

SHORT COMMUNICATIONS

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XANTHOSOMA UNDIPIPES (ARACEAE) AS A FOOD SOURCE FOR BLACK-CHINNED MOUNTAIN-TANAGER (*ANISOGNATHUS NOTABILIS*) AND ORANGE-BELLIED EUPHONIA (*EUPHONIA XANTHOGASTER*) IN NORTHWEST ECUADOR

Benjamin Kerbs

Department of Biological Sciences, Emporia State University, Emporia, KS 66801, USA.
E-mail: bkerbs@emporia.edu

***Xanthosoma undipes* (Araceae) como una fuente de alimento para la Tangara Barbinegra (*Anisognathus notabilis*) y la Euphonia Ventrinaranja (*Euphonia xanthogaster*) en el noroeste del Ecuador.**

Key words: Black-chinned Mountain-Tanager, conservation, ecological succession, food source, Orange-bellied Euphonia, reforestation, regeneration, *Xanthosoma undipes*.

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The speed with which native plant species recolonize disturbed sites in the tropics is dependent on the presence of previously established root and stem systems, the seed bank, and on seed dispersal into the degraded areas (Holl 2013). The establishment of animal-dispersed seeds in opened areas (e.g., agricultural fields) is slow because many forest birds, in particular, intentionally avoid open habitats (Holl 2007). Early-colonizing or remnant plant species serve as influential promoters of forest succession by attracting birds and enhancing seed rain of bird-dispersed, forest tree species (Schlawin & Zahawi 2008). Ultimately, birds play an important role in the establishment of forest trees in degraded

habitat, and the loss of avian frugivores has been shown to be correlated with reduced native-tree colonization (Caves *et al.* 2013).

One plant species that may promote ecological succession in the tropics is *Xanthosoma undipes* (Araceae). Occupying a large elevational range (0–2250 m a.s.l. reported; Tropicos 2014), this species (locally referred to as “camacho”) is a widespread and common arum native to Central America and northwestern South America. It grows well in a variety of habitats, including along roadsides, streams, and forest edges, in pasturelands and swampy areas, and also within primary forest (Tropicos 2014). Asexual reproduction via underground corms is presumed to be an

important propagation method for *X. undipes*, as it is for other species of *Xanthosoma* (Langeland *et al.* 2008). For some species, corms may remain dormant for several months, sprouting when light gaps become available (Langeland *et al.* 2008). This might explain why *Xanthosoma* is commonly seen and collected in gaps and pastures (Tropicos 2014, pers. observ.). Infructescence ripening of *X. undipes* typically occurs two months after pollination (García-Robledo *et al.* 2005), and the fleshy, ripe fruits are pale green in color with white seeds. The fruits are eaten by insects (García-Robledo *et al.* 2005), and the underground tubers of some *Xanthosoma* species are fit for human consumption (Langeland *et al.* 2008). The fruits and flower buds of various arums have been shown to be food sources for birds (Hilty 2011), especially *Anthurium* (Araceae) species, whose berries are bird-dispersed (Croat 2004). To my knowledge, *X. undipes* has not been previously recorded as an avian food source, nor have any other species of *Xanthosoma*. Here I describe the observed feeding activity of Black-chinned Mountain-Tanager (*Anisognathus notabilis*) and Orange-bellied Euphonia (*Euphonia xanthogaster*) on the fruit of *X. undipes* in northwest Ecuador.

Endemic to the Chocó biogeographic region of the western Andes in Colombia and Ecuador, the Black-chinned Mountain-Tanager is an uncommon bird species (Hilty 2011). Its elevation range extends from 900–2200 m a.s.l. in Colombia and 1400–2200 m a.s.l. in Ecuador (well within the range of the target plant), and it may be found in wet forests or at forest edges (Hilty & Brown 1986). The Black-chinned Mountain-Tanager is known for its characteristic run-hops that it performs as it forages (Hilty & Brown 1986), which it does quietly without vocalization (Hilty 2011). These tanagers typically forage alone, in pairs or small groups (J. Lyons, pers. comm.) and eat fruit (especially of the genera *Alchornea*, *Clusia*, and *Miconia*), though insects may also

be eaten (Hilty 2011). Although not threatened, the Black-chinned Mountain-Tanager population is very limited in range and is decreasing (Stotz *et al.* 1996, IUCN 2014), likely as a result of deforestation and agriculture (Hilty 2011).

