

# SOUTH AUSTRALIAN BUTTERFLIES

## *Data Sheet*

*Theclinesthes albocincta* (Waterhouse) (Bitter-bush Blue)



These images are of the coastal full-blue form of the butterfly



Male brown inland form

**Interesting aspects:** This butterfly belongs in a genus having very closely related species that are still in active phenotypic and polyphenetic processes of speciation, wherein each of the species has evolved on specific larval hosthosts in often-specialised ecological niches. It is sometimes difficult to distinguish the various adult species, especially the females as the latter usually have similarly patterned blue coloured wing uppersides. *Theclinesthes albocincta* has evolved on *Adriana* (Euphorbiaceae). Even within this species there is active speciation. There is a blue coloured adult form having larvae that exist solely on *Adriana*

*quadripartita* form *klotzschii*, and this butterfly only occurs in coastal regions of South Australia. In the hot inland dune areas of Australia and also in northwest Western Australia, there are other forms of this butterfly that exist solely on *Adriana urticoides* (in its various growth forms). These butterflies are brown coloured, without any blue markings. In coastal and near coastal areas of Queensland and northeast New South Wales there are blue and green forms of the butterfly that survive on *Adriana urticoides* form *glabrata*. In coastal southwest W.A. there exists a purple coloured (male) adult butterfly, very similar in pattern to the above adults, but which exists solely on *Adriana quadripartita* form *quadripartita*. This butterfly is presently known as *Theclinesthes hesperia*. It was probably the original archaic species from which *T. albocincta* evolved. Another (but more widespread) purple coloured (male) adult butterfly within the group has evolved on *Acacia* (Leguminosae), and this butterfly is known as *Theclinesthes miskini*. Yet another purple coloured (male) adult butterfly, very similar in appearance to the previous butterfly, but which tends to be larger in size, has evolved on cycads (Cycadaceae) and macrozamia (Zamiaceae). This butterfly is found in coastal and near coastal areas of eastern and northern Australia, and is known as *Theclinesthes onycha*. There are a further two species in the group that are slightly more divergent in morphology, and which have a similar speciation background as for *Theclinesthes albocincta*. One of these species is a blue coloured adult butterfly which has evolved on the common and widespread saltbushes (*Atriplex*, *Rhagodia*, *Chenopodium* etc, Chenopodiaceae) and is known as *Theclinesthes serpentata*. However, there is also a similar but slightly smaller butterfly without blue colouration (as for *T. albocincta*) which has evolved on coastal samphire (Chenopodiaceae) in eastern and northern Australia. This butterfly is known as *Theclinesthes sulphitius*. These various species of *Theclinesthes* have collectively presented Australian taxonomy experts with the unusual predicament of trying to determine, as to what stage should a geographical form of a butterfly be recognized as a subspecies, and at what stage should a subspecies be recognized as a distinct species. There is currently a DNA molecular project underway by Rod Eastwood at Griffiths University to try and resolve this dilemma. Many of the *Theclinesthes* forms and even the presently recognised morphological species are genetically very closely related, to the point where they would not normally be recognised as separate species. Some have only 'speciated' during the Pleistocene geological period, less than 2.6 million years ago!

Adults of *T. albocincta* normally fly very close to the hostplants, but males will dune-top during the heat of the day, especially when females are scarce. Males attempt to set up mini-territories on the hostplants, from where they make frequent flying forays to either fend off other males, or to other adjacent hostplant areas to look for unfertilised females. They perch on twigs or bushes in these territories, usually with opened wings. Females are normally seen flying near the hostplants where they are constantly searching for a good place to lay eggs. On occasions there are mass emergences of the butterflies when hundreds of butterflies are seen flying around the hostplants. Flight is reasonably fast, but of short duration, and occurs at the level of the hostplant bushes which are normally below (human) head height. Both sexes can usually be approached with ease when settled.

This butterfly is probably the most variable coloured butterfly to occur in Australia. The areal extent of the blue areas on the wing uppersides of the coastal form butterfly is variable, and reduces rapidly for butterflies occurring away from the coast or in hot, dry areas. The inland form of the butterfly occurring in the Far North of the state is entirely devoid of blue colouration. The underside colour can vary from pale to dark grey, or can be yellowish or brownish, and the markings can also be variable. Butterflies flying in winter are much darker

on the underside (sometimes black and white) thought due to increased melanin content being acquired during the longer early stage period in a cold environment (and perhaps shorter daylight period), and in some populations the blue upperside colour is replaced by dark grey colour during winter. This dark colouration cannot be reproduced in captivity with the pupa and is thought to be acquired through the larval stage.

