

Genus *Tirumala* Moore, [1880]

Monarchs

In: Moore, [1880-2]. *The lepidoptera of Ceylon* 1: 4 (190 pp.). London.

Type-species: *Papilio limniace* Cramer, by original designation [extralimital].

= *Melinda* Moore, 1883. *Proceedings of the Zoological Society of London* 1883: 229 (201-324).

Type-species: *Danais formosa* Godman, by monotypy. Invalid; junior homonym of *Melinda* Robineau-Desvoidy, 1830.

= *Elsa* Honrath, 1892. *Berliner Entomologische Zeitschrift* 36: 436 (429-440). Type-species: *Elsa morgenii* Honrath, by monotypy.



Tirumala formosa mercedonia. Image courtesy of Jeremy Dobson.

The genus *Tirumala* belongs to the Family Nymphalidae Rafinesque, 1815; Subfamily Danainae Boisduval, 1833; Tribe Danaini Boisduval, 1833; Subtribe Dainaina, Boisduval, 1833. The other genus in the Subtribe Danaina in the Afrotropical Region is *Danaus*.

Tirumala (**Monarchs**) is an Old World genus of nine species, two of which are Afrotropical.

Relevant literature:

Hashimoto & Yata, 2008a [Taxonomic implications of male genitalic morphology].

Hashimoto & Yata, 2008b [Sexual isolation between species in relation to pheromone transfer particles].

Hashimoto & Yata, 2007 [Comparative microstructure of pheromone transfer particles and role in reproductive isolation of taxa].

Lushai *et al.*, 2003 [Molecular clocks and phylogeny].

**Tirumala formosa* (Godman, 1880)

Beautiful Monarch

Danais formosa Godman, 1880 in Godman & Distant, 1880. *Proceedings of the Zoological Society of London* 1880: 183 (182-

185).



Tirumala formosa mercedonia. Male (Wingspan 78 mm). Left – upperside; right – underside. Wingspan 78 mm. Mabira Forest, Uganda. 13 July 2008. P. Ward. Images M.C. Williams ex Dobson Collection.



Tirumala formosa mercedonia. Female. Left – upperside; right – underside. Fort Portal, Uganda. 7 June 2017. J. Dobson. Images M.C. Williams ex Dobson Collection.

Alternative common names: Beautiful Tiger; Large Tiger.

Type locality: [Tanzania]: “Gnuru Hills, East Africa”.

Distribution: Nigeria, Cameroon, Equatorial Guinea, Gabon, Democratic Republic of Congo, Sudan, Ethiopia, Somalia, Uganda, Rwanda, Burundi, Kenya, Tanzania, Zambia.

Habitat: Semi-montane forest. Rarely found below 1 500 in Kenya and Nigeria (Larsen, 1991c; Larsen, 2005a) and up to 2 300 m in Tanzania (Kielland, 1990d). At 1 100 m in Korup, Cameroon. Occasionally as low as 300 m (Sanje, in Tanzania) (Kielland, 1990d).

Habits: Normally flies high up in the forest canopy, with a slow, gliding flight, unless disturbed. Specimens regularly come down to feed from flowers. Males have been seen imbibing pyrrolizidine alkaloids from species of *Heliotropium* (Boraginaceae) (Larsen, 1991c). Males congregate to mud-puddle (Congdon & Collins, 1998). Kielland (*vide* Larsen, 2005a) noted a northward migration in Tanzania, but migrations are probably unusual for this species. Mimicked by the much larger *Papilio rex*, the subspecies even mimicking those of its model (Larsen, 2005a).

Early stages:

Rogers & Van Someren, 1925.

Larval food:

Cryptolepis species (Apocynaceae) [Van Someren, 1974: 324].

Periploca linearifolia Quart.-Dill. & A.Rich. ex A.Rich. (Apocynaceae) [Van Someren, 1974: 323].
Secamone africana (Oliv.) Bullock (Apocynaceae) [Van Someren, 1974: 323; as *Secamone platystigma*].
Secamone parvifolia (Oliv.) Bullock (Apocynaceae) [Van Someren, 1974: 324; as *Secamone zambesiaca*].
Secamone punctulata Decne. (Apocynaceae) [Van Someren, 1974: 323; as *Secamone micranda*].
Secamone punctulata Decne. (Apocynaceae) [Van Someren, 1974: 323; Congdon & Collins, 1998: 35; Tanzania; oviposition only; as *Secamone punctata*].

***Tirumala formosa formosa* (Godman, 1880)**
Beautiful Monarch

Danais formosa Godman, 1880 *in* Godman and Distant, 1880. *Proceedings of the Zoological Society of London* **1880**: 183 (182-185).

