

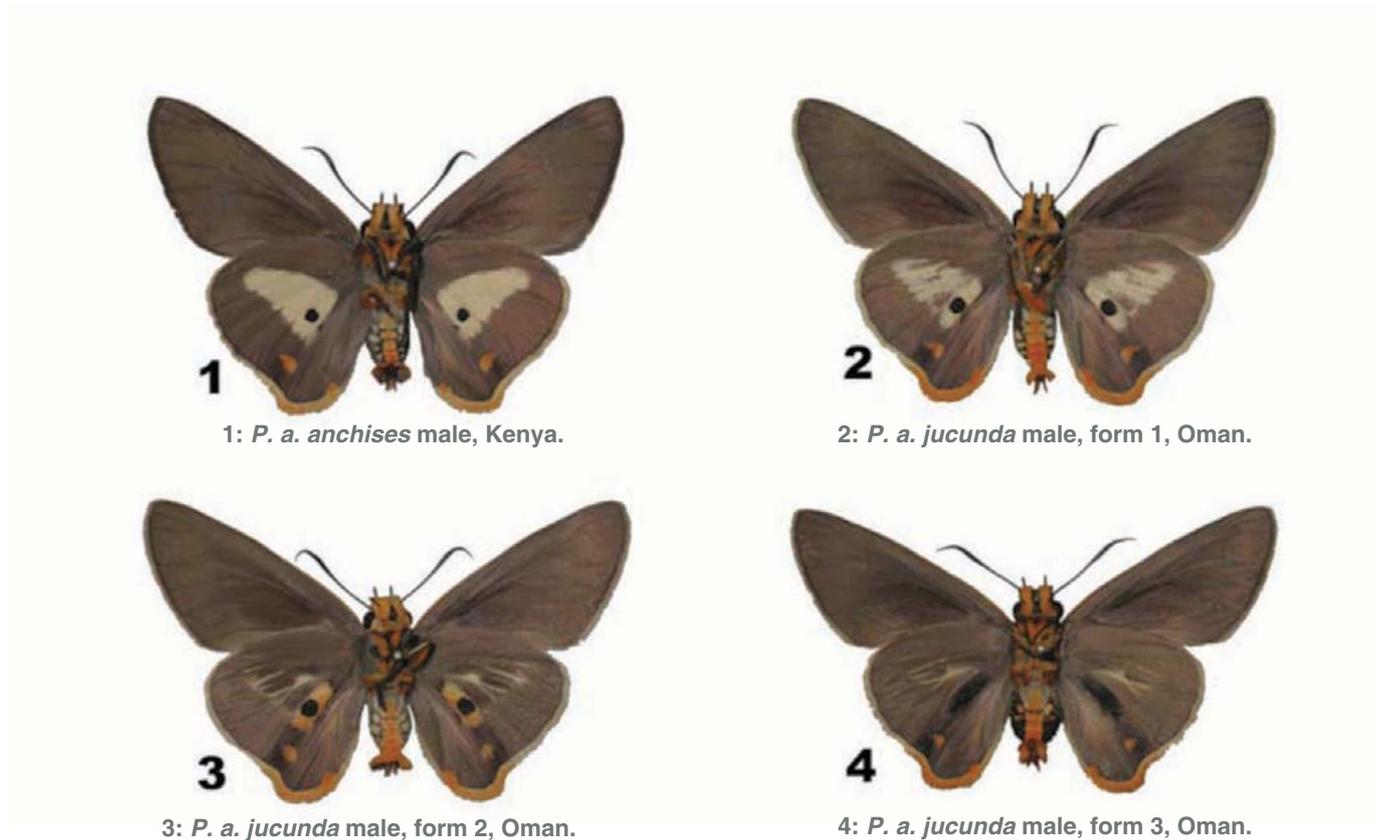
# The biology of *Pyrrhiades anchises jucunda* (Butler) in northern Oman (Lepidoptera: HesperIIDae, Coeliadinae)

by Matthew J.W. Cock

## Summary

The giant skipper, *Pyrrhiades anchises jucunda* (Butler) (= *Coeliades anchises jucunda*), was reared from *Acridocarpus orientalis* A.Juss (Malpighiaceae) in Oman. All stages are described and illustrated. Three adult forms are illustrated and compared with previous observations and illustrations published by T.B. Larsen; one form has not been previously reported.

