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CHRISTA BEURTON

Notes on *Zanthoxylum (Rutaceae)* from the Antilles

Abstract

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A first record of *Zanthoxylum rolandii* for Hispaniola is given and discussed. *Z. rolandii* is closely related to *Z. arnoldii* and both belong to a group of six species, previously known from Cuba only, with small phyllodes and 0-2(very rarely 3) small leaflets. Flowers, fruits and seeds of *Z. haitiense* are analysed for the first time and illustrated. The flowers have a five-merous perianth and the fruits are aggregated of (1-)2(-3) modified follicles. The dehiscence of the follicles is pericarpic-semivalvate to pericarpic-bivalvate; seeds are dangling on the vascular bundle of the placenta. A distribution map of *Z. arnoldii, Z. haitense* and *Z. rolandii* is provided.

Introduction

The genus *Zanthoxylum* L. s.l. comprises about 200 paleo- and neotropical species and about 15 species from the temperate zones of North America and E Asia. In the Antilles, there are about 45 species, of which more than 50 % are endemics. These species are trees, shrubs or subclimbers with small, unisexual and 3-, 4-, or 5-merous flowers. The fruits are aggregates of modified follicles (Beurton 1996).

Material and methods

For studies of *Zanthoxylum* and other members of the *Rutaceae* for the Flora of the Greater Antilles Project and for the Flora de la República de Cuba a six-week trip was undertaken to the Dominican Republic and Puerto Rico in 1998. Besides field work, the herbaria of Santo Domingo (JBSD), Santiago de Los Caballeros (UCMM), San Juan (UPRRP, UPR, SJ), Mayagüez (MAPR) were consulted. The findings extend unpublished work in Antillean species, which is based mainly on herbarium specimens from B, FLAS, GH, GOET, HAC, HAJB, JBSD, JE, NY, P, S, US (abbreviations according to Holmgren & al. 1990). For examined Cuban specimens of *Z. rolandii* and *Z. arnoldii* see Beurton (1986: 37; 1987: 65). The distribution map is based exclusively on examined material.

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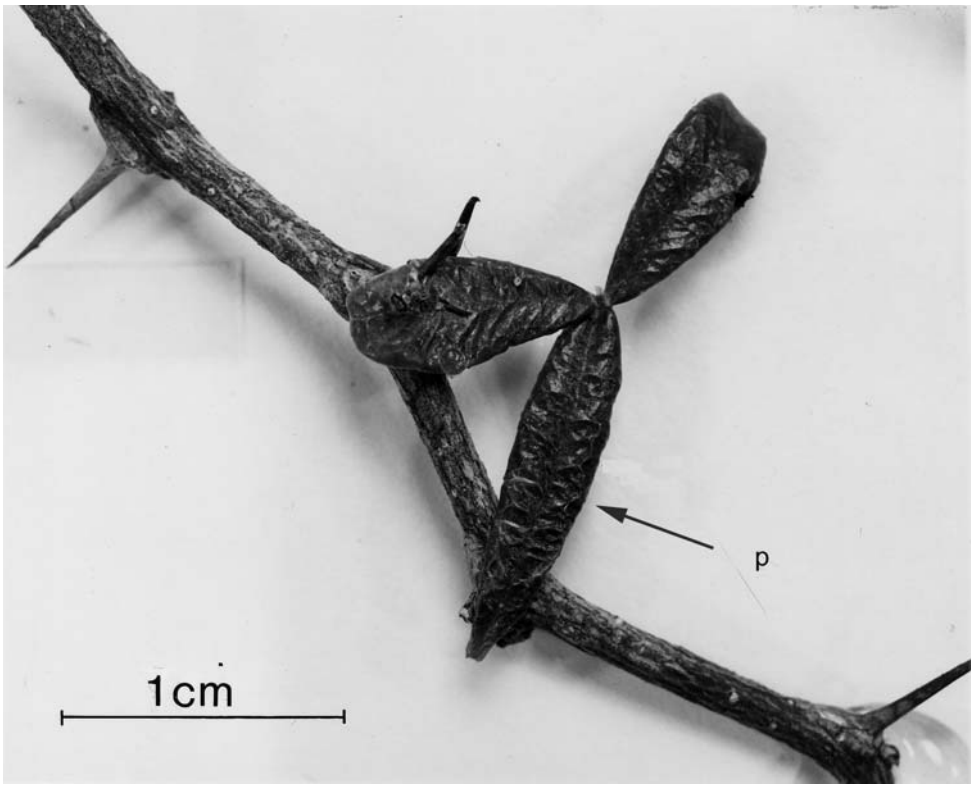


