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Source: Florida Entomologist, 91(1) : 118-120

Published By: Florida Entomological Society

URL: https://doi.org/10.1653/0015-4040(2008)091[0118:NSFEAL]2.0.CO;2

NECTAR SOURCES FOR *EUMAEUS ATALA* (LEPIDOPTERA: LYCAENIDAE: THECLINAE)

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I report on nectar sources used by the tropical hairstreak butterfly *Eumaeus atala atala* Poey and the subspecies *E. atala florida* Röber (Lycaenidae: Lepidoptera), including those that have not been published previously. In addition to the importance and presence of larval host plants, availability of nectar sources for adults is also important in establishing viable populations. I also list the current conservation status of the atala butterfly as determined by 4 Florida State conservation agencies. The atala butterfly is a species almost wholly dependent on domestic gardens for its survival now because of the lack of wild lands in South Florida.

Reintroduction of the atala butterfly is vital to its recovery from a vulnerable status. This article will facilitate conservation and restoration efforts for this species of special concern, as well as encourage cultivation of butterfly gardens.

Eumaeus atala florida is locally abundant when both nectar sources and larval food plants are available, but is otherwise rare. I have researched the nectar plants for the atala that have been documented previously in scientific journals and in popular articles, presenting them here as one unit. I have used the names of plants as originally recorded by those authors, although I have updated plant names that have changed. Plant taxonomy is according to Wunderlin (1998) and/or Correll & Correll (1996). Previously unrecorded nectar sources come from field observations over a period of 18 months from May 2003 to Sep 2005.

In Table 1, the nectar sources by family, genus and species (with original citations footnoted) are provided, along with the common name and origin of the plant. Favored plants, i.e., those on which I have noted numerous individuals nectaring simultaneously, are denoted by an asterisk. One interesting observation is that *Eumaeus atala atala* and *E. atala florida* both seem to prefer small white flowers with short corollas (Koi, unpublished data). This may be in part due to the short proboscis of all Lycaenidae hairstreaks, although the obvious color preference warrants further study.

While many other issues remain, such as spraying pesticides for mosquito control, I have been working with several organizations to re-introduce the butterfly within its former range for several years, including Everglades National Park. In addition to re-distributing butterfly populations, coontie is being replanted within historically documented areas, and plants are being redistributed from development sites to safe locations. In South Florida, gardeners in cities such as Coconut Creek, Fort Lauderdale, Hollywood, Key Biscayne, and Wilton Manors are planting coontie and nectar sources for *E. atala florida*. Local chapters of the North American Butterfly Association and Native Plant Societies have been instrumental in this effort. The atala also seems to flourish in coastal environments (Kilmer 1993), of which gardeners should be aware; my most successful colonies support this observation (Koi, unpublished data).

Cultivated coontie plants are being used by some landscapers and homeowners as an ornamental (Minno 2002). The atala larvae in these isolated sites may become a pest problem (Culbert 1995) requiring human management of the colony (Koi, unpublished data).

The butterfly is currently listed by the Florida Commission of Rare and Endangered Plants and Animals as a "Species of Special Concern," primarily due to habitat loss and development (Deyrup 1994). It is also listed as rare and vulnerable (S3) by the State of Florida (NatureServe 2005). The atala is listed under the Comprehensive Wildlife Conservation Strategy as one of over 900 species in greatest need of conservation (FWC 2005). It is also considered a species of management concern in the South Florida Multi-Species Recovery Plan (USFWS 1999).

I thank the following volunteers for their help in documentation: Michael Tompkins, Leta Pelczar, Mona Johnston, Roger Hammer, and Nancy Eckert. I also thank Dr. Paul Bardunias, Dr. Forrest (Bill) Howard, and Dr. James Nation (University of Florida), Dr. Marc Minno, and Roger Hammer for review of this manuscript. I acknowledge the guidance and support of Dr. Evelyn Frazier and Dr. John Baldwin, Florida Atlantic University. I thank Dr. Joshua Feingold and Dean Don Rosenblum (Nova Southeastern University) for their support. This research was funded through a scholarship provided by National Fish and Wildlife Foundation, Budweiser Conservation Scholarship, and publishing costs were funded by Nova Southeastern University, Fort Lauderdale, Florida.

