Nicholas Martin, Landcare Research,

By post to: Private Bag 92170, Auckland 1142, or

Courier to: Landcare Research, 231 Morrin Road, St Johns, Auckland 1072

If possible contact (0-9-574 4105, email: martinn@landcareresearch.co.nz) before sending.

Level of expertise

This version is suitable for non- experts. A 10x hand lens is useful but not essential to confirm the presence of some invertebrates. Versions of this identification guide that are suitable for experts (botanists and entomologists) and students are available. The identification guide and the accompanying recording sheets can be obtained from Dr Martin (see above) or the Plant-SyNZ web site, <http://plant-synz.landcareresearch.co.nz/index.asp>.

Identification of *Phormium tenax* J.R.Forst. & G.Forst. (Hemerocallidaceae)

This information is provided on the assumption that the plant species in the habitat are known and that the species of interest can be distinguished from closely related species in the habitat being surveyed. The most reliable way to distinguish the two *Phormium* species is the form of the seed pods.



Phormium tenax seed pods point upwards



Phormium cookianum seed pods hang down

Information about herbivores associated with *Phormium tenax*

Separate internet factsheets have been produced about some of the invertebrate herbivores associated with each plant species. These will have pictures of the different life stages, more pictures of the damage to plants, and information about their life cycle and distribution in New Zealand. Information about natural enemies (parasites, pathogens and predators) will be included if known.

The factsheet series, Interesting Insects and other Invertebrates, is available at nzacfactsheets.landcareresearch.co.nz/Index.html.

Acknowledgement

B Rhodes for photographs of *Hoangus venustus*

G Hall for a photo of *Trite planiceps*

RC Henderson for photograph of *Hemiberlesia rapax*

Jeff Hall, Department of Conservation and Colin Miskelly, Te Papa for photographs of flax weevil

Please send feedback to:

Dr Nicholas Martin, Landcare Research,

By post to: Private Bag 92170, Auckland 1142, or

Email: martinn@landcareresearch.co.nz

Please send us your feedback with comments on what you like and ideas for improvements. Comments are particularly welcome on the layout and arrangement of the photographs, the selection of photographs for the level of expertise you have used, and the text under each photograph.

Questions.

1. Is the selection of organisms suitable for this level of expertise?
 - a. Should any be listed as 'May be found'?
 - b. Should any be moved to the first section, expected to be found?
2. Are the photographs suitable?
 - a. Should any photographs be changed for better ones?
 - b. Should any photographs be deleted?
3. Is the arrangement and order of the photographs suitable?
 - a. Should any photograph be moved to be nearer another, if so which one and where?
4. Are the captions for each photographs adequate?
 - a. Please suggest any that need improvement.

Is the use of numbers for each organism a suitable link between the pictorial identification guide and the recording sheet?