Figs. 1-4: Undersides of *Pyrrhiades anchises*.



## Introduction

The giant skipper, *Pyrrhiades anchises jucunda* (Butler), is the largest skipper butterfly found in Arabia. Until recently, it was known as *Coeliades anchises jucunda*, but Chiba (2009) transferred it and three other species from *Coeliades* to *Pyrrhiades*, based on clear differences in the male genitalia. Its distribution includes the island of Socotra (type locality), Dhofar and northern Oman (Evans 1937; Larsen 1984; Ackery *et al.* 1995; Gillett 1995), with one record from Jebel Hafit, UAE (Khan 1999). The biology of ssp. *jucunda* in Oman is known (Larsen & Larsen 1980; Larsen 1984), but not recorded in any detail. A second subspecies, *P. anchises anchises* (Gerstaecker) (**Fig. 1**) is found from South Africa, where it is probably not resident (Henning *et al.* 1997), throughout eastern Africa to Arabia (Yemen). This paper describes the biology of ssp. *jucunda* from Oman, and makes limited comparisons with the author's unpublished observations of ssp. *anchises* in Kenya.

## Food plants

The only confirmed food plant of ssp. *jucunda* is a small tree in the Malpighiaceae: *Acridocarpus orientalis* A.Juss (Larsen & Larsen 1980), known locally as *qafaf* or *qafas* (Khan 1999). Larsen (1983) quotes an early report that *Ficus* sp. (Moraceae) is a food plant of ssp. *jucunda* on Socotra, but he considers this likely to be an error, and I agree.

In contrast, reported food plants of ssp. *anchises* include Asclepiadaceae: *Marsdenia* sp. in Kenya (Sevastopulo 1974), *Marsdenia angolensis* N.E.Br. in East Africa (van Someren, 1974), and Malpighiaceae: *Tristellateia australis* A.Rich. in Kenya (Sevastopulo 1974) *Triaspis leendertziae* Burtt Davy in South Africa (Gifford, 1965), and *T. glaucophylla* Engl. also in South Africa (Henning *et al.* 1997), although the last two records may actually refer to the same host plant species. In Kenya, I have found caterpillars on two other Malpighiaceae: once on *Acridocarpus zanzibaricus* A.Juss. (a sprawler rather than a tree), and frequently on *Caucanthus auriculatus* Nied. (M.J.W. Cock unpublished).

## Locality and habitat

The observations reported here were made on 28 January 1995, in Oman, close to the border with Abu Dhabi, UAE, and subsequently from material collected on this occasion. The locality is Hajah al Gharbi; it lies South-East of Al Buraymi Oasis (also spelt Buraimi), about 5 km south of Daqiq (also spelt A'Daqeeq), following the route described in Zandi (1993). This is an area of dry hills and wadis (**Fig. 5**), and was located on the basis of advice from M. Jongbloed (*pers. comm.* 1995) that the food plant, *Acridocarpus orientalis*, could be found in this area. South of Daqiq, *A. orientalis* grew as scattered bushes or small trees along the sides and edges of the wadis. Ova and caterpillars were easy to find on the food plant. Final instar caterpillars were particularly common on *A. orientalis* growing along a wadi running from West to East, and many could have been collected. By collecting large caterpillars, I subsequently reared six male and three female adults.



Fig 5. Habitat of *Pyrrhiades anchises jucunda*, Oman (Hajah al Gharbi, about 5 km South of Daqiq, Southeast of Al Buraymi Oasis), 28 January 1995. The small tree in the middle foreground is the food plant, *Acridocarpus orientalis* (*qafaf* or *qafas*).

## Adult behaviour

Adults of ssp. *jucunda* (**Fig. 6**) were quite common and at least 10 were seen. They were noted to fly around the food plants, settling briefly, but were very restless. They were also observed to fly slowly around low vegetation, perhaps looking for nectar sources, but to fly rapidly around hillsides with little vegetation

## Life History

**Ovum.** Ova (**Fig. 7**) are laid on both the leaf upper surface and under surface, usually singly, or two close together, but one small group of six was also found. The ova are white when newly laid, and turn cream in colour as they mature. Ova are typical of *Coeliades* and *Pyrriades* spp., almost hemispherical, 1.3mm ( $\pm 0.03$ , n=8) diameter and 0.9 mm ( $\pm 0.00$ , n=3) height, with 23-27 (mean  $24.8 \pm 1.4$ , n=9) fine ribs from the base to short of the micropyle, leaving a smooth area around the micropyle of about 0.7mm diameter. They are similar to the ovum of ssp. *anchises* which I have found in Kenya (M.J.W. Cock unpublished), but are larger and have more ribs.

