

SOUTH AUSTRALIAN BUTTERFLIES

Data Sheet

Polyura sempronius (Fabricius) (Tailed Emperor)



Interesting aspects: A large, spectacular butterfly. Even its early stages are spectacular, with large globular eggs, large colourful larvae with horned dragonheads, and very large glistening emerald green pupae, marked with white. This butterfly was first seen in South Australia during the big invasion of subtropical butterflies that occurred during the unusually moist and humid summer conditions of 1973-1974. It established itself in urban Adelaide in those years and has maintained its presence ever since. Flight numbers tend to vary from year to year, but have noticeably declined over the past 10 years.

Males usually group on hill tops, particularly up from their hostplants. They settle high up in the trees with wings either closed or partially open. They periodically fly off to scout the area for newly emerged females before returning to settle again in the same position. If there is more than one male then they will compete for the best advantage point on the hill top or tree, and during this struggle they often come down closer to the ground where they can be viewed. They often become very territorial on the hill tops, chasing and attacking any large flight movement in their vicinity, including other males and large insects, and even small birds. They attack other males by a clashing of wings, which is sometimes audible. The females only venture to the hill tops to mate. They are more often seen flying gracefully through the urban areas pausing often to investigate potential hostplants. They will often stay near the hostplant tree or within the area in which they spent their early stages. Although they usually have a slow graceful flight interrupted by frequent gliding spells, the butterflies are very strongly built (typical for the subfamily) and if disturbed are capable of extremely fast flight. Other species have been recorded flying at a sustained rate of nearly 30 km/hr. The butterflies are readily attracted to sap flows from certain trees, and sometimes to fermenting and rotting fruit where they will become intoxicated. They are also attracted to congregations of scale insects, and if the scale is common enough to

produce copious amounts of sugary secretions, then these butterflies find such secretions irresistible. In the humid tropics they will imbibe water from the edges of puddles, and are also attracted to animal and bird droppings, even decaying corpses (yuck)!

The butterfly belongs to a subfamily group of very robust butterflies with strong, stout thoraxes, and characteristically shaped wings. The larvae are also very characteristic, having long stout bodies, bluntly forked tails, and large horned heads. The group occurs mostly in the tropical humid forests and woodlands around the world. The *Polyura* generic group is best developed in Australia and South East Asia. It is very similar in appearance to, and very closely related to the *Charaxes* generic group, which is best developed in Africa.

Life History

Larval food-host: Numerous native (interstate) and introduced ornamental trees, mainly of legume origin. Those suitable for S.A. conditions include *****Acacia baileyana*** (Cootamundra wattle), *****A. dealbata*** (silver wattle), *****A. decurrens*** (queen wattle), *A. longifolia longifolia* (Sydney golden wattle), *A. mearnsii* (black wattle), *****A. podalyriifolia*** (Mt Morgan wattle), ***A. pycnantha*** (golden wattle), *****A. saligna*** (golden wreath wattle), *****Paraserianthes(Albizia) lophantha*** (Cape Leeuwin wattle) (Mimosaceae); ****Robinia pseudoacacia*** (black locust or false acacia), **Wisteria* spp (Fabaceae) **Caesalpinia ferrea* (Brazilian ironwood), **C. gilliesii* (bird of paradise tree) (Caesalpinaceae); *****Brachychiton acerifolius*** (Illawarra flame tree), *****Brachychiton acerifolius x populneus*** (flame tree), *****B. discolor*** (white kurrajong), *****B. populneus*** (kurrajong), *****Sterculia* sp** (Sterculiaceae); **Quercus palustris* (pin oak) (Fagaceae); **Celtis occidentalis*, **C. paniculata*, **C. philippensis*, **C. sinensis* (Portuguese elm) (Ulmaceae); **Cinnamomum camphora* (camphor lural) (Lauraceae); **Lagerstroemia indica* (crepe myrtle) (Lythraceae); *Jasminum* sp (native jasmines) (Oleaceae). Use of the local wattle *A. pycnantha* was only recently recorded in an Adelaide suburb. The larvae usually eat the leaves of the hostplants.

Eggs: Very large (for a butterfly) 2 mm, pale yellow. If fertile, after about two days they acquire a broad, ragged purplish brown ring on top. About a day before hatching they become slightly brownish, and 12 hours before hatching the brown apical ring disappears. Nearly spherical, apically and basally flattened, smooth and shiny, with about 32 indistinct, finely beaded vertical ridges, and with numerous very indistinct fine lateral ridges. The intensity of the ridges decreases basally. The apex becomes increasingly flattened, and eventually depressed, with age. Laid singly on the hostplant, usually on the uppersides of leaves. Larval development within the egg commences immediately after being laid, and the eggs hatch in about 6-8 days. The egg shell is eaten by the larva after its emergence. Early instars nibble the leaf edges, but later instars devour the entire leaf.

