BUTTERFLIES OF AUCKLAND

by D.R. Cowley and J.M. Cowley
Department of Zoology, University of Auckland, Private Bag, Auckland

SUMMARY

Fifteen species of butterflies are listed as having been found in the Auckland region. Brief descriptions of the adults of four species which do not breed in Auckland are given. Life cycles of the remaining 11 species which do breed around Auckland are detailed. Five of these are endemic to New Zealand.

INTRODUCTION

During the history of Auckland 15 species of butterflies have been recorded from the region. Of these, the lemon migrant (Catopsilia pomona pomona) is known from a single specimen taken at Saint John’s College sometime prior to 1876. Three others, the lesser wanderer (Danaus chrysippus petilia), blue moon (Hypolimnas bolina nerina) and Australian meadow argus (Precis villida calybe) only rarely appear and then as migrants from Australia. The lesser wanderer has occurred on very few occasions, usually between January and April after cyclonic storms. The blue moon was first found before 1855 and has turned up sporadically since then, usually in April and May. Over the years a few Australian meadow argus have arrived between September and April. Although the larval food plants of this butterfly are common, it is not known to breed here.

The Australian painted lady (Cynthia kershawi) is the only other migrant from Australia, being the most common trans-Tasman visitor. It arrives almost every year in October/November and can breed here (one summer generation) but seems unable to overwinter. Those adults seen from January till March are therefore generally locally reared ones.

The remaining ten species are established around Auckland although they are not all endemic. The long-tailed blue (Lampides boeticus) arrived and settled in New Zealand in the 1960s. The white butterfly (Pieris rapae rapae) was introduced to New Zealand in 1930. The monarch (Danaus plexippus plexippus) probably arrived here by itself in the 1840s or earlier and became established once swanplant was introduced. The yellow admiral (Bassaris itea), which feeds on nettles, has been here for many years and is also found in Australia, Norfolk Is., Loyalty Is. and Kermadec Is. The common blue (Zizina otis labradus) is even more widespread being also found in Chatham Is., Australia, Tasmania, Lord Howe Is., Norfolk Is., New Caledonia, Loyalty Is. and...
Cook Is. This leaves five species that are endemic to New Zealand i.e. the forest ringlet (*Dodonidia helmsii*), red admiral (*Bassaris gonella gonerilla*), common copper (*Lycaena salustius*), Rauparaha's copper (*L. rauparaha*) and glade copper (*L. feredayi*).

To assist with identification, reference can be made to the works cited at the end of this paper.

**FAMILY PIERIDAE**

**Subfamily Coliadinae**

*Catopsilia pomona pomona* (Fabricius), 1775. Lemon migrant

This species and others of the same genus are very common migrants in Australia and the tropics and we would therefore expect them to be blown here. However only one specimen has ever been reported. It is a large (65-75 mm wingspan), creamy white or lemon butterfly sometimes with irregular black wing-tip markings (see Gibbs 1980, plate 13).

**Subfamily Pierinae**

*Pieris rapae rapae* (Linnaeus), 1758. White butterfly (Fig. 1, 2)

The white butterfly is a well known visitor to our vegetable gardens, living mainly on cruciferous crops (cabbage, cauliflower etc). They are medium sized (38-50 mm wingspan), white or creamy white butterflies with grey or blackish wing tips. There are one (males) or two (females) black spots near the middle of the forewing and also in females, one close to the posterior edge. Females are only slightly yellower than males but to the insect, this is very marked. In ultra-violet light males show intense dark vermilion fluorescence due to large amounts of pterin pigment. Insect eyes are very sensitive to this end of the colour spectrum.

White butterflies overwinter (diapause) as a pupa or chrysalis, the first adults appearing in September and October. Females lay 300 or more eggs singly on the surfaces of leaves, usually more being placed on the undersides than on top. Each egg is about 1 mm high and spindle-shaped with about 12 vertical ridges. It is pale white when first laid. Later the egg becomes yellow before hatching - in one or two weeks depending on temperature. The first instar eats its egg shell then attacks the leaf at this point, remaining close to the egg site until the third instar (about 14 mm long). At this stage it shifts towards the centre of the plant where it feeds until fully grown in the fifth instar. The total larval period at 19°C is about 23 days. The mature larva, now almost 30 mm long, roams up to 30 m from the host plant before pupation. The caterpillar spins a silken mat to which it clings by its rear prolegs, with a strong-silken thread (girdle) around its middle. This serves to hold the pupa firmly. The posterior hooks of the pupa are also firmly embedded in the silken pad. Pupae have two colour forms, green
or greyish brown.