**Caterpillar behaviour.** The smallest caterpillars hide between two leaves, one on top of the other, held in position with silk threads. They do not make the typical first stage shelter of *Coeliades* and *Pyrriades* spp., perhaps because the leaves of *A. orientalis* are so tough. Small caterpillars skeletonise the leaf upper surface, rather than perforate the lamina. The medium grown caterpillars either continue to shelter between two leaves, or may make a second stage shelter. Two forms of second stage shelter were observed. Typical of *Coeliades* and *Pyrriades* spp., one was made at the leaf apex by eating a cut from the edge of each side of the lamina about 25 mm from the tip to close to the mid-rib, and folding both flaps upwards to form a pocket (**Fig. 8**). Alternatively, just one cut was made and the resultant flap folded over onto the other half of the leaf apex. The third stage shelters occurred in three forms. Some caterpillars simply roll a whole leaf (**Fig. 9**). Other caterpillars made a cut from the edge of the lamina near the base of the leaf, and rolled the resultant distal flap. Finally, some drew together two or three leaves and held them with silk to form a tube between them (**Fig. 10**) - this was the least common type.

**Final, Sixth Instar Caterpillar.** Larsen & Larsen (1980) illustrate the mature caterpillar on *Acridocarpus orientalis* at Wadi-al-Asi near Nakhl, Oman. Henning *et al.* (1997) reproduce this photo in their account of *P. a. anchors* in South Africa. Larsen (1984, p.23) also illustrates the caterpillar in lateral view.

The following is based on an individual caterpillar of 45 mm (**Fig. 13**). Head 5 mm across; red; shiny rugose; a row of five black spots across the lower part of the face, the outer spots surrounding the stemmata, and the central one on the clypeus; mouthparts brown; scattered long, pale, setae, especially ventrally.

Thoracic segment 1 black, posterior margin white.

Thoracic segments 2 and 3 black; double, narrow white line across posterior margin, narrowly interrupted on dorsum; the two lines fuse laterally and each to the

legs; dark red ventrally.

Abdominal segments 1-4 black; quadruple white line across posterior margin, narrowly interrupted at dorsum apart from the second line; the four lines join together laterally and extend to just below the spiracles; red ventrally. Abdominal segments 5-9 brown-red ventrally.

Abdominal segments 5-6 similar to abdominal segments 1-4, but anterior two transverse lines brown-red at dorsum.

Abdominal segment 7 black; a long brown-red transverse bar; separated by narrow black line from double white line on posterior margin (interrupted at dorsum).

Abdominal segment 8 black; a long brown-red transverse bar on posterior margin.

Abdominal segment 9 black; a curved line runs from laterally on the anterior margin of the segment, to the posterior margin on the dorsum; this line brown-red apart from the lateral extremities which are white. Anal plate brown-red, with yellow anterior margin and dark lateral spot.

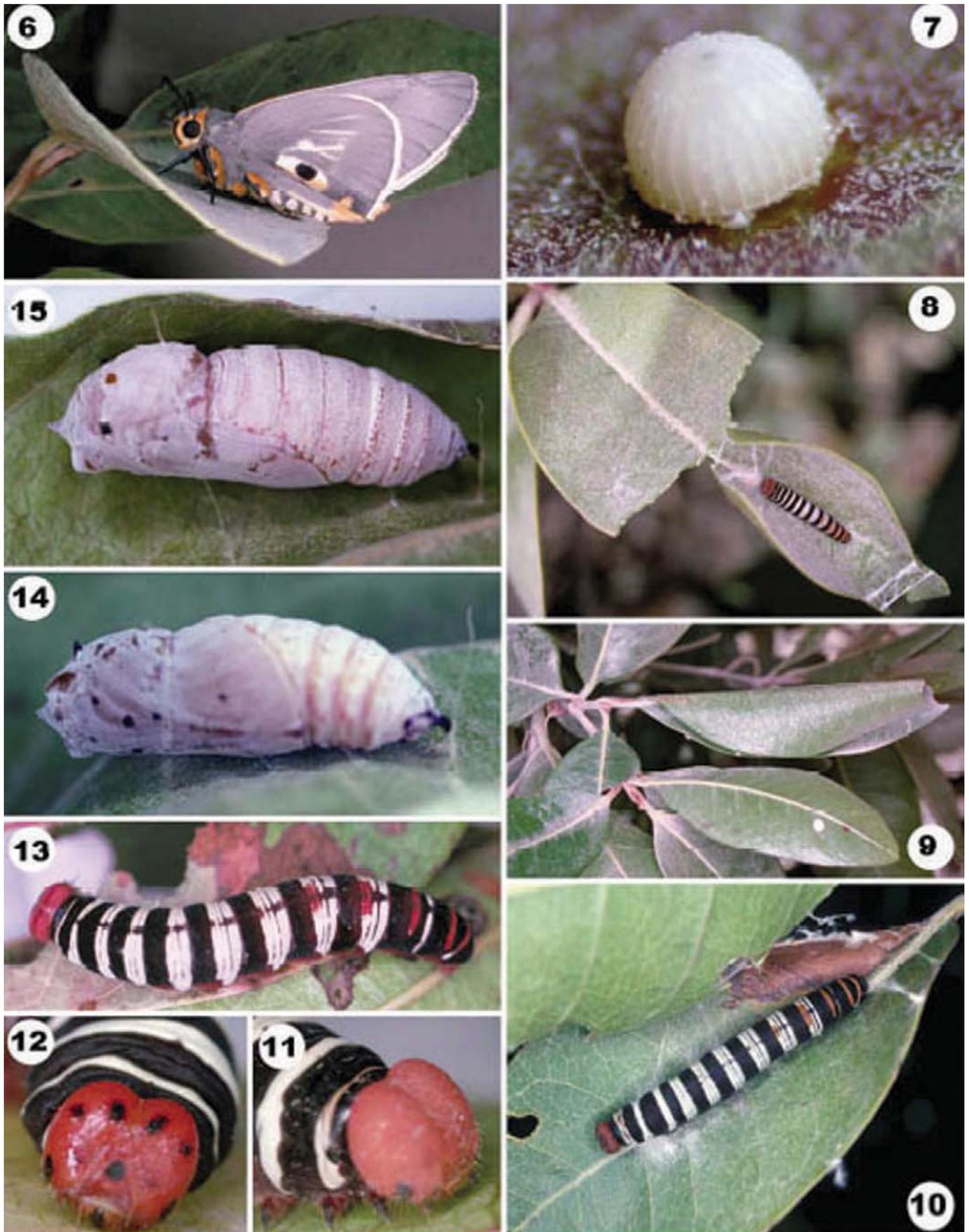
Spiracles dark; legs black; prolegs red-brown.

The markings of the head are variable, ranging from specimens with a plain red head, apart from a black spot around the stemmata (**Fig. 11**), to those with an upper row of four spots as well (**Fig. 12**), all heavily marked. Similarly, the extent to which the white transverse bands are interrupted at the dorsum is also variable, some caterpillars having more heavily marked white bands that continue across the dorsum. One caterpillar had lateral red-brown patches anterior to the white stripes on abdominal segments 3-6.

The caterpillars of ssp. *jucunda* are superficially similar to one of three forms of caterpillars of ssp. *anchors* which I have found in Kenya (M.J.W. Cock unpublished), which will be reported elsewhere.

**Earlier Instars.** In the first instar caterpillar, the head measures 0.7 x 0.7mm (n=1) wide x high and is orange-brown, with a black spot covering the stemmata; body orange-brown. The caterpillars of instars 2 to 5 are all basically similar in markings to the final, sixth instar caterpillars (**Figs. 8 and 10**). The head capsules of the penultimate instar measures 3.8 x 3.8mm (n=2), width x height.

**Pupa.** Pupation is in the stage 3 caterpillar shelters. Larsen (1983) refers to pupation taking place in a particularly elaborate shelter, but this does not seem to be the case. The pupa is smoothly contoured, with a short pointed frontal spike (**Figs. 14, 15**). When newly moulted, the pupa retains the colouring of the caterpillar, but over 1-2 days it turns pale brown and acquires a patina of white waxy powder so that it appears white. Cremaster, projecting spiracles on thoracic segment 1, two spots on the leg of thoracic segment 2, one spot on the leg of thoracic segment 3, spot at end cell forewing, and heart shaped outline ventrally just anterior to cremaster all black (**Fig. 14**). A spot dorso-laterally on thoracic segment 1 is bare of the white waxy powder and shows the light brown ground colour of the pupa (**Fig. 15**). The pupa is similar to that of ssp. *anchors* (M.J.W. Cock unpublished), but with reduced spotting.



Figs 6-15. Life cycle of *Pyrrhades anchises jucunda*, Oman. 6: Adult male, form 2; 7: Ovum; 8: Second stage caterpillar shelter; 9: Third stage caterpillar shelter, made by rolling an individual leaf; 10: Instar 4 caterpillar in third stage caterpillar shelter made from two leaves, one on top of the other; the shelter has been opened and the upper leaf displaced towards the top of the picture; 11: Head of instar 5 caterpillar, form with no spots on head; 12: Head of instar 5 caterpillar, form with full complement of spots, although the spots between the clypeus and stemmata are weak and diffuse; 13: Instar 5 caterpillar, dorsal view; 14: Pupa, ventro-lateral view; 15: Pupa, dorso-lateral view. All food plant leaves are *Acridocarpus orientalis*.

## Natural enemies

One ovum was parasitised by a *Trichogramma* sp. egg parasitoid, and more than 20 adult wasps were reared from this one ovum. They have not been identified to species. Other ova found in the field showed similar exit holes. No caterpillar parasitism was recorded.

## Adult variability

T.B. Larsen comments on the variability of adults of this species, and indicates that the type "has no trace of white markings and well developed red markings on the underside of the hind wings" (Larsen 1983, p. 443). The specimen illustrated by Larsen & Larsen (1980, p. 71) and Larsen (1984, plate 22, 416) closely resembles the type according to Larsen (1983), but it does have traces of white markings along the veins on the disc of the hind wing underside. Larsen (1983) states that most Oman specimens have feeble traces of white markings and less intense orange markings, but that very occasionally specimens are encountered in Dhofar (Larsen, plate 22, 418) with a white band almost as well developed as in ssp. *anchises*.

The reared adults from Oman were all collected as mature caterpillars, all collected at the same time, and within a few metres of each other, yet they are surprisingly variable. They seem to fall into three distinct groups, referred to here as forms 1-3.

In form 1, consisting of one male, the underside hind wing band is almost white, comparable with Larsen's Dhofar specimen (**Fig. 2**). In form 2, comprising four males and two females, the band is heavily sullied with grey, and there is a variable orange border to the dorsal margin of the white band in space 2 (**Fig. 3**); these are comparable with the intermediate male illustrated in Larsen (1983, Plate 22, 417). Finally in form 3, comprising one male and one female, the band is almost completely grey with just the veins paler, and the black spot in space 2 surrounded by grey instead of orange, and resembling a greasy blemish (**Fig. 4**). Nothing comparable to this third group seems to have been previously reported. No specimens matched that which Larsen compares to the type, in which the white in the underside hind wing band is replaced with orange. More material is needed to clarify whether these are relatively discrete forms, or whether the variation is continuous.

Although, both caterpillars and adults are variable, I cannot detect any correlation between the two. The adult of form 1 was reared from a caterpillar with all spots present on the head, although the outer spots in the upper row and the spots between the clypeus and the stemmata in the lower row were weak. Of the caterpillars which produced form 2 adult males, one had the upper row and the central spot of the lower row both missing, another had only the lower row of spots, and two had all spots present. One female of form 2 was reared from a caterpillar with only the spot over the stemmata, while the other had only the lower row of spots, the middle three being weak. The male of form 3 was reared from the caterpillar described in detail above, having only the lower row of spots on the head, while the female was reared from a caterpillar that had the lower spots and just a trace of the two inner spots from the upper row.

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