Type locality: [Tanzania]: “Gnuru Hills, East Africa”.

Distribution: Kenya (highlands east of Rift Valley), Tanzania (north-east and western highlands), Zambia.

Specific localities:

Kenya – central highlands (Larsen, 1991c); Nairobi (Larsen, 1991c); Teita Hills (Larsen, 1991c); Chyulu Hills (Larsen, 1991c); Namanga (Larsen, 1991c); Mt Sagala (Larsen, 1991c).

Tanzania – Gnuru Hills (TL); Mountains of the north and north-east, south to Mufindi, inland to Rubeho Mountains (Kielland, 1990d); Mpanda and Kigoma (Kielland, 1990d); Kasoge (Kielland, 1990d); Sanje (Kielland, 1990d); Lufisi River, in the Rubeho Mountains (Kielland, 1990d); Mt Kilimanjaro (Liseki & Vane-Wright, 2015).

Zambia – Known from a single specimen from the Mafinga Mountains, collected by Heath (Heath *et al.*, 2002).

Note: Specimens from Kakamega forest tend to be transitional between the nominate subspecies and subspecies *mercedonia* (Larsen, 1991c).

***Tirumala formosa mercedonia* (Karsch, 1894)**
Congo Beautiful Monarch

Melinda mercedonia Karsch, 1894. *Entomologische Nachrichten. Berlin* **20**: 225 (209-240).



Tirumala formosa mercedonia. Male (Wingspan 78 mm). Left – upperside; right – underside. Wingspan 78 mm. Mabira Forest, Uganda. 13 July 2008. P. Ward. Images M.C. Williams ex Dobson Collection.



Tirumala formosa mercedonia. Female. Left – upperside; right – underside.
Fort Portal, Uganda. 7 June 2017. J. Dobson.
Images M.C. Williams ex Dobson Collection.

Type locality: [Tanzania]: “Deutsch-Ostafrika, See Kirima, Karewia, Ukondja und Mtarika”.

Diagnosis: Differs from the nominate subspecies in that, on the forewing upperside, the red basal areas are absent and on the hindwing upperside the hyaline basal areas and spotting are reduced (Congdon & Collins, 1998).

Distribution: Democratic Republic of Congo (Ituri, north Kivu), Uganda, Rwanda, Burundi, Kenya (west of the Rift Valley), Tanzania (north-west).

Specific localities:

Democratic Republic of Congo – Ituri Forest (Ducarme, 2018); Semuliki Valley (Ducarme, 2018); Mt Mitumba (Ducarme, 2018); Mt Blue (Ducarme, 2018).

Uganda – Semuliki N.P. (Davenport & Howard, 1996).

Kenya – Yala (Stoneham, 1958); Kitale (Larsen, 1991c); Kericho (Larsen, 1991c); Kakamega Forest (Larsen, 1991c).

Tanzania – Lake Kirima (Karsch, 1894); Karewia (Karsch, 1894); Ukondja (Karsch, 1894); Mtarika (Karsch, 1894); Minziro Forest (Congdon & Collins, 1998); Munene Forest (Congdon & Collins, 1998); Rumanyika Game Reserve (Congdon & Collins, 1998).

yala Stoneham, 1958 (as f. of *Danaus formosa*). *Bulletin of the Stoneham Museum* (71): [2] ([3 pp.]). Kenya: “Yala”.

Tirumala formosa morgeni (Honrath, 1892)

Western Beautiful Monarch

Elsa morgeni Honrath, 1892. *Berliner Entomologische Zeitschrift* 36: 436 (429-440).

Type locality: Cameroon: “Kamerun centr.”.

Distribution: Nigeria (east), Cameroon, Equatorial Guinea, Gabon.

Specific localities:

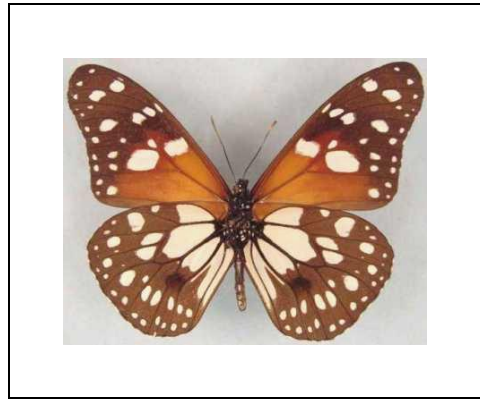
Nigeria – Obudu Plateau (Larsen, 2005a); Oban Hills (Larsen, 2005a).

Cameroon – Korup (Larsen, 2005a).

Tirumala formosa neumanni (Rothschild, 1902)

Abyssinian Beautiful Monarch

Danaus formosa neumanni Rothschild, 1902. *Novitates Zoologicae* 9: 596 (595-598).