## Life History

**Larval food-host:** *Adriana* species including *A. quadripartita* form *klotzschii* (coast bitterbush), *A. quadripartita* x *A. urticoides* (hybrid bitterbush), and *A. urticoides* var. *hookeri* (mallee bitterbush or water bush) (Euphorbiaceae). The coastal form of the butterfly usually associates with *A.q.* form *klotzschii*, but in the northern Eyre Peninsular region it also associates with *A.u.* var. *hookeri* and sometimes with a very rare *Adriana* hybrid *A. quadripartita* x *A. urticoides*. In the Far North of the state the inland form of the butterfly associates only with *A.u.* var. *hookeri*. (Unfortunately, the plant species within the *Adriana* genus have been undergoing an inordinate amount of name changing in recent years and one is likely to see the confusing previous names in many plant books or other references.)

*Adriana* are dioecious (separate male and female plants), and have numerous nectary glands. The larvae will eat all fleshy parts of the plants but prefer the flowering heads of the male plants. The *Adrianais* often indicative of near-surface fresh water.

**Larval attendant ant:** Larvae are attended or at least are harmlessly associated with most ants in the general area of the hostplant, as the ants also feed from the nectary glands on the *Adriana*. These ants include the large sugar-ants *Camponotus consobrinus* and *C. terebrans*, and a small black sugar-ant of the *C. rubiginosus* group, a small *Crematogaster* sp, *Dolichoderus* sp, *Iridomyrmex* spp incl. the large meat ants *I. purpureus*, *Iridomyrmex* sp (*rufoniger* group), *Melophorus* sp, *Monomorium* sp (harvester ant), the stinging *Myrmecia* spp incl. the inch-ant *M. nigriscapa*, brown or black *Notoncus*spp, a small *Ochetellus* sp, *Ochetellus glaber*, a black *Polyrhachis* sp and the black stinging *Rhytidoponera metallica*. There is a change of ant shifts at nightfall and at dawn.

**Eggs:** Small, initially pale green, later turning bluish, hemispherical, flattened top and bottom, with a coarsely reticulated pattern on the side, which becomes finer on top. There are very slight blunt projections at the pattern intersections. The reticulations are trapezoidal. Laid singly on the hostplant, and most commonly on the flower heads of the male plants. Eggs are sometimes so common on the male flower buds as to impart a fine speckled appearance. Eggs hatch in a few days in summer but take much longer to develop in the cool months, being about nine days in May.

**Larvae:** The first instar is initially pale greenish yellow with numerous long setae (hairs), changing colour after eating the hostplant. Later instars are onisciform (slater shaped) with a few short lateral hairs. The mature larvae are about 11-13 mm long, the head is small, smooth, yellow or brown, hidden beneath the body. The body is covered in numerous tiny secondary setae having a stellate spiny base and a long protruding serrated and pointed central spine, which give the larvae a scabrous appearance. The larvae are polymorphic coloured (i.e. they occur in many colour forms), and the colour and markings are highly variable, being some shade of green, pink, purple or brown, or combinations thereof, and

usually with a darker longitudinal dorsal stripe edged pale yellow on thoracic segments 2-3 and abdominal segments 1-6. The colours usually blend in with the portion of the hostplant they are eating, such as pink or purple if they are eating the purple male flower heads, or green if they are eating leaves. In captivity the colour can change during the life of the larva from purple to green or vice versa. There are some minor differences between the larvae of the adults occurring in southern coastal areas, and central and northwest Australia.

Larvae feed openly during the day as well as at night, and prefer to eat the flower buds of the male plants, which are more common during spring, but will also readily eat other parts of the plant when the male flowers are unavailable. The presence of larvae is readily discernible by the presence of ants, and of holes in the buds of the male flowers and by the scoring of the leaves. The larvae are very immobile when feeding on the flower buds. They eat a small hole into the sides of the buds then progressively insert their heads and forward parts of their bodies (and sometimes the complete body if it is still a first instar), into the bud and gradually eat out the stamen contents, until the bud is reduced to an empty shell. The larvae then become mobile again as they move to other buds. (The larvae are capable of extending considerably their hard heads into the bud, as the soft 'neck' parts behind the head work like a concertina.)

**Pupae:** Short cylindrical, with some short bristles, rounded anteriorly and posteriorly, about 9-11 mm long, in various shades of brown, speckled with darker markings which are more concentrated on the thorax, head and wings. Winter formed pupae may be nearly black. There is a prominent dark mark dorsally above the head, and there are usually an indistinct dark longitudinal dorsal line and an indistinct row of subdorsal spots. Attached by anal hooks and a central girdle to a silked substrate on (usually) dead leaf and other debris within or beneath the hostplant.

At pupation the larvae will sometimes loosely silk together two leaves or similar debris to make a flimsy cocoon or space to pupate within. In temperate areas the pupation period is about 7-15 days in the warmer months, extending to about 42 days in winter.

