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Rediscovery and Floral Biology of *Jaltomata biflora* (Solanaceae)

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## NOTES ON ECONOMIC PLANTS

**Rediscovery and Floral Biology of *Jaltomata biflora* (Solanaceae).**—The floral biology of this little known Peruvian species, valued by the natives of the central Andes for its small edible fruits, has not been previously investigated. Formerly, *Jaltomata biflora* (R. & P.) Benítez was known almost exclusively from the type specimens collected by Dombey in the late 1700s, and from the botanically incorrect illustration of this species that appears in Ruiz and Pavón's 1799 protologue (3, *tab.* 179a). The lectotype (MA; F neg. 29720: photos at GH, WIS) lacks flowers and fruit, but the isolectotype in the Paris herbarium (P) bears intact flowers. Specimen No. 8422/28 in the Geneva (G) herbarium may be a type given that it is conspecific and a label on it indicates "Herb. Pavon", but the sheet lacks a collection number and provenance data. Aside from type specimens, only one general collection of *J. biflora* has been seen (Peru, Department of Junín, Carpapata, above Huacapistana, 2700–3200 m, edge of forest, *Killip & Smith* 24396; NY, US), although a large number of herbaria were consulted (B, BH, BM, C, COL, COLO, CONN, G, F, GH, K, LD, MA, MO, NY, P, US, USM, VT, WIS). To track down the type locality we noted that it was given as "huasa-huasi" on the label of the types and "Huassahuassi" in the protologue. Also, *Saracha biflora* (the basionym) was listed by Ruiz (2) among the species discovered near Tarma.

With this information in hand we consulted maps and learned that Huasahuasi is a small town in Peru, Department Junín, province Tarma (11°16' S, 75°39' W). One of us (D. Mugaburu) traveled to Huasahuasi with the following aims in mind: 1) to determine if *Jaltomata biflora* really occurs at that locality; 2) to assess, if present, whether it is common or rare; 3) to learn about the habitat of the species; and, 4) to record human uses, if any. With the help of a local farmer who served as a guide, *J. biflora* was located twice at approximately 3000 m of elevation within a few hours walk of Huasahuasi. Its habitat was the narrow corridor of disturbed vegetation between a foot road and an agricultural field. Although the steep slopes of the mountains surrounding Huasahuasi are grazed

and have been extensively cleared for cultivation, this sprawling shrub appears to be well tolerant of disturbance, and is thus not uncommon in the vicinity. Some of the local populace refers to this species as "capulí silvestre," whereas others call it "capulí de campo." In the protologue of Ruiz and Pavón, the local names given for this species are "tomatillo Cimarron" and "tomate cimaron" for the type. According to Ruiz (2), children eat the fruits of this plant. Our native guide, on the other hand, informed us that the fruits of this species are occasionally eaten when found along the hillsides. Moreover, he also reported that plants of this species are grazed by livestock. Pressed specimens (*D. Mugaburu* 5 & 6) were deposited in 2 herbaria (MO and MOL).

Seeds of *J. biflora* were collected at the type locality. Plants were grown at the University of Connecticut in a greenhouse with minimum evening temperatures of 7–10°C, and daytime temperatures of 15–29°C, depending on cloud cover/sunshine. Our plants did not flower under warmer conditions present in other greenhouse rooms. Two fruits, collected in Peru, were orange at maturity and contained 161 and 166 seeds each. Other observations were made in the greenhouse during April and May of 2000.

The 1.3 cm long corolla (Fig. 1) is green and urceolate, with a narrow mouth and broad base reaching 1.4 cm in diameter. The limb (ultimately revolute) is made up of 5 narrowly triangular lobes alternating with inconspicuous lobules. The stamens and style are exerted beyond the mouth of the corolla on mature flowers. The anthers are purple before dehiscence. The calyx and corolla bear a dense indument of gland-tipped finger hairs. Stalked glands were present (see illustration in Mione and Serazo 1999), but were rare on the abaxial face of the calyx. Neutral red stained both the multicellular head of these glands and the tip of the glandular finger hairs.

Ten flowers were observed to remain open from 6 to 9 days (mean 7.25 days), including the night time hours. The filaments and the style elongated during the first few days a flower was open, and only after a stamen elongated did its



**Fig. 1.** Flower of a greenhouse-grown specimen of *Jaltomata biflora* (length is approximately 23 mm from the base of the calyx to the tip of the stigma). The pistillate phase (shown, anthers have not yet dehisced) precedes the hermaphroditic phase. The stigma can be seen just below the anther having its dorsal face toward the viewer. Photo by T.M.

anther dehisce. During April, it was observed that 2 to 4 of the anthers that were found in 6 of the flowers studied dehisced on one day, while the others dehisced the morning of the next day. In May, however, when daytime temperatures in the greenhouse were noticeably warmer, all anthers of 4 flowers that were being observed for this particular condition were dehiscent by 10:00 am of the same day. In 10 flowers, the pistillate phase lasted 2 to 3 days (mean 2.3 days) with the stigma protruding through the partially open corolla on the first day.

This species is self-compatible. Three manually emasculated and self-pollinated flowers during the pistillate phase set fruit, as did all 4 flowers that were manually self-pollinated during the hermaphroditic phase. Many fruits were spontaneously set in the greenhouse in the absence of pollinators. These were orange at maturity, subspherical, and up to 14 mm in diameter.

Nectar was sweet to the taste. A refractometer was used to estimate percent sugars from destructively sampled flowers. The average sugar concentration in 2 flowers during the pistillate phase was 14.2% (ranging from 14 to 14.4); whereas in 5 flowers that were measured during the hermaphroditic phase the average sugar concentration was 38.9% (ranging from 26 to 57.6 percent). Given that the pistillate phase precedes the hermaphroditic phase, and no nectar was removed by pollinators, the higher sugar concentration during the latter phase may have been due to continual nectar secretion and/or evaporation of water from the nectar. Eight flowers produced 0 to 47  $\mu$ l of nectar. Nectar was clear at first, and although inconspicuous, could be seen through the corolla wall. Nectar became more conspicuous toward the end of the hermaphroditic phase, when it turned amber to orange in color, as viewed both through the corolla wall and when removed with a clear pipette tip.

Literature Cited. (1) Mione, T., and L. A. Serazo. 1999. *Jaltomata lojiae* (Solanaceae): Description and floral biology of a new Andean species. *Rhodora* 101: 136–142. (2) Ruiz, H. *Relación del viaje*. 1931. *Travels of Ruiz, Pavón, and Dombey in Peru and Chile*. Edited and annotated by A. J. Barreiro, Madrid. English translation by B. E. Dahlgren. *Botanical Series, Field Museum of Natural History*, vol. 21. (3) Ruiz, H. and Pavón, J. 1799. *Florae Peruviana et Chilensis* 2.

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