Fig. 1. *Zanthoxylum rolandii* – part of a zigzag-growing twig with a bifoliolate leaf (adaxial surface). – Specimen: leg. *García,* duplicate of JBSD 3126 at B; p = phyllode.

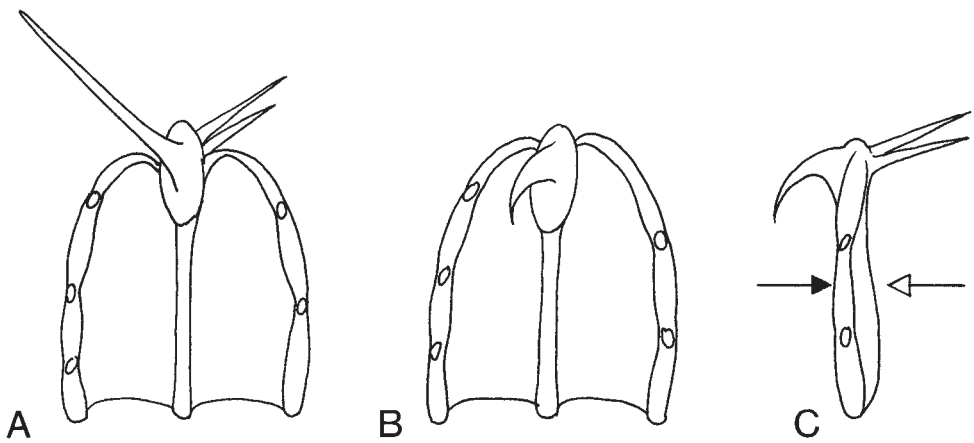


Fig. 2. Types of spines at the apex of the phyllodes of *Zanthoxylum* (schematized) – A: *Z. rolandii*, *Z. arnoldii* (abaxial view); B-C: *Z. pseudodumosum* (B: abaxial view, C: lateral view). – White arrow: adaxial side, black arrow: abaxial side.

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Zanthoxylum rolandii Beurton (Fig. 1-3)

Zanthoxylum rolandii belongs to a group of six species of zigzag-growing shrubs or subclimbers with phyllodes, 0-2(very rarely 3) small leaflets and 4-merous flowers in small axillary inflorescences. The group has been known so far from Cuba only (Léon & Alain 1951, Beurton 1986, 1987). Four species are distributed in the Cuban serpentine ranges and hills: *Z. dumosum* A. Rich. (Sierra de Cajálbana to Bahia Honda) and *Z. rolandii* (Cajálbana mountains) in W Cuba (Pinar del Rio province), *Z. pseudodumosum* Beurton from the border between the provinces La Habana and Matanzas (central Cuba) to the serpentine ranges of the provinces Holguín, Guantánamo and Santiago de Cuba (E Cuba), and *Z. arnoldii* Beurton in the Sierra de Nipe, E Cuba (Beurton 1986, 1987). Two more species occur in thorn scrub vegetation on limestone in E and W Cuba (*Z. phyllopterum* (Griseb.) Wright) and central and E Cuba (*Z. ignoratum* Beurton).