The Orange-bellied Euphonia encompasses a much broader range and is common in Panama, Venezuela, Colombia, Ecuador, Peru, Guyana, Brazil, and Bolivia (Isler & Isler 1987). Orange-bellied Euphonias are typically found in humid forests, second growth forests, forest edges (Hilty & Brown 1986), and even far into forest clearings (Ridgely & Tudor 1989). This species forages from forest understory to canopy (Hilty 2011), and is the only *Euphonia* known to occupy ground-level habitat (Ridgely & Greenfield 2001). More than 40 plant species have been identified as food sources, including mistletoe (Loranthaceae), *Ficus*, *Miconia*, *Cecropia*, and various arums (Araceae) (Hilty 2011). Individuals forage in pairs or mixed-species flocks. Orange-bellied Euphonias are particularly vocal and call a continuous “dee-dee-deét” and “cheea-cheea-cheea” (Ridgely & Tudor 1989). Although the species is not threatened, certain populations may be in decline from deforestation (Hilty 2011).

Both bird species were observed feeding in a small grove (~8 mature individuals, 6 juveniles) of *X. undipes*, growing in a gap surrounded by primary forest, and overlooking a steep decline (Fig. 1A). The site is located within Reserva Las Gralarias, a 425 ha reserve in the western Andean Cordillera of Ecuador (0°00.438'S, 78°44.325'W, 1846 m a.s.l.). The fruits of *X. undipes* were consumed by birds during two of three visits to the site; the first on 7 June 2013, when I saw one Black-chinned Mountain-Tanager and the last on 1 July 2013, when two Orange-bellied Euphonias were observed. A 20-minute visit on the morning of 30 June 2013 yielded no feeding activities of any birds.

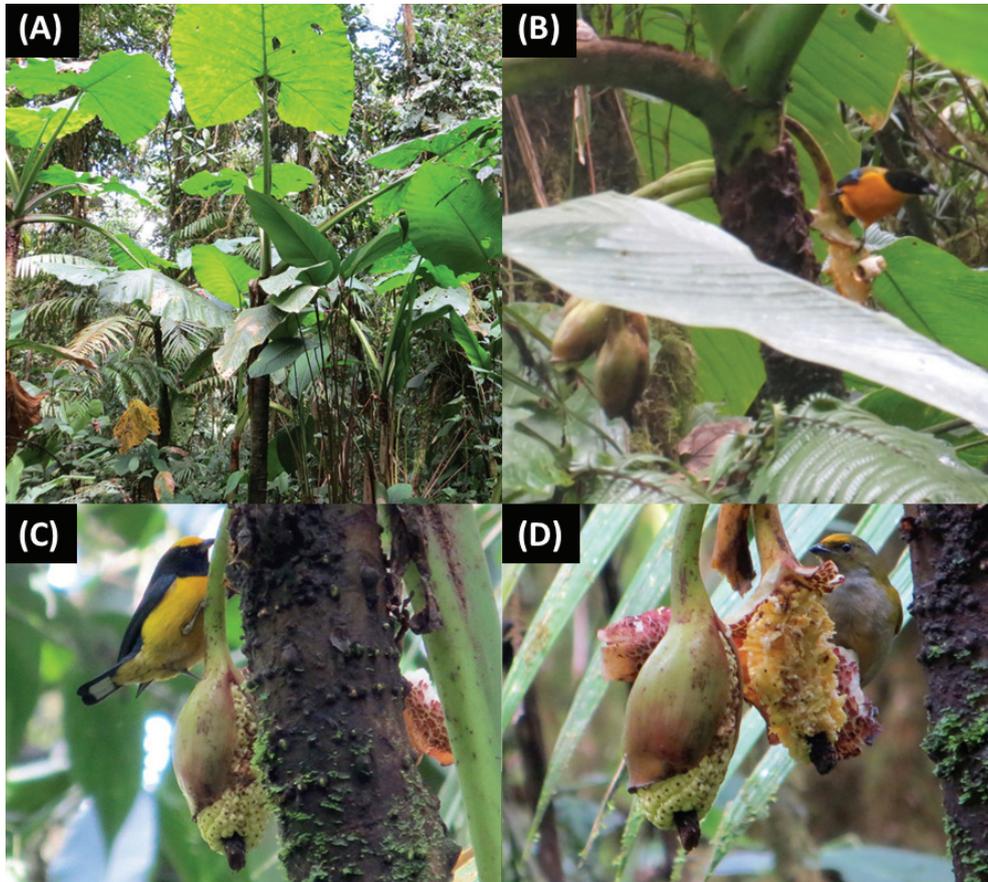


FIG. 1. A. Stand of *X. undipes* where all sightings occurred, located within Reserva Las Gralarias, Pichincha, Ecuador (S 0° 00.438' W 78° 44.325'); B. Male Black-chinned Mountain-Tanager feeding on *X. undipes* fruit on 7 June 2013; C. Male Orange-bellied Euphonia feeding on *X. undipes* fruit on 1 July 2013; D. Female Orange-bellied Euphonia feeding on *X. undipes* fruit on 1 July 2013. Photographs by the author.

An adult male Black-chinned Mountain-Tanager was observed feeding on the ripe infructescence of one *X. undipes* individual on 7 June 2013 at 10:37 h. The aboveground stem was 2.0 m high, and the vegetative spread was 3.4 m wide. The plant contained five infructescences, but only one, presumably the ripest, was consumed. The observed feeding duration was 2 min. The tanager pecked at and consumed the fruits in an upside-down position, by grasping the peduncle with one

claw and the spathe tube with another (Fig. 1B).

On 1 July 2013, a pair of Orange-bellied Euphonias arrived at the same site. The pair consisted of one adult male and one adult female (Figs 1C, 1D). The two euphonias separately consumed the single infructescence of one individual, 1.5 m distant from the plant observed on 7 June 2013 where the tanager fed. The stem ran parallel to the ground for 1.8 m, arching upward to attain a vertical

height of 1.9 m (total stem length 3.7 m). The vegetative spread was 3.0 m. The male arrived at 11:26 h and fed in intervals, usually between 30 s to 2 min, flying off and returning every 5–10 min. Although I attempted to minimize disturbance, the bird was keenly aware of my presence, and it may have been startled by periods of photographing, which I attempted twice. The male fed much like the tanager, facing downward to feed. The female, which was apparently much less disturbed by my presence, began feeding at 11:46 h for approximately 12 min. It initially held to the lower rind of the fruit and ate upright and sideways. Later, the female perched on the peduncle of a nearby unripe infructescence to consume the ripe one, often facing downward to do so. Vocalizations of the male were heard as the female ate, and both vocalized after feeding.

Xanthosoma undipes may be found throughout Reserva Las Gralarias, but it is most common at elevations between 1800–1900 m a.s.l. At the reserve, individuals of this species seem to be fast colonizers and can be found in a variety of habitats, including primary cloud forest, but also in heavily disturbed, clear-cut, and grassy areas, which were previously used as cattle pastures (pers. observ.). Such deforestation is widespread in the Chocó biogeographic region, a zone regarded as a biodiversity hotspot due to high levels of endemism (Myers *et al.* 2000). Only 38% of Ecuador's land area is occupied by forest (FAO estimate 2012), reduced from an estimated 90% original forest cover (Wunder 2000). For these reasons, along with the evidence that *X. undipes* is now shown as a food source for some birds, attention should be given to this species as a mechanism in natural rainforest regeneration. The species may also be considered in active reforestation, perhaps in conjunction with *Miconia* (Melastomataceae), *Clusia* (Clusiaceae), *Ficus* (Moraceae), and *Cecropia* (Urticaceae), all important food

sources for many Neotropical bird species (Skutch 1980, Hilty 2011, pers. observ.). The bird-plant interactions documented herein were not studied in agricultural areas, nor were dietary preferences of either bird species for *X. undipes* investigated. However, if this plant can bring birds out of forests and into disturbed pasture areas, it may play an important role in the dispersal of other forest trees. I suggest that *Xanthosoma undipes*, and other genus members, should be studied more thoroughly as a food source for birds, especially in early successional forests.

