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New or noteworthy species of *Aegiphila*, *Styrax* and *Zamia* from Peru

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Abstract: *Styrax nui* sp. nov. (*Styracaceae*) and *Zamia urep* sp. nov. (*Cycadaceae*) from Peru are described. *Clerodendrum ulei* HAYEK is transferred to the genus *Aegiphila* (*Verbenaceae*). New collections of *Styrax foveolaria* PERKINS are reported.

Key words: *Aegiphila*, *Clerodendrum*, *Cycadaceae*, *Styracaceae*, *Styrax*, *Verbenaceae*, *Zamia*, Flora of South America, Flora of Peru.

Descriptions

Aegiphila ulei (HAYEK) B. WALLNÖFER comb. nov.

Clerodendrum ulei HAYEK, Bot. Jahrb. 42: 172-173 (1909)

Syntypes: Ule 5926 [erroneously cited as number 5976 in the protologue!] and Ule 5513 [both G-DEL, photograph 24625 ex F].

The following taxa are, according to my own observation in herbaria, most probably conspecific or at least belong to the same species group: *Aegiphila costaricensis* MOLDENKE, *A. triflora* MOLDENKE, *Clerodendrum haughtii* MOLDENKE, *C. tessmannii* MOLDENKE and *C. ulei* HAYEK. NASH & NEE (1984: 6, 47) are expressing a similar opinion. These authors include *Clerodendrum matudae* STANDLEY as a synonym in *Aegiphila costaricensis*. The status of all these taxa can only be elucidated after study of the types and the available specimens deposited in herbaria. *Clerodendrum ulei* is the oldest validly published name. This taxon, as well as *C. tessmannii*, was omitted from Index Kewensis, both however, are reported in the Gray Card Index. *C. ulei* was not reported for Peru by BRAKO & ZARUCCHI (1993).

Aegiphila ulei is an understory treelet attaining a height of 2-6 m and up to 6 cm DBH. The leaves are usually chartaceous, some specimens show, however, more coriaceous ones. This phenomenon can be observed on twigs collected from different plants at the same locality (e.g. Panguana in Peru) and could be connected with their exposition (shady or quite sunny, more open places). The peduncles of the type of

C. ulei are very thin and short, those of *C. tessmannii* (type: Tessmann 3244 in G-DEL, photo at NY) are up to 7-8 cm long and thick. