A recently discovered subspecies of *Pyrisitia euterpiformis* Munroe (Lepidoptera: Pieridae) from Jamaica, West Indies

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Abstract: In 2011, while surveying the Lepidoptera present in an arid, south coast locality east of the village of Alligator Pond, Manchester Parish, Jamaica, some small, pale yellow *Pyrisitia* Butler with weak flight were observed flying low to the ground, in and out of the margins of acacia scrub. These butterflies were noticeably smaller than the more brightly colored *Pyrisitia lisa euterpe* (Ménétriès) that were also present. Examination suggests this insect is very similar to *P. euterpiformis* (Munroe) of Hispaniola but with some differences. The Jamaican insect is named *P. euterpiformis turlandi* Turner, **ssp. nov.**

Key words: Acacia scrub, weakly flying, *Pyrisitia*, subspecies, Jamaica, Hispaniola.

INTRODUCTION

In July 2011, during continuing surveys of the Lepidoptera of arid cactus and acacia scrub, approximately 5 km east of Alligator Pond, Jamaica, Vaughan Turland and the author observed a few, small, pale yellow *Pyrisitia*-like butterflies, that were at first believed to be *Pyrisitia lisa euterpe* (Ménétriès). However, they were flying no more than 30 cm above the ground in and out of *Acacia tortuosa* (L.) Willd. shrubs growing along the roadside. At the same time, brighter yellow *P. lisa* (Boisduval & Le Conte) were flying much higher over low growing shrubs as well as along the exposed open verges along the roadside. Superficial examination of one of the paler male specimens from the acacia scrub revealed that there were fewer ventral markings on these specimens than on *P. lisa.* Significantly, the pink spot usually visible on the anterior of the lower hindwing of *P. lisa* between veins Rs–M2, was either absent or represented by a few pale orange scales. It was not until October 2014, following comparative studies of Caribbean *Pyrisitia* at the McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, Gainesville, FL, USA (MGCL), that three males were collected. A small, worn female specimen was collected at the same locality two months later. This female also exhibited small differences in the markings compared with *P. lisa*. Subsequent examination of the male genitalia determined that there were similarities with those of *P. euterpiformis* of Hispaniola. In particular, both species possess a V-shaped uncus. According to Munroe (1947, as *Eurema*) all other *Pyrisitia*, including *P. lisa*, possess a Y-shaped uncus. Examination of the genitalia of a number of species of Caribbean *Pyrisitia* indicates that the shape and ornamentation of the uncus appears to be reliably species-specific while differences in shape and armament of the distal process of the valve, when compared, may also be useful in distinguishing isolated island populations.

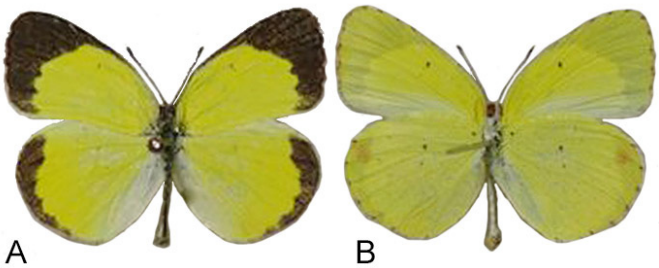

Fig. 1. Male holotype, *Pyrisitia euterpiformis turlandi*. **A**. dorsal surface. **B**. ventral surface.

Pyrisitia euterpiformis turlandi Turner, **ssp. nov.**

Description. **Holotype male**: (Figs. 1A, B) Wingspan 22.5 mm; forewing length 13.0 mm.

Dorsal forewing: Pale yellow; costa black; with or without a basal dusting of gray black scales; discal spot faintly present; apex black, broad, narrowing slightly along the outer margin, finishing bluntly, rather than tapering, at the tornus. *Dorsal hindwing*: Pale yellow with a short gray-black basal streak extending to the anal margin. Outer margin from Rs to Cu2 black, tapering towards the tornus; inner margin scarcely toothed. *Dorsal head*: black, with a few yellow or yellow and pink hair-like scales; palpi pale yellow. Antennae, less than half the length of forewing; black-and-white banded, with elongated, somewhat tubular-shaped clubs with buff tips. Dorsal thorax, black with sparse, mostly yellow, hair-like scales; ventrally pale yellow, with pale yellow legs. Dorsal abdomen black, with a few short yellow scales; lateral and ventral abdomen: pale yellow. *Ventral forewing*: Pale yellow; primary veins endings marked with fine black spots, linked by a fringing line of orange-yellow marginal scales; a single minute, black, discal spot present; remainder of wing without markings. *Ventral hindwing*: With a minute, black spot at the base of the humeral vein, and a pair of minute black spots at the end of the discal cell, the uppermost largest; a greatly reduced, gray vertical marking along vein Sc near the center of the anterior margin; basal, median, and submarginal maculations virtually absent. Anterior outer margin between Rs–M2 with a diffuse orange-pink spot lacking a well-defined border.