In 1999, during a visit to the herbarium of the Jardin Botanico "Rafael Moscoso" Santo Domingo (JBSD), Dominican Republic, Ricardo García drew my attention to undetermined specimens of a Hispaniolean flowering female plant of *Zanthoxylum* (Fig. 1). The specimens were collected by him in the Cordillera Septentrional, in a dry scrub vegetation on serpentine soil, similar to that of Cuban serpentine areas. The specimens represent *Z. rolandii*, but there are differences to the Cuban populations in the leaf morphology. The leaves agree in size and shape of the leaflets and phyllodes as well as in the conspicuous, straight apical spine situated abaxially on the midvein of the phyllode (Fig. 2A). However, while in the Cuban population such spines are present on the leaflets too, they are absent from the leaflets in the Hispaniolean population. It would be desirable also to compare the fruits (as far as known the follicles of *Z. rolandii* are the largest in this group, Beurton 1987: 67), but fruits (and male plants) of the Hispaniolean population are still unknown.

The occurrence of a member of this species group in Hispaniola is an unexpected discovery and the distribution of *Z. rolandii*, disjunct between W Cuba and N Hispaniola, is a further indication of the very close phytogeographical relationships between the two islands (cf. Howard

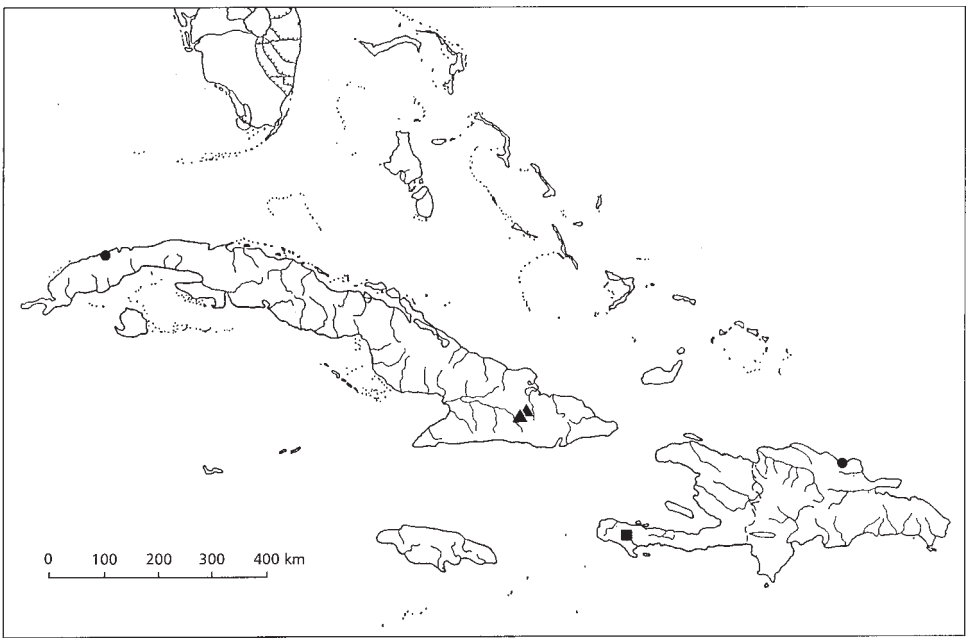


Fig. 3. Distribution of *Zanthoxylum rolandii* (●), *Z. arnoldii* (▲) and *Z. haitiense* (■).

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1973, Borhidi 1996). The distribution pattern of *Z. rolandii* is phytogeographically remarkable also because it may well be related to the bipolar disjunct east-west distribution pattern that is well documented for several genera and species in Cuba (Borhidi 1996: 245ff) and of which instances exist also within this group of *Zanthoxylum (Z. phyllopterum;* cf. Beurton 1986: 35).

A straight apical spine situated abaxially on the midvein of the phyllode as in *Z. rolandii* is present also in *Z. arnoldii*. The phyllodes of the remaining four species of this group, in contrast, possess short, recurved spines (Fig. 2B-C). The little investigated *Z. arnoldii*, endemic to semiarid scrubs of the Sierra de Nipe, possesses phyllodes only or, at most, with leaflet rudiments, and its phyllodes are smaller. This species geographically mediates between the two distant *Z. rolandii* populations (see Fig. 3 and Beurton 1987: 65). *Z. rolandii* and *Z. arnoldii* each occur sympatrically with one of the species listed in the beginning: *Z. rolandii* together with *Z. dumosum* and *Z. arnoldii* together with *Z. pseudodumosum.* Borhidi (1996: 351) considers the Nipe-Baracoa Massif to be the area with "the richest flora of the Caribbean, as an evolutionary centre of the Cuban flora, and as a starting point for the dispersal of species groups with different ecological requirements". He found that several floristic elements of the Cajálbana mountains are vicariates of Nipe and Moa endemics (Borhidi 1996: 317).