SUMMARY

This list of nectar sources will assist lepidopterists and butterfly gardeners in South Florida choose and offer appropriate adult foods for the

TABLE 1. NECTAR SOURCES FOR *EUMAEUS ATALA*.

Family (common name)	Genus species/original citations	Common name	Origin
Anacardiaceae (Cashew Family)	*Rhus copallina* L.[1, 6]	Sumac	FL
	Schinus terebinthifolius Raddi. L.[1]	Brazilian Pepper	Trop. Am.
Apiaceae (Carrot Family)	*Coriandrum sativum* L.[4]	Coriander	Mediterranean
Aquifoliaceae (Holly Family)	*Ilex cassine* L.[4]	Dahoon holly	FL
Aracaceae (Palm Family)	*Sabal palmetto** (Walter.) Lodd ex. Schult. & Schult.[1, 6]	Cabbage Palm	FL
	*Serenoa repens** (W. Bartram) Small[1, 2, 3, 6]	Saw Palmetto	FL
Apocynaceae (Milkweed)	*Asclepias curassavica* L.[4]	Milkweed	WI
	A. tuberosa L.[6]	Butterflyweed	FL
Asteraceae (Aster Family)	*Ageratum conyzoides* L.[4, 8]	Tropical Whiteweed	Trop. Am.
	A. houstonianum Mill[3]	Bluemink	Trop. Am.
	Bidens alba var. *radiata*[1, 3, 6]	Spanish Needles	FL
	Carphephorus odoratissimus[4]	Pineland Purple	FL
	Chromolaena odorata DC. = *Eupatorium odoratum* L. [1, 5, 6]	Jack-in-the-bush	FL
	Eupatorium serotinum Michx.[3]	Late-flowering Thoroughwort	FL
	Flaveria linearis, Lag.[4]	Yellowtops aster	FL
	Gaillardia pulchella Foug.[7]	Blanketflower	FL
	*Koanophyllon villosum** SW.[4] = *Eupatorium villosum*	Fl. Keys Thoroughwort	FL
	Melanthera nivea Rohr & Small[4] = *M. parvifolia* Rohr & Small[4] = *M. aspera* (Jacq.) Small[4] §	[Everglades] Square Stem	FL,WI
	*Mikania scandens** (L.) Willd.[4, 8] §	Climbing hempvine	WI, FL
	Solidago sempervirens L.[9]	Seaside Goldenrod	FL
	*Verbesina virginica** L.[4, 8]	White Crownbeard	FL
Buddlejaceae (Butterfly Family)	*Buddleja lindleyana* L.[1]	Butterfly Bush	China
	B. madagascariensis Lam.[3]	Madagascar Butterfly-bush	Madagascar
Boraginaceae (Borage Family)	*Cordia bahamensis** Urb.[4]§	Cat's Tongue	WI, FL
	*C. globosa** (Jacq.) Kunth.[1, 3]	Bloodberry	FL
Combretaceae (Combretum Family)	*Bucida buceras* L.[1]	Black Olive	WI
	Bucida molinetii (G. Maza) Alain[3]	Spiny Black Olive	FL, WI
	Terminalia catappa L.[1] §	West Indian Almond	Asia
Erythroxylaceae (Coca Family)	*Erythroxylum confusum** Britton[3]	Pigeon Berry	WI, Trop. Am.
Euphorbiaceae (Spurge Family)	*Cnidoscolus chayamense*[1] = *Jatropha integerrima* (Jacq.)	Chaya	Cuba
Fabaceae (Pea Family)	*Pithecellobium keyense** (Britton ex. Britton & Rose)[4, 8]	Black Bead	FL
Lauraceae (Laurel Family)	*Persea americana* Mill.[1, 5, 6]	Avocado	Trop. Am.
Lamiaceae (Mint Family)	*Callicarpa americana* L.[4]	Beauty Berry	FL
Oleaceae (Olive Family)	*Forestiera segregata* (Jacq.) Krug. & Urb.[1]	Swamp Privet	FL
Olacaceae (Olax Family)	*Schoepfia chrysophylloides* (A. Rich) Planch. = *S. scheberi* (J. K. Gimel misapplied)[1]	Whitewood (Graytwig)	FL
Plumbaginaceae (Leadwort Family)	*Plumbago scandens* L.[4]	Doctorbush	FL
Proteaceae (Protea Family)	*Macadamia integrifolia* L.[1] = *M. ternifolia*	Macadamia Nut	Australia
Rubiaceae (Madder Family)	*Exostema caribaeum**[4] (Jacq.) Small	Caribbean Princewood	WI, FL