Genitalia. *Valve*: Short, with one long, curved, pointed chitinous spine, and one much shorter blunter spine just distad, repeated on both the upper and lower sides of the valve, all

positioned towards the end of the valve. *Distal process*: With one longer spine and two shorter teeth, the longer curved spine just separated from the shorter teeth. *Aedeagus*: base slightly enlarged; tubular; gently arched; distal end slightly flared. *Tegumen*: Short; somewhat triangular. *Uncus*: Base broad laterally but tapering towards the vinculum, forming a shallow V shape, with a long narrow extension terminating in a slight ventral expansion at the terminus. *Saccus*: Relatively long, almost straight; anterior end slightly bulbous; a short-tapered extension beneath the anterior of the valve.

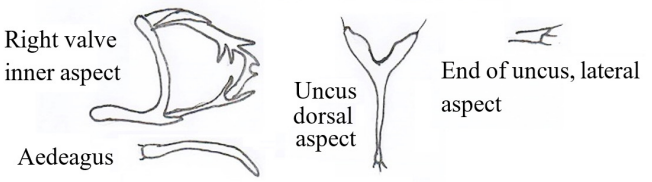

Fig. 2. Male holotype genitalia, *Pyrisitia euterpiformis turlandi*.

Paratype female: Wingspan 23.0 mm; forewing length 13.5 mm (n=1).

Dorsal forewing: Pale yellow with a minute black discal spot and a broad black apex extending along the outer margin to vein Cu2 where it bluntly terminates. Inner margin of black marking, not dentate as found in the male. Outer margin fringed with yellow scales intermixed with a few pink scales. *Dorsal hindwing*: Pale yellow with a lighter anal margin; smudged black markings at the margin over veins Sc+R1–Rs; darker markings along M1; ends of remaining primary veins marked with black endings at the margin. *Head, thorax, legs, and abdomen* are similar in color to those of the male. *Ventral forewing*: Similar to those described for the male. *Ventral hindwing*: with faint, gray, postdiscal and mesal maculations; a small, diffuse pale orange-pink spot between Sc+R1–Rs and M1 extending marginally into the cell below M1, lacking a well-defined border. Outer margin marked with a narrow orange-yellow marginal line with yellow fringing scales.

Fig. 3. Paratype female, *Pyrisitia euterpiformis turlandi*. **A**. dorsal surface. **B**. ventral surface.

Specimens examined. Three males and one female were collected by Vaughan Turland under permit # 18/27 issued by the National Environmental Protection Agency (NEPA) and made available for study before the specimens were deposited at the Natural History Museum of Jamaica, Institute of Jamaica as one of the conditions of the permit. The permit allowed for the collection of only four specimens of this insect although others were observed and photographed in the field. The average wingspan for the male *P. euterpiformis turlandi* that were collected is 20.4 mm; average forewing length 13.5 mm (n=3), as compared to Jamaican *P. lisa* where the average wingspan of the male is 26.4 mm and average wingspan of the female 27.8 mm; average forewing length 15.7 mm (n=138). Both insects are present in the field at the same time in the same location.

Observations in the field and examination of photographs indicate that the female is a uniform pale yellow color and that dorsal markings on the upper hindwing may be limited to black spots at the ends of the primary veins at the margin, or may include a limited smudged black marginal marking between veins Rs–M1. In this respect the insect is similar in appearance to *P. lisa* but the black marginal markings on the upper hindwing are between Sc+R1 and midway between M1–M2. A similar distribution of black marginal markings is found on the upper hindwing of female *P. euterpiformis euterpiformis* in Hispaniola, while in *P. euterpiformis turlandi* the black markings on the female upper hindwing, if present, are found only between Rs–M1.