Specimina visa selecta: Dominican Republic, Province Espaillat: Cordillera Septentrional, Río Piedras, 8.5 km east of Gaspar Hernández, 150 m, 16.7.1990, *García* (B, JBSD 3126).

Zanthoxylum haitiense (Urb.) J. Jiménez Alm. (Fig. 3-4)

Zanthoxylum haitiense was known previously only by two sterile collections from the La Hotte mountains in Haiti (Liogier 1985). Because of similarities in the leaf morphology, the species was believed to be allied to *Z. pimpinelloides* (Lam.) DC. (Urban 1922: 34). An analysis of male flowers of a specimen found in the collection of JBSD *(Judd 3969)* revealed that the flowers have five sepals, five apically small hooded petals and five stamens. Female flowers are still unknown. The flowers of *Z. pimpinelloides* in contrast are 3-merous. A subsequent inspection of fruits and seeds of another specimen collected by Judd and deposited in the University of Florida Herbarium (FLAS) led to the following results (for terminology of fruits, seeds and follicle dehiscence see Beurton 1996): The fruits are aggregated of (1-)2(-3) modified follicles with a pedicel of 1-2 mm length. The sessile follicles are subglobose to subglobose-pyriform, laterally compressed (size: 5-6 × 4.5 × 3.5-4 mm) and of red colour. The placentar bundle, the inner part of the exocarp and the axis are pubescent with short hairs. The seeds are subglobose, laterally compressed, 4-5 × 4 × 3-3.5 mm, shiny black and with a linear, slitlike, 3-3.5 mm long hilum (Fig. 4D-E). Follicle dehiscence is pericarpic-semivalvate to pericarpic-bivalvate. The seed is first presented for a period of some weeks in the partly dehisced follicle, later it dangles dorsally in front of the follicle on the knee-shaped vascular bundle of the placenta (Fig. 4A-C; see also Beurton 1996: fig. 4c-d).

Fruit dehiscence and seed presentation are quite different in *Z. pimpinelloides,* following the endocarpic-bivalvate dehiscence pattern where exocarp and endocarp are separated from each other and bisected medially towards the pedicel (Beurton 1996: fig. 4a-b). The seed is not dangling on a vascular bundle but adheres ("sticks") at one of the endocarpic valves.

Hence the morphology of flowers, fruits and seeds, and the follicle dehiscence in *Z. haitiense* indicate no closer relations to *Z. pimpinelloides. Z. haitiense* actually belongs to the large group of 5-merous *Zanthoxylum* species of the Neotropics (Engler 1896, 1931, Urban 1896), which is badly in need of a systematic revision, as is true for the whole genus (Beurton 1994, 1996).

The vegetation of the Haitian La Hotte mountains, where *Z. haitiense* occurs, was completely undisturbed when Ekman collected there in 1917 and 1926. According to Ekman (1928: 206), *Z. haitiense* is a rare species, growing above the village Formon (about 36 km NW of Les Cayes) at

