

NOTES ON THE FLORA OF COSTA RICA, 2

HEDYOSMUM OF THE CHLORANTHACEAE

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Hedyosmum is a genus with probably fewer than twenty species in the neotropics and with a single species in southeastern Asia. The genus is primarily South American with several species in the West Indies and only one species reaching Mexico. The male flowers are perhaps the most reduced among angiosperms, lacking bracts, perianth, and represented by a single, almost sessile, anther. The connective, usually broad and flat above, serves to protect the reproductive parts in early stages before expansion of the spike.

I have interpreted Costa Rica's species as having rather narrow ecological limits. I believe that our collections are sufficiently ample to indicate that these narrow patterns of distribution are real and not merely artifacts of inadequate sampling. Our species are found only in evergreen areas that are quite moist throughout the year. However, no collections have been made from below 500 m. elevations in Costa Rica.

The following key recognizes five species in Costa Rica and one in western Panama. These species will be illustrated in the forthcoming Flora Costaricensis. Two of these species are here described for the first time: H. costaricense and H. montanum. Hedyosmum costaricense was first distinguished by Carroll E. Wood, Jr. about eight years ago and the name has been used and distributed widely in herbaria. A Latin description is provided and type is designated here.

Hedyosmum montanum is very closely related to H. calloso-serratum Oersted but is found at much higher elevations and differs consistently in its flowering parts. The type collection of H. calloso-serratum is said to have been collected by Oersted at an altitude of 9000 feet on Volcán Irazú. I am sure that this is an error as all subsequent collections come from below 1000 meters elevation. A similar error is found in Peperomia oerstedii C.DC., said to have been collected at 8000 feet on Irazú but with all other material known only from between sea level and 1200 meters.

1a Leaf-sheath with conspicuous distal fimbriate structures 4-12 mm long, leaves glabrous and smooth; plants unisexual with the female flowers in compact heads, male flowers (anthers) 3 X 1 mm on spikes 3-16 cm long; at elevations of 1100 to 2800 m. (in Costa Rica).

H. mexicanum

1b Leaf-sheath entire or with subulate or very short (1-4 mm) fimbriate processes distally; female flowers solitary or in small groups of 2 to 4.

2a

- 2a Leaves linear-lanceolate to very narrowly elliptic, leaf-sheath entire distally, leaves glabrous and smooth; plants bisexual with the female flowers sessile and solitary, often in a cincinnus-like form, male flowers (anthers) 1 X 0.7 mm; 1000-1300 m. on the Pacific slope (in Costa Rica). H. brenesii
- 2b Leaves broader, plants of the wet Caribbean slopes and the Central Highlands and Cordilleras. 3a
- 3a Leaves with 12 to 20 (30) secondary veins on a side, glabrous and usually smooth; inflorescences free of the stem above the leaf-sheath, male flowers (anthers) 1.5 X 0.7 mm, the plants bisexual or (?) occasionally unisexual; 900-1600 m. H. costaricense
- 3b Leaves with 5 to 10 secondary veins on a side, often scabrous; inflorescences usually united with the stem to above the leaf-sheath, plants unisexual. 4a
- 4a Female flowers solitary within a subtending cupulate or open bract, male flowers (anthers) 1.4 X 0.5 mm; elevations of 500-1000 m. H. calloso-serratum
- 4b Female flowers usually in groups of 2 or 3 within the subtending bracts. 5a
- 5a Plants of higher (1800-2700 m.) elevations along the Caribbean side of the Central Highlands and in the Cordillera de Talamanca; male flowers (anthers) 1.7 X 0.6 mm. H. montanum
- 5b Plants of lower (0-1000 m.) elevations on the Caribbean slopes of western Panama; male flowers (anthers) 2.5 X 0.5 mm. H. scaberrimum

HEDYOSMUM COSTARICENSE C. E. Wood, Jr., sp. nov.