In Auckland about five generations occur each year. Populations of white butterfly have been stabilized at a relatively low level following the introduction of small wasp parasites and attack by a virus disease.

**FAMILY NYMPHALIDAE**

**Subfamily Danainae**

*Danaus plexippus plexippus* (Linnaeus), 1758. Monarch (Fig. 3, 4)

A large butterfly (80-100 mm wingspan) with distinctive orange, black and white wings. The male has a black spot on vein Cu$_2$ of each hind wing. Adults live for six months or more and overwinter. In Auckland they may be seen throughout the year whereas elsewhere in New Zealand they shelter in groups (6-1 000s) on the branches of trees. Butterflies congregate in April and May, dispersing again in September. Although mating pairs are sometimes seen in mid-winter, the first eggs do not appear until late October. These "winter" butterflies bask, fly and feed from flowers on fine days. Populations reach a peak in autumn.

Females lay eggs singly usually on the undersides of swan plant leaves. Eggs are 1.2 mm high, 0.9 mm in diameter and have 22-25 mildly defined vertical ribs interconnected by fine transverse lines. Eggs are pale cream when laid but turn almost black before hatching (in 5—10 days). An emerging larva usually eats part or all of its egg shell and is initially grey but by the fourth instar, prominent black, yellow and white bands develop. The second thoracic and eighth abdominal segments possess a pair of black filaments. Caterpillars pass through five instars in about three weeks and feed on milkweeds (Asclepiadaceae) during this time. Prior to pupation each caterpillar usually seeks a firm object that will shelter it. There it spins a small pad to which it clings by the anal prolegs. One to two days later the darkened larva sheds its skin, the pupal cremaster (hooks) is plunged into the silken pad and the rounded pupal form develops. This is green with gold and black markings. About three weeks later the darkened pupa splits and the adult emerges.

*Danaus chrysippus petilia* (Stoll), 1790. Lesser wanderer

The tawny orange wings, absence of black on the veins and black and white markings on the undersides of the hindwings distinguish this species from the monarch. Its total wingspan (60-80 mm) is also smaller than a monarch's. At least three records of the lesser wanderer breeding in New Zealand (not in Auckland) are known. The larva feeds on swanplants but has a different colour pattern from that of the monarch, and an extra pair of filaments on the second abdominal segment (see Gibbs 1980, plates 41-42)
Subfamily Satyrinae

*Dodonidia helmsii* Butler, 1884. Forest ringlet (Fig. 7)

This butterfly has a wingspan of 40-64 mm, broad bands of gold to orange on top of each wing and silver and brown bands on the undersides of the hindwings. The hindwings also have four prominent eyespots. Forest ringlets usually frequent sunlit forest glades flying mainly at treetop level. Adult seasons are short, usually only about one month, and vary from year to year. Adults are most common in December and January.

Eggs are laid on the undersides of leaves of forest sedges (*Gahnia* spp.) and tussocks (*Chionochloa* spp.). Each egg is 1.4 mm high and almost spherical with about 54 very fine, vertical ribs. At first it is pale green but darkens to yellowish green and just before hatching the black larval head capsule becomes apparent. Incubation takes about 22 days. The 5 mm long, newly hatched larva promptly devours its egg shell then chews an elongate notch right through the leaf. After about 30 days the first moult results in the larva having a green double horned head which stays in this form for the remaining four instars. Around Auckland, caterpillars reach the second or third instar by winter but then cease feeding and either shelter at the base of their food plant or shift away altogether. In spring, feeding recommences. Pupation usually occurs away from the food plant. Pupae are either green or brown and take about 20 days to develop.

Subfamily Nymphalinae

*Bassaris gonerilla gonerilla* Fabricius, 1775. Red admiral (Fig. 5)

A predominantly dark brown or black butterfly with a wingspan of 50-60 mm and a distinct red patch on the top of each wing. There are also smaller white patches towards the tips of the forewings and four white dots surrounded by black within the red patch of the hindwings. Underneath, hindwings and tips of forewings are cryptically coloured in brown with the remaining portion of each forewing having a large eyespot and orange and yellow bands. Adult butterflies live for several months (more than six months over winter). They are usually found in sunny forest glades and also in many other habitats. As with most admirals they are dependent on stinging nettles (*Urtica* spp.) for larval food, make "tents" by spinning leaves together and overwinter as adults.

Eggs are laid singly on the upper or lower sides of nettle leaves. Each egg is green with about nine distinct vertical ribs that stop abruptly at the top of the barrel shape. The larva hatches after 8—9 days but apart from a small hole to escape, does not eat the rest of the egg shell. It then forms a "tent" using silk and shifts to a new one each time the leaves become too eaten. Caterpillars prefer *Urtica ferox* and pass through five instars in their 4—6 week life. The first instar is dull brown with small
white blotches. Its setae are simple and black, its head capsule black. Progressively the larva develops until, in the final instar, its head is olive green with dark patches formed by clusters of tiny round black spots. The body varies from velvety black through pale brown to reddish brown. Most are black or deep brown on top and a lighter shade below. Small setae on raised white bases cover the entire body. Also, many setae are compound, having an axial stalk with lateral spines. There is a prominent creamy white lateral line and an interrupted subdorsal line along the body. Before pupation the larva suspends itself by its anal prolegs from a silken pad, taking up a “J” position within its leafy “tent”. After two days the larval skin is shed and the dull brown or grey pupa takes on its form. This is finely sculptured with small raised knobs edged with gold. The pupal stage lasts from 14—18 days. Several generations occur over summer with larvae disappearing about the end of May. Adults can be found during winter in a torpid state amongst dry foliage.

**Bassaris itea** (Fabricius), 1775. Yellow admiral (Fig. 6)

This is a slightly smaller butterfly than the red admiral with a wingspan of 48-55 mm. Wing markings are similar to those of the red admiral but with creamy yellow instead of red on the upper sides of the forewings. Bases of the forewings and large portions of the upper surfaces of the hindwings have rusty brown pigmentation. These butterflies were first recorded from New Zealand by James Cook in 1769—70. They may arrive here from across the Tasman but as they are identical to New Zealand forms it is impossible to measure the frequency of these visits. The yellow admiral is more common than the red admiral in domestic gardens and it prefers the introduced nettle (*Urtica urens*). The small herbaceous *U. incisa* is sometimes used, but never *U. ferox*. Life history stages closely resemble those of *B. gonerilla gonerilla*. Eggs are usually laid close to the growing tip of the plant. They are dark green with 8-10 white vertical ribs. The first instar feeds at the growing tip and later shifts away to “tent” sites on the rest of the plant. Large larvae, when crowded together, leave their “tents” and feed openly. Pupation rarely occurs on the food plant, the mature caterpillar usually searching for a stable sheltered object. The pupa is very similar to that of the red admiral except that its colour is a fairly uniform pale brown. Occasionally gold markings may be quite extensive. *Bassaris itea* overwinters as an adult, its populations building up slowly over spring and early summer.

**Cynthia kershawi** McCoy, 1868. Australian painted lady (Fig. 8)

A medium sized butterfly (46-60 mm wingspan) with a patchwork pattern of orange, black and white on the upper surfaces of all wings. Three pale blue spots and a black one are present on the hindwings.
Forewing tips are black. Most adults seen in Auckland are migrants from Australia arriving in springtime. This butterfly was first recorded from New Zealand in 1855. It can live for 3—4 months and becomes faded and tatty in its later life. The undersides of the wings are cryptically coloured. In New Zealand suitable host plants are all introduced lawn weeds of the Compositae e.g. Capeweed (*Cryptostemma*), cudweed (*Gnaphalium*) and everlasting daisy (*Helichrysum*).