Tirumala formosa neumanni. Male. Left – upperside; right – underside.
Wingspan: 74mm. Volgo F., Boure, 45k SW. Jimma, W. Ethiopia. 11/13.7.95.
S. Collins. (Curle Trust Collection – 58).

Type locality: Ethiopia: “Kaffa”.

Distribution: Sudan (south), Ethiopia, Somalia.

Specific localities:

Ethiopia – Kaffa (TL); Volgo Forest, Boure, 45 km sw of Jimma (male illustrated above).

****Tirumala petiverana* (Doubleday, [1847])#**
African Blue Monarch



Male Blue Monarch alkaloiding on *Crotalaria*. Cameroon, May 2019.
Image courtesy Jeremy Dobson.

Danais limniace var. *petiverana* Doubleday, [1847] *in* Doubleday & Westwood, [1846-52]. *The genera of diurnal Lepidoptera*, London: 93 (1: 1-250 pp.; 2: 251-534 pp.). London.

Danaus limniace petiverana Doubleday & Hewitson, 1847. Dickson & Kroon, 1978.

Tirumala petiverana (Doubleday, 1847). Ackery & Vane-Wright, 1984.

Tirumala petiverana (Doubleday, 1847). Pringle *et al.*, 1994: 48.



Tirumala petiverana. Male. Left – upperside; right – underside.
Malta Forest, Limpopo Province, South Africa. 26 June, 1976. P. Kruger.
Images M.C. Williams ex Henning Collection.



Tirumala petiverana. Female (Wingspan 72 mm). Left – upperside; right – underside.
Mabira Forest, Uganda. 29 June 2008. P. Ward.
Images M.C. Williams ex Dobson Collection.

Alternative common names: Dappled Monarch; African Blue Tiger.

Type locality: “Africa”.

Diagnosis: Closest [superficially] to the Oriental species *Tirumala limniace* (Cramer) (Kielland, 1990d).

Distribution: Senegal, Guinea-Bissau (Bivar-de-Sousa *et al.*, 2016), Guinea, Burkina Faso, Sierra Leone, Ivory Coast, Ghana, Togo, Benin (throughout), Nigeria (south and Cross River loop), Cameroon, Gabon, Angola, Central African Republic, Democratic Republic of Congo, Sudan, Ethiopia, Uganda, Kenya, Tanzania, Zambia, Mozambique, Zimbabwe (north), Botswana, Namibia (north), South Africa (Limpopo Province, Gauteng – a few records for both provinces).

Specific localities:

Senegal – Basse Casamance (Larsen, 2005a).

Guinea – Ziama (Safian *et al.*, 2020).

Ghana – Bobiri Butterfly Sanctuary (Larsen *et al.*, 2007); Boabeng-Fiema Monkey Sanctuary (Larsen *et al.* 2009).

Benin – Noyau Central, Lama Forest (Fermon *et al.*, 2001); Houeyogbe Forest (Coache & Rainon, 2016); see Coache *et al.*, 2017.

Cameroon – Rumpi Hills (Helps, *vide* Larsen, 2005a).

Gabon – Keri (Vande weghe, 2010); Ipassa (Vande weghe, 2010); Waka (Vande weghe, 2010); Lope (Vande weghe, 2010); Bitam (Vande weghe, 2010); Franceville (Vande weghe, 2010).

Central African Republic – Dzanga (Noss, 1998).

Democratic Republic of Congo – Ituri Forest (Ducarme, 2018); Semuliki Valley (Ducarme, 2018); Mt Blue (Ducarme, 2018).

Uganda – Semuliki N.P. (Davenport & Howard, 1996).

Kenya – Widespread (Larsen, 1991c); Malindi (Stoneham, 1958); Marsabit (Larsen, 1991c).

Tanzania – East, north and west (Kielland, 1990d); Katavi National Park (Fitzherbert *et al.*, 2006); Mt Kilimanjaro (Liseki & Vane-Wright, 2015).

Zambia – Kabompo River (Heath *et al.*, 2002); Mwinilunga (Heath *et al.*, 2002); Mpongwe (Heath *et al.*, 2002); Mufulira (Heath *et al.*, 2002); Mwekera (Heath *et al.*, 2002); Ndola (Heath *et al.*, 2002); Mumbwa (Heath *et al.*, 2002); Chisamaba (Heath *et al.*, 2002); Mount Makulu (Heath *et al.*, 2002).

Zimbabwe – Dichwe Farm, near Chinhoyi (Pringle *et al.*, 1994); Hibernian Mine (Stevenson); Hwange (Stevenson); Lomagundi (Stevenson); Mutare (Sheppard); Penhalonga (Pinhey); Harare (Pinhey); Rutenga (Van Son); lower Vumba Mountains (Paré); Lundi (male illustrated above).