Holotype male with the following labels: white label printed in black ink "V. Turland/Oct. 2, 2014/Alligator Pond/ Manchester/Jamaica W. I." - red label printed in black ink identifying holotype also attached. Male genitalia in vial with same data numbered JA 18/27 also deposited.

Paratype: Female collected at the same site as the male holotype. Specimen deposited at the Natural History Museum of Jamaica, Institute of Jamaica, Kingston with the attached notation "V. Turland/Dec. 14, 2014/Alligator Pond/Manchester/ Jamaica W.I." – on white label; red label signifying paratype also attached. Two additional males with same collection data were also deposited; the first without a pink spot on the lower hindwing; the second with a faint orange-pink spot.

Type locality. Approximately 5 km east of the village of Alligator Pond, Manchester Parish on the west side of the first road cut through a limestone bluff at an elevation of approximately 30 m (Fig. 4).

Fig. 4. Type locality of *Pyrisitia euterpiformis turlandi* in arid cactus and acacia scrub, approximately 5 km east of Alligator Pond, Alligator Pond, Manchester Parish.

Etymology. This subspecies is named for Vaughan Turland, experienced field naturalist and wildlife photographer who, while photographing specimens for a new book on Jamaican butterflies, noticed differences in behavior of this small pale yellow butterfly in arid dry limestone scrub habitat leading to this discovery. The common name is The Jamaican Yellow.

Distribution and phenology. The only confirmed localities for *P. euterpiformis turlandi* are the sites at Alligator Pond, Manchester Parish, and in similar acacia scrub habitat at Starve Gut Bay, St. Elizabeth Parish, 25 km to the west. Examination of a series of "*P. lisa*", collected island-wide between 1960 and 1970 in the Turner collection, found five additional male specimens of what appear to be male *P. euterpiformis*, and in addition, one male collected at Burnt Hill, Trelawny Parish on the east side of the Cockpit Country in July 1995 (permit JM 250). The Burnt Hill specimen is deeper orange-yellow with bold marginal markings, very similar to typical Hispaniolan specimens and was flying in dry limestone habitat bordering wet limestone habitat. Single specimens from the dry coastal locations of Falmouth and Silver Sands, Trelawny Parish to the north are bright lemon-yellow rather than pale yellow and may represent this species. Additional permits are required to complete an island wide survey (Fig. 5).

Fig. 5. Known distribution (red spots) and suspected locations (red circles) of *P. euterpiformis turlandi* in Jamaica.

Comparative discussion. The genitalia of *P. e. turlandi* (Fig. 2) are very similar to those of *P. e. euterpiformis* (Fig. 5) of Hispaniola, but differ as follows: Anterior arms of uncus somewhat tapered, and less ovate than the nominate subspecies, but in both subspecies forming a distinct V rather than a Y-shape as found in related species including *P. lisa euterpe* (Fig. 6). Distal end of uncus in *turlandi* expanded ventrally, bearing three terminal setae; in the nominate subspecies terminus of uncus slightly lobed with several median setae present but none terminally. Saccus slightly notched in subspecies *euterpiformis*; bulbous in *turlandi*; valves shaped similarly in both subspecies. Setation on valves similar; each valve with dorsal and ventral pairs of long chitinous spines; distal process, with two small and one large tooth in *turlandi* but with three small teeth and one larger in *euterpiformis.* The genitalic similarities indicate a clear relationship between the subspecies from Jamaica and Hispaniola. Additional research may prove that the differences are indicative of a distinct species.

Color variations. Male dorsal forewing: discal spot may be absent, faintly present or distinctly present but minute. Specimens of *P. euterpiformis* described from Hispaniola by

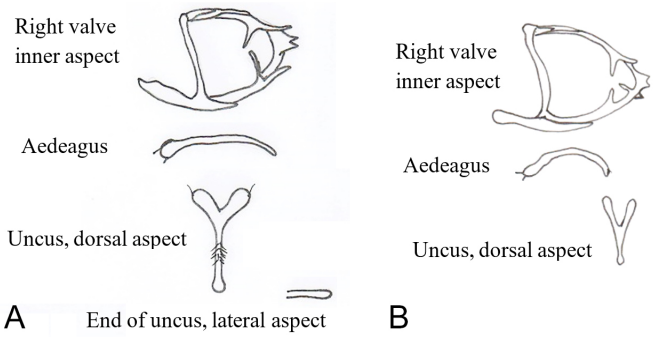

Fig. 6. A. Male genitalia of *P. euterpiformis euterpiformis*, from Dominican Republic. **B**. Male genitalia of *P. lisa euterpe* from Jamaica.