Eggs are laid singly though sometimes close together on the undersides of leaves. Each egg is leaf green with 13-15 distinct ribs. In about 12 days the grey and black larva chews its way out of the egg and forms a crude shelter, using silk, under the concave edge of a leaf. The second instar also stays in this shelter, the caterpillar not moving off until the third instar. By this time it has a patterning of longitudinal stripes with a distinct greyish lateral one. The larva is now blackish brown with tufts of black setae. Last (fifth) instar larvae vary in colour from almost black to pale brown on top and occasionally green or yellow-grey. Branched spines are pale brown and prominent. Older larvae do not have shelters and hide at the base of the food plant during daytime. The pupa is usually suspended from a firm surface and varies from pale grey to yellow-brown. A lateral dark band extends from the wings to the posterior hooks. A row of subdorsal knobs are silver on the grey, and gold on the light brown varieties. Adults emerge in 2—3 weeks.

*Hypolimnas bolina nerina* (Fabricius), 1775. Blue moon (Fig. 9, 10)

A large butterfly (85-110 mm wingspan) with predominantly black on the upper wing surfaces. Male wings have large white patches usually edged with blue. Females have both white and orange patches. The undersides of the wings are brown with white bands. The blue moon arrives from Australia in most years, usually in late autumn. In 1956 and 1971 large migrations occurred. *Hypolimnas* is a tropical and subtropical genus, rarely breeding as far south as Sydney in Australia. It has not become established here, even though its food plants e.g. joyweed (*Alternanthera*) and Paddy’s lucern (*Sida*) are present.

*Precis villida calybe* (Godart), 1819. Australian meadow argus

This is a basically tawny brown butterfly with a 48-52 mm wingspan. It has orange markings in short bands and also blue and black eyespots on each wing. One pair of these spots is conspicuous on both fore and hindwings. Except for the summer of 1886-87 when hundreds of meadow argus arrived in New Zealand, this is a rare visitor. Some years none are recorded. They have been found from September till the end of April although their usual season is summer. This subspecies occurs in Australia, Tasmania, New Caledonia, Norfolk Is. and Lord Howe Is., being a sporadic visitor to the latter two islands. It is usually found
basking in hot sunshine in open localities as well as in gardens. The meadow argus has never been reported as breeding here although food plants such as plantains (Plantago spp.) and snapdragons (Antirrhinum) are common (see Gibbs 1980, plate 138).

FAMILY LYCAENIDAE

Subfamily Lycaeninae

The genus Lycaena includes the gleaming coppery butterflies. Three very closely related species occur around Auckland. They are representatives of a genus that is basically from the northern hemisphere (central Asia) but also occurs in South Africa and New Zealand though not in Australia or South America. Larvae of all three species feed on various species of Muehlenbeckia.

Lycaena salustius (Fabricius), 1793. Common copper (Fig. 11, 12)

This has a wingspan of 24-33 mm and distinct gold and black markings on the upper surfaces of the wings. The black bands are far more distinctive in females though colour patterns vary greatly. Hindwing characters are most important for identifying this species, the undersides of these wings being bright yellow. In males, veins of all wings are marked in double black lines whereas in females it is only veins M and Cu towards the middle of the hindwing that have this feature. Females also have a row of iridescent blue marks near the margins of both wings. The common copper is found throughout the countryside although it is most common in coastal situations. It was one of the earliest New Zealand butterflies to be described (1793), having been collected on Cook’s voyage. In netted collections males predominate in a ratio of about 3:1 although this may be the result of their greater activity. Common coppers may be found large distances away from their food plant and have at least two generations each year.

Eggs are laid singly on the undersides of Muehlenbeckia leaves and usually near the edges. M. complexa (pohueheue) is the main host although M. australis is also used. Further south (below 38°S) caterpillars feed on M. axillaris. Each egg (0.65 mm in diameter and 0.35 mm high) is bun-shaped and pale green with a honeycomb pattern of white ridges. It hatches in about ten days and is left with a roughly circular hole out of which the larva has crawled. The first instar is equipped with a double row of long curved hairs along its dorsal midline. At the first moult, which occurs after about ten days, these are replaced by short straight setae. Three more instars occur at intervals of about six, six and 20 days the larva now appearing green and sluglike with a velvety skin. In the last two instars the larval body is clothed with short setae and also minute, white, spherical ones (not found in the other two species). First and second instars only remove small oval patches of
tissue from the undersides of leaves. Third and fourth instars feed from above, chewing holes right through the leaves and often also feeding on flowers. Pupation of the now 15 mm long larva takes place in dry leaves and debris beneath the host plant or under any solid object. Often the caterpillar pupates loosely but may attach to a silken pad with a supporting girdle. After about 18 days the adult emerges and lives for up to two weeks. Overwintering occurs in the larval stage and this appears to result in a shifting away from the food plant. Around Auckland however, some larvae remain on the plants during winter.