Botswana – Tuli Block (S. Baytopp; single record *vide* Larsen, 1991).

Namibia – Katima Mulilo in the Caprivi (Pringle *et al.*, 1994); Kombat (S. Braine); Andara (Gaerdes).

Limpopo Province – near Chuniespoort (Stevenson); Pietersburg (Wannenburg).

Gauteng – Randburg (Thamm).

Habitat: Open forest, disturbed areas in the main forest zone and moist savanna. In Tanzania, at altitudes from 400 to 1 600 m (Kielland, 1990d).

Habits: The flight is usually high above the ground, fairly slow and relaxed, and swooping. Males mud-puddle and are sometimes also found on carnivore scats (Pringle *et al.*, 1994). Together with *Danaus chrysippus*, large numbers are sometimes found feeding from flowering acacia trees (Larsen, 1991c). Males are frequently noted imbibing pyrrolizidine alkaloids (Larsen, 1991c). A frequent participant in mixed migrations (Larsen, 1968). Stoneham (1960) records regular east-west migrations in Trans-Nzoia, Kenya, in the early months of the year, just before the rains. Gregarious roosting is known to occur (Pringle *et al.*, 1994). Groups of up to thirty, together with species of *Amauris*, quasi-aestivate during extended dry periods (Larsen, 2005a). They have sometimes been caught in banana-baited traps, probably in search of water rather than alcohol (Larsen, 2005a). *Graphium leonidas*, *Graphium philonoe whalleyi* and *Euxanthe eurinome* are probably mimics of *Tirumala petiverana* (Larsen, 1991c; Larsen, 2005a).

Flight period: Southern African records are for February to May, with a peak in April (Pringle *et al.*, 1994; Woodhall, 2005) but further north it flies in every month of the year.

Early stages:

Rogers & Van Someren, 1925: 30 (*J. E. Afr. Uganda Nat. Hist. Soc.* 21: 30).

Egg pale creamy white; laid on underside of leaves of a “creeper”; tall, oval; longitudinal ribs and transverse ridges. Larva from 2nd instar whitish with narrow brownish transverse lines; each segment with broad white band at anterior edge; legs blackish, each with a couple of large white spots at their bases; head black with a white trident; two pairs of fleshy filaments, placed on 3rd (2nd, *vide* Van Son, 1955: 8) and 11th segments, dorsally, as in *D. chrysippus* (incorrect *vide* Van Son, 1955: 8 – *chrysippus* has three pairs of processes). Pupa pale translucent green, similar in shape to other danaines but more angled dorsally; golden spots along the line of the abdominal angle, dorsothoracic ridge, wing cases and head case; once imago has emerged pupal case is clear and transparent.

Ackery & Vane-Wright, 1984 [larva].

Larval food:

Daemia species (Apocynaceae) [Larsen, 2005a].

Hoya species (Apocynaceae) [Sevastopulo, *vide* Pringle *et al.*, 1994: 48].

Marsdenia species (Apocynaceae) [Larsen, 2005a].

Pergularia daemia (Forssk.) Chiov. subsp. *daemia* (Apocynaceae) [Van Someren, 1974: 324; as *Pergularia extensa*].

leonora Butler, 1866 (as sp. of *Danais*). *Proceedings of the Zoological Society of London* **1866**: 51 (43-59). Angola.

35. *DANAIS LEONORA*, sp. n. (LIMNIACÆ, var.?).

Upperside—front wings black brown, with pale-greenish semitransparent spots, which differ from those of *D. limniacæ* in being broader and shorter; no streak below the base of the submedian nervure. Hind wings much smaller and rounder than those of *D. limniacæ*; the cells much shorter; rich olive-brown, with pale-greenish semitransparent spots, which differ from those of *D. limniacæ* in being broader and shorter.

Underside as above, excepting that the apical portion of the front wing is of an olive-brown colour, and the interior margin reddish; the hind wing is also paler.

Expanse of wings $3\frac{3}{16}$ inches.

Hab. Angola.

B.M.

phrynichus Fruhstorfer, 1910 *in* Seitz, 1908-25 (as ssp. of *Danaida melissa*). *Die Gross-Schmetterlinge der Erde*, Stuttgart (2) **13** *Die Afrikanischen Tagfalter*: 203 (614 pp.). [Africa]: “Collingwood Bay, in the northern part of British New Guinea”. [False locality.]

septentrionides Stoneham, 1958 (as f. of *Danais limniacæ*). *Bulletin of the Stoneham Museum* (71): [1] ([3 pp.]). Kenya: “Malindi, Kenya Coast”.