Larvae: Initially pale yellow with some short, white coloured secondary setae, arising from pale coloured raised bases. The neck area behind the head is reddish brown. After eating the green leaves of the hostplant, the larva gradually turns green (after 2 days), although the posterior portion of the larva always remains yellow. The larva tapers posteriorly ending with a deeply divided fork, tipped white. The head is mostly black coloured with some yellowish brown frontal markings, large, rounded, granulose, with some short hairs and spiny protuberances, and with two pairs of bowed tapering horns, the more dorsal pair being the longest, which are white tipped. There is a further very short dorsal pair. The larva

emerges from the egg with the head horns and tail fork being pale pinkish coloured, and are short, soft and pliable. The horns and tail fork are quickly erected (10 minutes), and they gradually become hardened and black coloured (complete in 2 hours), with the tips of the tail fork and the longest dorsal head horns remaining white tipped. Immediately after leaving the egg, and before eating the empty egg shell or expanding its head horns and tail fork, the larva will make a silk pad upon which it will attach itself.

In subsequent instars, the larva acquires a yellow lateral line, the secondary setae become common, producing a very scabrous (sand-paper) appearance to the skin, and the posterior fork is reduced. The head in the second instar is mostly brown, but in later instars it is mostly green. The head also acquires an additional pair of very short horns between the longest two pairs, while the original long horns become increasingly better developed and straighter. The fourth instar is the first instar to acquire yellow dorsal lunettes on the body. These lunettes are not immediately evident after a moult, being a dull orange colour, but as the larva grows the lunettes gradually turn bright yellow. The first lunette to develop, occurs on abdominal segment (AS) 3. Additional lunettes can be acquired in the fifth instar. During moulting, the larva is burdened with the large, horned head. As with the egg stage, the new head development during a moult is undertaken in a soft state, and when the actual moult occurs the new horns on the head have to expand and harden. This is done very quickly, with the entire moult and head expansion occurring in about 5 minutes. Once hardened the head cannot enlarge further, and remains the same size until the larva moults again. The new head capsules are mostly fully coloured at the time of the moult, except for those areas which are meant to be black. Those areas gradually become black as the head capsule hardens. The old head capsules (except the final capsule of the fifth instar), are discarded complete, and they retain their colour. The discarded larval skin from the moult is eaten by the succeeding instar. Moulting often seems to take place during the late afternoon or early evening. Early instars tend to align themselves along the mid-rib of the leaf (if the latter is large enough), with their heads directed towards the stem, and this posture affords some camouflage protection. Additional camouflage is sometimes provided in this position as the forked larval tail and the horns of the head are directed in the same direction as the side veins of the leaf (towards the leaf tip), and thus imitate the side veins.

The final instar is about 55 mm long, stout, cylindrical but tapering posteriorly, with the final posterior segment flattened and produced into a blunt fork. The lateral part of the larva is slightly flanged, which is best developed posteriorly where it merges with the flattened tail-fork. The head is large, hard, flat, very rough and granulose, and grooved in the front. A short indistinct hair emanates from each granule. It has four pairs of tapering horns that point dorsally, and which have further small blunt spines laterally. There is a long subdorsal pair (the longest), a long lateral pair, a short dorsal pair, and another very short pair situated between the subdorsal and lateral pair. The side of the head also has very short spines. The larvae are green coloured above, bluish laterally and at the posterior end. The underside is bluish white initially, but with larval growth it becomes green. The skin is covered in minute pale coloured secondary setae, which are simple and spinose, and these emanate from a large elongated, white coloured bulbous base, which impart a rough scabrous appearance. There are usually one (AS 3) or two (the second on AS 5), and sometimes even more, yellow lunette shaped dorsal transverse markings across the back, which are edged metallic bluish-black anteriorly. Up to 11 of these markings have been recorded, each restricted to an individual segment of the larva. Sometimes the yellow lunettes are incompletely developed as large spots. There is a yellow lateral line that is continuous to the forked tail, but weakens anteriorly towards the head. There is sometimes

a large pale yellow spot on the side of each central proleg. The face of the horned head is streaked vertically in front with green and pale green, edged yellow around the periphery, the lateral horns are yellow, the subdorsal horns are greenish yellow basally, turning bluish black apically with the apex being white or pale blue tipped, the smaller dorsal horns are black, the smallest subdorsal horns are green, while the side of the head is green coloured. Near pupation, the larvae turns a dull green colour.

The green colouration of the larvae provides excellent camouflage within the leafy foliage. The additional yellow markings help mimic the blemishes, stems and veins of the leaves. Larvae of all stages make silken pads on the uppersides of the leaves. Throughout their life, the larvae will make these silk pads from which they will never leave except to feed, make another pad, or to pupate. When young only a single leaf is used, but when the larvae are larger they will use several leaves grouped together. When the larvae move from the pads to feed, they make silken trails from these pads to where they eat, and they follow these same trails back to the pads so that they do not get lost on the return trip. They move along the trails in a slow pulsating or lurching movement as they detect the old silk and then lay a new thread of silk. They eat ravenously for very short periods, but often, and always return to their pads after the brief eating spell. The larvae have strong jaws, and the eating by the older larvae is quite audible. If disturbed while on the pads the larvae (particularly the early instar larvae), will arch their front and rear ends off the pads while holding on with their centrally positioned prolegs. This is a defensive posture, in which position the larvae remain perfectly motionless. In the case of bird predators it may be a bluff to make the birds think that the elevated horned head may in fact be a nasty biting insect or arthropod. In the case of other insect predators the position frees the larva head for a quick defensive swing, which they will execute with the least provocation. Their initial response to a small intruder is to thump the leaf with their head or rear ends. If that does not work then they proceed to Plan B and swing the head around hoping to make contact with the intruder. Larger larvae may also use their strong jaws to dismember any small irritating insect if they come into range of the head.