Notes: Genus or species may be native to more than one area. Asterisk denotes favored nectar sources. Abbreviations: FL—Florida; WI—West Indies; Trop. Am—Tropical America. § Denotes nectar sources used by *E. atala atala* as witnessed on Andros Island, Jun 2005, 1. Culbert (1995). 2. Gerberg and Arnett (1989) 3. Hammer (1995, 2005) 4. Koi, this note 5. Landolt (1984) 6. Lollar (2004) 7. Stewart (2004) 8. Tompkins, pers. comm. 9. Lana Edwards, pers. comm.

TABLE 1. (CONTINUED) NECTAR SOURCES FOR *EUMAEUS ATALA*.

Family (common name)	Genus species/original citations	Common name	Origin
	*Psychotria nervosa** L.[1]	Wild Coffee	FL
	P. ligustrifolia (Northrop) Millsp.[3]	Bahama Wild Coffee	FL
	P. sulzneri Small[3]	Shortleaf Wild Coffee	FL, WI
	Randia aculeata L.[1, 3]	Indigoberry	FL
Rutaceae (Citrus Family)	*Citrus sinensis** L.[4]	Sweet Orange	Asia
	*Murraya koenogii** L.[1] = *M. paniculata*	Curry Tree	Asia
Sterculiaceae (Cacao Family)	*Dombeya* spp. L.[1, 5, 6]	Florida Powder Puff	Madagascar
Verbenaceae (Vervain Family)	*Citharexylem spinosum** L.[4]	Florida Fiddlewood	FL
	Duranta erecta L.[4] § = *D. repens*	Golden Dewdrops	WI
	*Nashia inaguensis**[3]	Moujean Tea	WI
	Lantana spp. L.[1, 4, 5, 8] §	Lantana	FL, WI
	*Petitia domingensis** (Jacq.) Schult.[4]§	Bastard Stopper	WI
	Stachytarpheta jamaicensis L. Vahl[4]	Blue Porterweed	FL
	S. cayennensis (L.C. Rich.) Vahl[3]	Porterweed	FL?
	S. frantzii Pol.[3]	Red Porterweed	Trop. Am.
	S. mutabilis Vahl[3]	Pink Porterweed	Trop. Am.

Notes: Genus or species may be native to more than one area. Asterisk denotes favored nectar sources. Abbreviations: FL—Florida; WI—West Indies; Trop. Am—Tropical America. § Denotes nectar sources used by *E. atala atala* as witnessed on Andros Island, Jun 2005, 1. Culbert (1995). 2. Gerberg and Arnett (1989) 3. Hammer (1995, 2005) 4. Koi, this note 5. Landolt (1984) 6. Lollar (2004) 7. Stewart (2004) 8. Tompkins, pers. comm. 9. Lana Edwards, pers. comm.

atala butterfly. Providing both larval host plants and adult nectar sources on private homesteads is essential to maintain a viable, healthy sustainable population as wild lands decrease (Schultz 1999). The few remaining wild populations of the atala's larval host plant, *Zamia floridana* (=*pumila*), often called "coontie," are being lost as development continues throughout South Florida (Coile 2000). Additional news about *E. atala* colonies is located on the web at http://e-atala.blogspot.com.

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