**Lycaena rauparaha** (Fereday), 1877. Rauparaha’s copper (Fig. 13)

This is much the same size as *L. salustius* with a wingspan of 25-31 mm. Markings on wings are similar to those of *L. salustius* though all veins on the upper sides of the wings are single black lines. On the forewings the space between the origin of veins M₃, CuA₁ and CuA₂, i.e. approximately the middle of the wing, is a clear coppery colour without black scales. *L. rauparaha* is basically a coastal species. It is found typically in dune areas vegetated with grasses, marram and small bushes such as lupin and flax but is not restricted to these areas. Females have more black banding than males though this difference is not as distinct as in *L. salustius*. The females also do not possess iridescent blue marks around the wing margins. Larvae have a similar life cycle to that of the common copper although they are only found on *M. complexa*. They are velvety green with minute cream spots and a single outer row of 6-8 crotchets (hooks) on each proleg. Pupae are plain, without black spots on the abdomen and have pale brown eye pigment.

**Lycaena feredayi** (Bates), 1867. Glade copper (Fig. 14)

The wingspan of this copper if 25-32 mm. The underside of each hindwing is yellow with a broad distal patch of brown contiguous with a brown outer margin. The triangular area between veins M₃, CuA₁ and CuA₂ of the forewing has at least some black scales and is usually almost completely black. The glade copper is very constant and distinctive as an adult, males and females being almost identical. The younger stages may be confused with other species.

So far as is known *L. feredayi* feeds only on *M. australis* which is a creeper that grows in forest glades or gullies. Adults do not disperse far from their food plant and live for about seven days. There appears to be two cycles during the summer, adults being abundant in November—December and again in February—March. In January when the common copper reaches its peak the glade copper is very scarce.

The life cycle is very similar to that of *L. salustius*. Eggs are laid on leaves of projecting shoots and are placed near the edges on the upper surfaces. First to third instar larvae chew small round holes on the undersides of leaves leaving clear windows. Late third instars chew
holes right through leaves and in the fourth (final) instar leaf margins are attacked. These mature larvae are velvety green with a reddish brown mid-dorsal line and creamy white spots. Prolegs have a single outer row of 12-16 crotchets. Larval life occupies about 28 days. Before pupation, each larva forms a “tent” by binding two leaves together, and in this, it pupates. The pupa is reddish brown with dark brown wings. It has a rough texture and is finely speckled with dark brown. This stage lasts about 17 days. Small larvae overwinter, resuming feeding when new Muehlenbeckia leaves arrive in spring.

Zizina otis labradus (Godart), 1819. Common blue (Fig. 15, 16)

Two subspecies of the common blue occur in New Zealand although only Z. otis labradus is found around Auckland. It is a small blue-grey butterfly with a wingspan of 20-27 mm. There are no distinct markings on the upper surfaces of the wings and no tails. Adults are usually found in open grasslands and it is probably our most common butterfly being present from October till May. Greatest numbers are found in late summer and autumn. When first emerged, the male’s wings are a brilliant lilac blue above with narrow slate grey borders fringed with white. Females are slate grey above and completely without marks except for a few lilac scales towards the bases of the wings. The undersides of the wings of both sexes are variable with grey to blue-grey patterns.