The larval duration is variable. It can be as short as 7-8 weeks over summer, but eggs laid during the autumn flight produce larvae that overwinter.

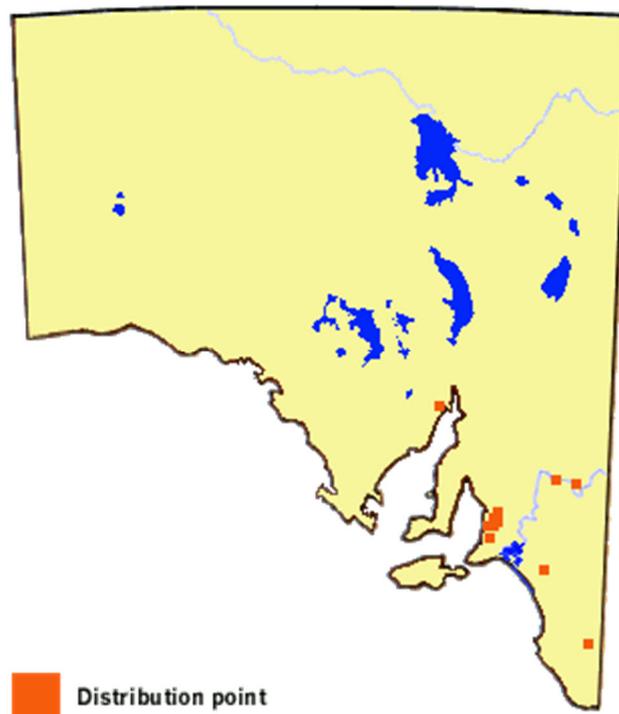
Pupae: Large about 27 mm long, stout, smooth, tapering anteriorly and posteriorly, rounded anteriorly. The abdomen is arched dorsally. Green coloured, sometimes bluish, ornamented with two broad, longitudinal ragged white bands on the wing cases extending to beneath the head, and there are two pairs of longitudinal dorsal lines. In the first few days after pupation there are also some additional white marks, but these tend to gradually fade. There are yellowish coloured bulbous ventral projections at the posterior end and again at the base of the cremaster. Suspended head downwards by the cremaster from a strong white silk pad, usually in a leafy situation, which provides excellent camouflage. Pupation usually occurs on the hostplant, but larvae will sometimes pupate on adjacent plants. During the pupation from the final instar, the larval head capsule splits down the middle (as in all butterflies), rather than being discarded in entirety as occurs in earlier instars during moulting.

The pupal duration is variable depending on the time of year. It can be as brief as 14 days during the warmest months, extending to 24 days in the cooler months, but usually those pupae formed in late autumn will not produce adults until the following spring.

Flight period in S.A.: The butterfly is seen all year round in the humid tropics of Australia. In South Australia it is seen in flight during the warmest months. There is usually a main late spring - early summer flight, followed by another flight in late summer - early autumn. The summer brood can be completed in 10-11 weeks. During seasons of abnormal humidity, vagrants will fly in from the eastern states. Larvae that overwinter usually produce pupae in October, and these develop to adults in November and early December. (It is not known what overwintering larvae do on deciduous plants, such as False Acacia).



Distribution: Normally a humid tropical and subtropical butterfly with vagrant tendencies. Within South Australia the butterfly has been sporadically documented from the southeast portion of the state, but seems to have established itself only around Adelaide and perhaps also at several other smaller towns.



Habitat: It prefers open forest and wooded areas. Apart from vagrant butterflies, it is an urban butterfly in South Australia. Its hostplants are nearly always introduced ornamental trees to be found only in the urban environment. The butterfly and its early stages probably require warm humid and sheltered conditions to survive for any extended period of time.

Conservation Status in S.A.: Usually a rare butterfly in South Australia, but in some years it can be more frequently seen on certain hilltops along the hills face to the Adelaide Plains.

Threats: Its main threat is likely to be an extended cold winter spell, although the early stages can withstand overnight frosts. Its favourite hostplants around Adelaide are Cape Leeuwin Wattle and False Acacia, which are often shortlived or are deciduous during winter, and this can cause additional stress to all stages of the butterfly.

Conservation Strategy: None required. If you are lucky enough to have the butterfly established in your area then nurture it, as it is a large spectacular butterfly. It may be receptive to the propagation of its favourite hostplants in your garden.

Author: R. GRUND, © copyright 4 August 2001, all rights reserved.
Last update 2 November 2005.