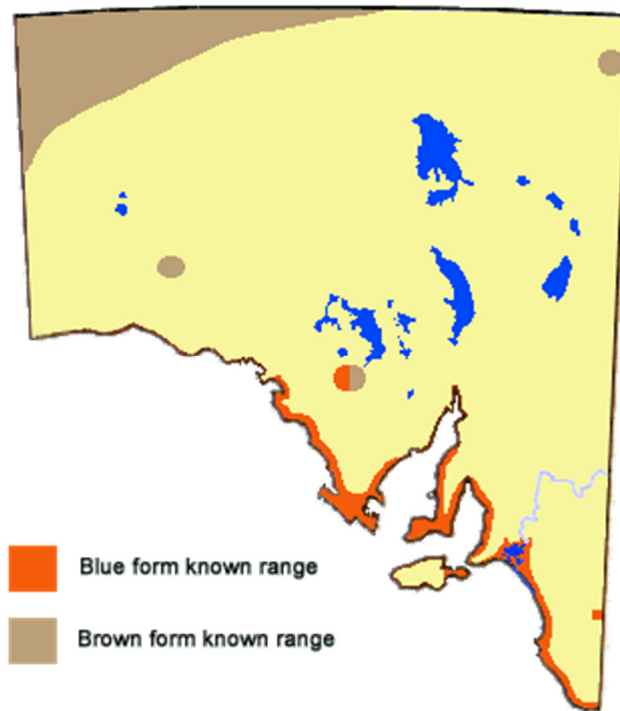
**Flight period in S.A.:** All months, but most common during spring to autumn. Very rarely seen during winter. In coastal areas, the flight numbers tend to build up during the hot months, such that in early spring few are seen flying, while in summer to early autumn they are usually quite common. In hot dry areas the flight numbers tend to be higher in spring and early summer, while the hostplants remain in a good condition. There are continuous broods over the warmer months, which are completed in 3 - 6 weeks during summer (depending on the area), extending to 10 weeks in late autumn. A winter brood can take 15 weeks to complete. There is sometimes a mass emergence of the butterfly when hundreds of butterflies are seen flying around the hostplants.



**Distribution:** The full-blue form of the butterfly is only found in coastal areas. The brown form of the butterfly is found in inland areas. The population in the Gawler Ranges is a

mixed hybrid population of both the blue and brown forms. The butterfly in its other forms, is also recorded generally from mainland Australia, wherever its hostplants occur in sufficient density.

The butterfly may have some degree of dispersal ability (typical of the Polyommata group of lycaenids), as they are able to recolonise isolated habitat seemingly destroyed after drought or fire.



**Habitat:** In South Australia the hostplant *A. quadripartita* form *klotzschii* usually occurs within the coastal and near coastal sand dune systems. There used to be a few additional small inland groves of this hostplant in the eastern Flinders Ranges extending to the Olary Region, and again in the Lower Murray Mallee and Southeast Regions. These latter groves are now mostly non-existent due to habitat clearance. On these groves, the butterfly has only ever been recorded at Wolseley (1939-49) in the Upper Southeast, comprising a single, dwarf brown form butterfly. Across the border in northwest Victoria, partially blue forms occur and those with the most brown usually occur during the hot and dry summer months. *A. urticoides* var. *hookeri* occurs sporadically in the inland red dune systems, mostly in the northern pastoral areas of the state, but there are several small occurrences in the dry, northern mallee areas at Ooldea and in the Gawler Ranges.

**Conservation Status in S.A.:** Locally common.

**Threats:** Groves of *A.q.* form *klotzschii*, away from the major urbanised areas, are still widespread and locally common in the coastal habitat, although this area is under constant threat in the form of beachside marina and holiday-shack developments. Some coastal *Adriana* groves, particularly north of Adelaide are under terminal stress from the lowering of the fresh water table due to excessive use of ground water for agricultural purposes. This aspect is further compounded by the continuing worldwide slow rise in sea

level due to global warming. The coastal form butterfly is presently only threatened near Adelaide due to the loss of hostplant from urbanisation and agricultural development. The rare *A.u. var. hookeri* groves of the inland are smaller in size, and many of the historical groves have been obliterated by drought and previous pastoral practices. Some pastoralists believe the plant is poisonous to stock and is therefore destroyed, although the plant is not listed as being poisonous. The relict hybrid form population of the butterfly in the Gawler Ranges is under potential terminal threat from bushfires and drought due to the small area of its hostplant.

**Conservation Strategy:** Coastal management policies need to recognise the dependence of the butterfly on the *A.q.* form *klotzschii* growing in the back-dune environment and therefore coastal dunes need to remain undisturbed. The latter plant would also be beneficial in preventing further scouring of beach sand. Near Adelaide, the butterfly and hostplant need to be re-introduced, particularly to conserved coastal dune areas. The hostplant would also make an attractive addition to gardens and the roadside environment in coastal areas, as it is tough (once established), easily grown, and readily amenable to pruning. Additional plantings of *A.u. var. hookeri* in the newly proclaimed conservation parks in the Gawler Ranges would help alleviate the potential threat to the butterfly in that region.

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