Eggs are laid singly almost anywhere amongst low herbs and clovers (Trifolium repens and T. arvense). Each egg is a squat barrel with a strong pattern of white reticulate ridges. The central region of each egg is greenish blue. In summer, eggs hatch in about six days. The first instar larva is almost transparent or pale green and typically sluglike as are other lycaenids. It also has a double row of long curved setae along the body. First instar larvae chew only part way through leaf tissue. As larvae pass from first to fourth (final) instar they become progressively darker green with a darker dorsal line and a creamy white lateral stripe. Some even take on a pinkish colouring. About 30—40 days are spent as a caterpillar and the damage by late instars usually shows as elongate holes parallel to the veins of the clovers. Mature larvae are about 10 mm in length. Apart from clover, trefoils and medick (lucerne) are popular foods. Pupation occurs on the bases of food plants, on stems and dead leaves, or even on the ground amongst litter. The larva produces a silken girdle and suspends itself in the usual way. The pupa is rounded, without angular prominences and usually pale ochre with varying degrees of dark brown mottling. The surface has a sparse covering of short erect hairs. In summer, pupation lasts about two weeks. Larvae overwinter in sheltered sites, the first group of adults emerging in October and November. With several generations over summer, populations soon build up.
Fig. 1. *Pieris rapae rapae*. White butterfly, male (x 1.3).

Fig. 2. *Pieris rapae rapae*. White butterfly, female (x 1.3).

Fig. 3. *Danaus plexippus plexippus*. Monarch, male (x 0.6).

Fig. 4. *Danaus plexippus plexippus*. Monarch, female (x 0.6).

Fig. 5. *Bassaris gonerilla gonerilla*. Red admiral (x 0.9).

Fig. 6. *Bassaris itea*. Yellow admiral (x 0.9).

Fig. 7. *Dodonidia helmsii*. Forest ringlet (x 0.9).

Fig. 8. *Cynthia kershawi*. Australian painted lady (x 0.9).
Fig. 9. Hypolimnas bolina nerina. Blue moon, male (x 0.35).

Fig. 10. Hypolimnas bolina nerina. Blue moon, female (x 0.35).

Fig. 11. Lycaena salustius. Common copper, male (x 1.3).

Fig. 12. Lycaena salustius. Common copper, female (x 1.3).

Fig. 13. Lycaena rauparaha. Rauparaha’s copper (x 1.3).

Fig. 14. Lycaena feredayi. Glade copper (x 1.3).

Fig. 15. Zizina otis labradus. Common blue, male (x 1.8).

Fig. 16. Zizina otis labradus. Common blue, female (x 1.8).

Fig. 17. Lampides boeticus. Long-tailed blue (x 1.3).
Lampides boeticus (Linnaeus), 1767. Long-tailed blue or pea blue (Fig. 17)

This small blue butterfly has a wingspan of 20-36 mm with two dark marginal spots on the posterior angle of each hindwing between which is a short hair-like tail. Specimens were first recorded from New Zealand at Waiheke in November 1965. This butterfly is found in most continents of the world except America. Males are a vivid violet-blue above with only a narrow dark edging to their wings whereas females are heavily bordered with dark slate grey, the blue colouring being confined to the centres and bases of the wings. The white, barred underside pattern of the wings differs greatly from that of Z. otis labradus. L. boeticus has a strong, swift flight usually one metre or more above the ground whereas Z. otis labradus has a slow ground hopping flight. The long-tailed blue is attracted to various legume flowers, particularly gorse and sweet peas. Larvae feed within flowers or seed pods of a wide range of leguminous plants especially gorse (Ulex europaeus).

The squat, barrel-shaped, pale grey egg is placed on an unopened flower bud. Egg surface sculpturing consists of a reticulation of low ridges which are not clearly visible. The newly emerged larva enters the flower bud and remains enclosed feeding on ovaries, stamens and petals. Young larvae are pale white with red-brown markings. Mature larvae reach about 15mm in length and on gorse flowers turn a dull yellow-brown with short brown bristles on their dorsal surfaces. Damage to flowers is usually only apparent when the caterpillar is in its fourth (final) instar. Pupation occurs either in withered, curled foliage held in place by loose webbing, or on/in the ground particularly if the soil is sandy. The pupa is about 9 mm long and pale yellow-brown with dark brown blotches. L. boeticus does not have posterior hooks for suspension. The life cycle may be as short as four weeks in midsummer whereas in winter it can take as long as three months. Long-tailed blues breed continuously throughout the year.

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REFERENCES


Hudson, G.V. 1939: "A Supplement to the Butterflies and Moths of New Zealand." Ferguson and Osborn Ltd., Wellington. 94 p.

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