Riley (1975: 120) indicate that there is no discal spot on this wing surface, which is also noted by Schwartz (1989) and Smith *et al*. (1994). However, of three male specimens of *P. e. euterpiformis* obtained from Ronald King, collected under permit # 0000892 in July 2008 at D. R. Pedernales/Parque Nacional/Bahoruco; D. R. La Altagracia/Parque Nacional del Esto/Boca del Yuma, and at Bayahibe in the Dominican Republic, one lacks the discal spot, the second displays a faint minute spot and the third a distinct minute discal spot, agreeing with variations seen in specimens examined from Alligator Pond, Manchester Parish, Jamaica. Presence or absence of this spot does not appear related to environmental conditions. While the inner margin of the black border along the outer margin on this wing is relatively smooth in dry season forms, for those specimens present in mesic conditions the inner margin is inwardly toothed along veins Cu1 and Cu2.

Male ventral hindwing: The orange-pink spot between Sc+R1–M1 on the anterior outer margin may be absent (Fig. 7A), reduced to a few orange-pink scales (Fig. 7B), or may be represented by a small pale orange-pink spot (Fig. 7C). Basal, mesal and submarginal maculations may be virtually absent or faintly present, represented by diffuse gray scales.

Female dorsal forewing: There is always a minute discal spot on the upper forewing. Marginal scales at the apical and outer margin are predominantly yellow, not pink as found in *P. lisa.*

Dorsal hindwing: Gray-black patch at the anterior outer margin is reduced to linear markings largely restricted to veins Sc+R1, Rs and M1 during dryer seasons, but forms a distinct gray-black patch inclusive of these veins during more humid periods, similar to variations found in females of *P. lisa*. However, in *P. euterpiformis turlandi* no pale and intermediate genetically-derived female color forms of *P. e. turlandi*, as occurring in *P. lisa euterpe* have been found.

Ventral hindwing: Basal, mesal and submarginal maculations tend to be greatly reduced or almost entirely absent in dryer periods, but can be moderately expressed with diffuse gray scales during mesic periods. However, none of these are as strongly marked as those found on *P. lisa* during comparable periods.

Identifying these taxa by wing pattern is difficult, but the male genitalia are distinct. It has not yet been possible to identify females of *P. e. turlandi* in existing collections, a situation that will change when additional specimens become

available for study. In the field it is also apparent that the clubs of *turlandi* are elongated with buff tips while those of *P. lisa* are curved, with yellow tips, but the clubs are very small and do not easily permit the separation of species with confidence. Also, a small, pale yellow male butterfly with broad black borders on the upper forewing from the type locality, appearing to be *turlandi* was found, upon dissection, to represent *P. lisa*.

Fig. 7. Examples of presence or absence of orange pink spot on the ventral hindwing. **A**. ♂ Alligator Pond, Manchester, Oct 2014. **B.** ♂ Alligator Pond, Manchester, Dec 2014. **C**. ♂ with prominent orange-pink spot, Starve Gut Bay, St. Elizabeth, Jun 2014.

Fig. 8. ♀ Alligator Pond, Manchester, Dec 2014.

Discussion. The male holotype of *P. e. euterpiformis* from Hispaniola was collected near Kenscoff, Ouest Department, Haiti at an elevation of 1471 m (4826 ft) by Marston Bates on March 10, 1935. It was initially identified *P. lisa* until recognized as being different by Munroe (1947), who described this as a new species, *Pyrisitia euterpiformis*. The type is deposited at the American Museum of Natural History (New York, New York), genital preparation # 562, with paratypes at the Museum of Comparative Zoology (Harvard University, Cambridge, Massachusetts).

Jamaican specimens differ from Hispaniolan specimens in being more lightly marked dorsally and ventrally, and both sexes from Alligator Pond, Manchester Parish are generally of a paler yellow color than those from Hispaniola.

Initially regarded as a high-altitude species associated with pine or mixed pine and hardwood forests, subsequent collecting revealed that *P. euterpiformis* can also be found in a wide range of lowland and coastal habitats in the Dominican Republic, including the edges of mesic forest, beaches, along margins of mangroves and in xeric forest including *Acacia* scrub (Schwartz, 1989: 161–163; Smith *et al*., 1994: 146). They often fly with *P. lisa*, as they also do in Jamaica.

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