Frutices vel arbusculae 3-7 m altae, monoeciae vel (?) dioeciae, glabrae. Folia petiolis 4-15 mm longis, laminis 7-16 cm longis, 2.5-5 (6) cm latis, ellipticis vel oblongis, apicibus abrupte acuminatis, basi-
bus acutis vel obtusis, marginibus serratis vel crenatis, nervis secundariis 12-20 (30) paribus. Inflorescentiae bisexuales (in typo) vel unisexuales, inflorescentiae masculinae spicis 6-8 mm longis, 4-5 mm crassis, antheris 1.3-1.8 mm longis, 4-5 mm crassis (in seco); inflorescentiae femineae floribus (1)3-6 aggregatis, in turmis 4-8 mm longis, 3-6 mm crassis, omnibus floribus subtentis bractea ca. 2.5 mm longa, flos femininus ca. 2 mm longus, lobis perianthii 0.5 mm longis. Fructus 2.5-4 mm longi, ca. 2 mm. crassi. HOLOTYPUS: Austin Smith H566 in F (941576)

Bisexual or (?) unisexual shrubs and small trees 3-7 m. tall, essentially glabrous, leaf-scars absent with the leaf-base persisting and encircling the stem. Leaves with the free portion of the petiole 4-15 (25) mm long, 0.8-2 mm thick, tube of the leaf-sheath 3-8 (12) mm long, the distal margins entire or with 2 minute (1 mm) linear structures on each distal margin; laminae 7-16 cm long, 2.5-5 (6) cm broad, very narrowly to broadly elliptic or oblong, abruptly acuminate, obtuse to acute at the base, laminae drying stiffly chartaceous to subcoriaceous, smooth and glabrous above and below, the 12 to 20 (30) pairs of major secondary veins flat or becoming impressed above, serrulate with the teeth about (4) 8 mm distant on the margin. Inflorescences occasionally bisexual (as in the type), usually free from the stem above the leaf-sheath; male inflorescences usually of spikes borne in 1 to 3 opposite pairs on an axis 3-8 cm long terminated by a pair of spikes, each spike subtended by an aculeate bract about 3 mm long, spikes sessile or occasionally short (15 mm) pedunculate, 6-18 mm long, 4-5 mm thick, stamens becoming 2 mm distant on the expanded rachis, anthers sessile, 1.3-1.8 mm long and 0.6-1 mm broad, connective about 0.5 mm broad and flat above; female inflorescences thyrselike, racemose, or spicate with groups of (1) 3 to 6 female flowers in opposite pairs, sessile or on short (1-8 mm) peduncles, each group of flowers about 4-8 mm long and 3-6 mm thick, each flower subtended by a broad bract about 2.5 mm long and united with the other bracts only at the very base, female flower about 2 mm long with perianth-lobes about 0.5 mm long, the lower half of the flower enclosed within the subtending bract. Fruit 2.5-4 mm long, about 2 mm thick, thickest at or above the middle, trigonous.

Plants of the very wet lower montane (premontane wet and premontane rain) forest formations between 900 and 1600 m. elevation and known only from areas of the Central Highlands subject to the wet Caribbean winds (see below); flowering and fruiting throughout the year. The species is endemic to Costa Rica.

The leaf-venation, occasional bisexual inflorescence, and floral details readily distinguish this species from all our other species of the genus. The plants are uncommon and known only from the following collections: Los Angeles de San Ramon (Brenes 4772, 13127, and 13589), 15 km. northwest of San Ramon (Lent 2604), and below Zarcero (A. Smith H566) in Alajuela Prov. and near Tapantí (Lent 990) and above Platanillo (Wilbur & Stone 10627) in the Province of Cartago. In addition, two rather unusual collections are placed here: J. Leon 133 from Capellades and Valerio 1348 from Santa Cruz de Turrialba, Cartago. These differ from the others in the thicker leaves with many more (16-30 pairs) prominent secondary veins and the closer (4 mm) serrations, but I believe they are only an unusual form of the species; they lack well preserved flowers. Vegetatively, the species and especially the latter two collections resemble H. scabrum (R. & P.) Solms of South America and H. arborescens Sw. of the West Indies.

HEDYOSMUM MONTANUM W. Burger, sp. nov.

Frutices vel arbusculae 3-10 (20) m altae, dioeciae. Folia petiolis 5-14 mm longis, glabris vel puberulentibus, laminis (4) 6-13 (17) cm longis, 2-5 (7) cm latis, anguste ellipticis vel oblongis, apicibus breve acuminatis, basibus obtusis vel attenuatis, paginis scabrellis, venis

secundariis 5-8 (10) paribus. Inflorescentiae saepe unisexuales, inflorescentiae masculinae spicis 3-6 cm longis, 4-6 mm crassis, antheris 1.4-1.8 mm longis, 0.6-0.7 mm crassis; inflorescentiae femineae floribus 3 (1-4) aggregatis, in turmis 4 mm longis et 4 mm crassis, omnibus floribus subtentis bractea 3-4 mm longa, bracteis inferne connatis, flos femineus ca. 2 mm longus. Fructus ca. 2.8 mm longi et 1.8 mm crassi. HOLOTYPE: W. Burger & R. Liesner 6366 in F (1713261), ISOTYPE: BM, COL, CR, GH, MO.