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REFERENCES

- BirdLife International 2012. *Anisognathus notabilis*. The IUCN red list of threatened species. Version 2014.2. Downloaded on 8 September 2014 from <http://www.iucnredlist.org>.
- Caves, E. M., S. B. Jennings, J. Hille Ris Lambers, J. J. Tewksbury, & H. S. Rogers. 2013. Natural experiment demonstrates that bird loss leads to cessation of dispersal of native seeds from intact to degraded forests. *PLoS ONE* 8: e65618; doi: 10.1371/journal.pone.0065618.
- Croat, T. B. 2004. Araceae. P. 415 in Smith, N., S. A. Mori, A. Henderson, D. W. Stevenson, & S. V. Heald (eds). *Flowering plants of the Neotropics*. Princeton Univ. Press, Princeton, New Jersey, USA.
- FAO 2012. Ecuador. Downloaded on 18 September 2014 from <http://www.fao.org/country-profiles/index/en/?iso3=ecu>.
- García-Robledo, C., P. Quintero-Marín, & F. Mora-Kepfer. 2005. Geographic variation and succession of arthropod communities in inflorescences and infructescences of *Xanthosoma* (Araceae). *Biotropica* 37: 650–656.

- Hilty, S., & W. Brown. 1986. Birds of Colombia. Princeton Univ. Press, Princeton, New Jersey, USA.
- Hilty, S. 2011. Family Thraupidae. Pp. 46–329 *in* del Hoyo, J., A. Elliott, & D. A. Christie (eds). Handbook of the birds of the world. Volume 16: Tanagers to New World blackbirds. Lynx Edicions, Barcelona, Spain.
- Holl, K. D. 2007. Oldfield vegetation succession in the Neotropics. Pp. 93–117 *in* Hobbs, R. J., & V. A. Cramer (eds). Oldfields. Island Press, Washington, D.C., USA.
- Holl, K. D. 2013. Restoring tropical forest. Nat. Educ. Knowl. 4: 4.
- Isler, M. L., & P. R. Isler. 1987. The tanagers; natural history, distribution, and identification. Smithsonian Institution Press, Washington, D.C., USA.
- Langeland, K. A., H. M. Cherry, C. M. McCormick, & K. A. Craddock Burks. 2008. Identification and biology of non-native plants in Florida's natural areas. Univ. of Florida IFAS Extension, Gainesville, Florida, USA.
- Myers, N., R. A. Mittermeier, C. G. Mittermeier, G. A. B. da Fonseca, & J. Kenty. 2000. Biodiversity hotspots for conservation priorities. Nature 403: 853–858.
- Ridgely, R. & P. Greenfield. 2001. The birds of Ecuador. Cornell Univ. Press, Ithaca, New York, USA.
- Ridgely, R., & G. Tudor. 1989. The birds of South America. Volume I. The oscine passerines. Univ. of Texas Press, Austin, Texas, USA.
- Schlawin, J. R., & R. A. Zahawi. 2008. 'Nucleating' succession in recovering Neotropical wet forests: the legacy of remnant trees. J. Veget. Sci. 19: 485–492.
- Skutch, A. F. 1980. Arils as food of tropical American birds. Condor 82: 31–42.
- Stotz, D. F., J. W. Fitzpatrick, T. A. Parker III, & D. K. Moskovits. 1996. Neotropical birds: ecology and conservation. Univ. of Chicago Press, Chicago, Illinois, USA.
- Tropicos. 2014. Missouri Botanical Garden. *Xanthosoma undipes*. Downloaded on 14 September 2014 from <http://www.tropicos.org/Name/2104687>.
- Wunder, S. 2000. The economics of deforestation: the example of Ecuador. MacMillan & St. Martin Press, London, UK.