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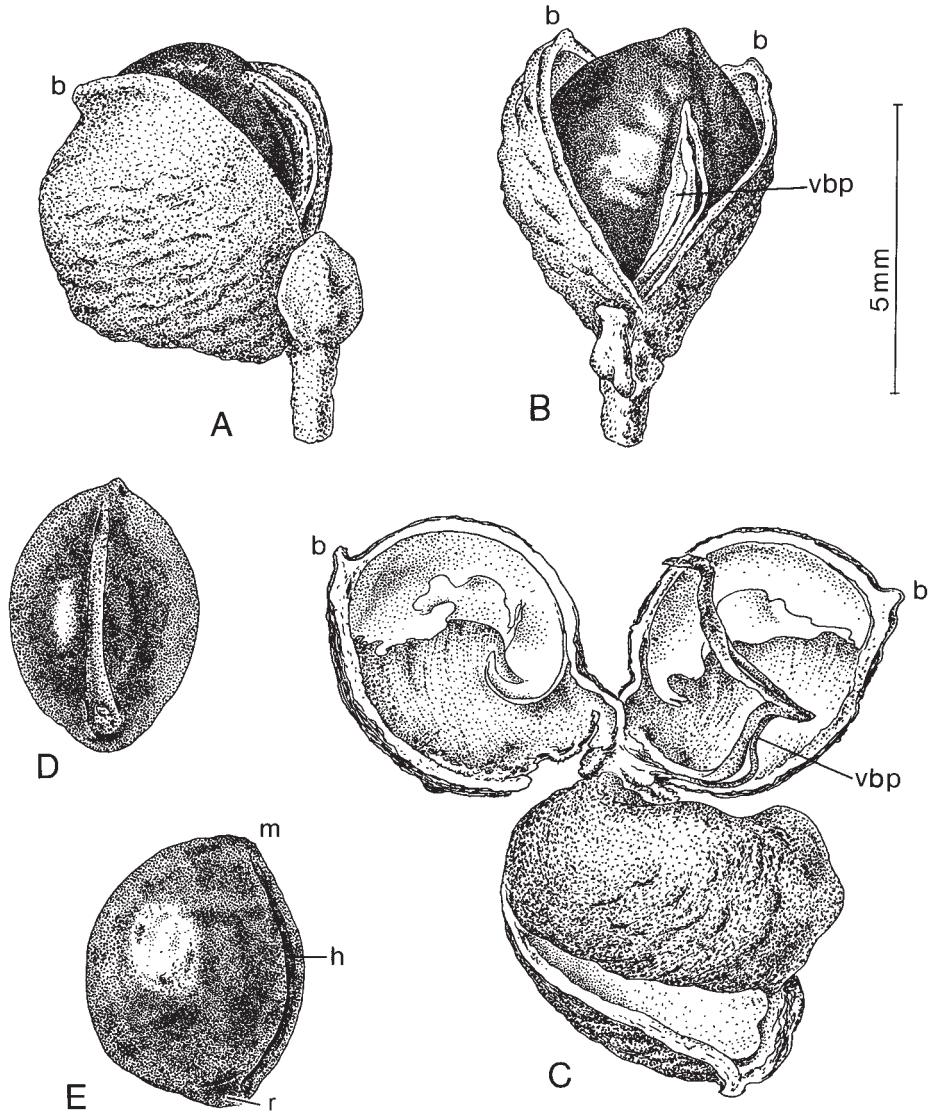


Fig. 4. Follicles and seeds of *Zanthoxylum haitiense* – A: fruit with one ripe dehisced follicle and one abortive follicle (one ripe follicle removed, lateral-adaxial view); B: same fruit, adaxial view; C: fruit of two ripe follicles (without seeds, note the inner part of the one bisected follicle with partly enrolled endocarp and the vascular bundle of the placenta); D: seed surface, adaxial view, E: seed surface, lateral view. – All from *Judd 5786* (FLAS); b = bisected base of style, h = hilum, m = micropyle, r = raphe, vbp = vascular bundle of placenta.

an altitude of about 1100 m. Since 1983, the Macaya National Park near Formon has served as a refuge for *Z. haitiense* and many other endemic species of this area (Judd & Skean 1990).

Specimina visa selecta: HAITI: DEPARTMENT SUD: Massif de la Hotte, foothills south of Morne Formon, Bois Formon, 1200-1500 m, 1.2.1984, *Judd 3969* (JBSD); Macaya Biosphere Reserve, Rak Bwa Formon, above Ville Formon, 1150-1230 m, 12.11.1989, *Judd 5786* (FLAS).

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