Unisexual shrubs or trees 3-10 (20) m. tall, leafy internodes 2-6 cm long, 2-5 mm thick, essentially glabrous but with a very rough surface and occasional rows of hairs on the leaf-sheath, leaf-scars usually absent with the leaf-base persisting and encircling the stem. Leaves with the free portion of the petiole 5-14 mm long, 1.5-2.5 mm thick, glabrous or with irregular hairs 0.2-1 mm long in rows, tube of the leaf-sheath 1-2.8 cm long, with 2 (several) slender often fimbriate stipule-like structures 1-3 mm long on each distal margin, the distal margin occasionally becoming torn in age; laminae (4) 6-13 (17) cm long, 2-5 (7) cm broad, narrowly elliptic to oblong, widest near the middle, gradually or abruptly short-acuminate, obtuse to acute or sometimes attenuate at the base, drying stiffly chartaceous to subcoriaceous, slightly scabrous or smooth above, glabrous above and often with irregular brownish hairs 0.2-1 mm long on the midvein beneath, minute (0.1 mm) epidermal projections obscure or prominent on both surfaces, the 5 to 8 (10) pairs of major secondary veins flat above and slightly raised beneath, serrulate with the teeth 2-4 mm distant on the margin. Inflorescences usually united with the stem to above the leaf-sheath; male inflorescences usually of 1 or 2 pairs of opposite spikes and a solitary terminal spike on a short (1-2 cm) rachis, opposing spikes subsessile, the terminal pedunculate, subtended by subulate bracts 3-6 mm long, the spikes becoming 3-6 cm long, 4-6 mm thick, stamens sessile and becoming 2-3 mm distant on the rachis, anthers 1.4-1.8 mm long, 0.6-0.7 mm thick, connective produced 0.1-0.2 mm beyond the thecae, flat above and often acute on one side; female inflorescences of racemose or spike-like branches arising from the stem or from a short rachis in opposing pairs and thyrselike in form, the female flower clustered in small sessile or short-pedunculate groups, each group with usually 3 (1 to 4) flowers and about 4 mm long and 4 mm thick, each flower subtended and partly enclosed by a bract 3-4 mm long, the bracts variously united at the base to form a cupulate involucre enclosing all the flowers of the group, flower about 2 mm long with perianth-lobes about 0.5 mm long, stigma 2-3 mm long (? apically bifurcate) and soon deciduous. Fruit about 2.8 mm long and 1.8 mm thick, ellipsoid and trigonous with the apical perianth-lobes persisting.

A species of the montane rain forests most often found on slopes subjected to the wet Caribbean weather and collected only from between 1800 and 2700 meters elevation in Costa Rica. The species ranges southward to the upper Rio Chiriqui Viejo in Panama. In Costa Rica the species has been collected from the area of Palmira (A. Smith A337, 4186A, & 4187) and Alto Palomo (Lent 1829) in Alajuela Prov., on the eastern slope of Volcán Barba (A. Jimenez 2269, Burger and Liesner 6366 & 6416), and La Carpintera (Allen 639) in San José Prov., and in the Cordillera de Talamanca near Empalme (Burger 7919, A. Jimenez 2758, Williams et al. 25018) and below Cerro Chirripó (Burger and Gomez 8370) in the provinces of Cartago and San José.

The species appears to flower throughout the year; collections with male inflorescences are very rare (A. Smith 4187).

Specimens placed here were previously thought to be H. calloso-serratum but the latter species has solitary female flowers and is separated, in Costa Rica, from H. montanum by an altitudinal disjunction of more than 800 meters. I believe that we have enough material to indicate that this ecological separation is real and not an artifact of poor sampling. This species is also closely related to H. scaberrimum which differs in anther size and lower elevation habitat. The lack of intermediates between these entities and the very consistent differences both as regards morphology and habitat lead me to believe that these taxa are best treated as species. Material of Hedyosmum from Nicaragua (Friedrichsthal 1031, Grant 811) differs slightly in morphology from material placed here and occurs in a rather different habitat. Hedyosmum montanum has not been collected in the Cordillera de Guanacaste where one might expect to find intermediates (if such exist) with the Nicaraguan material. I suspect that when the Nicaraguan population is better known it will also prove to be worthy of specific rank.

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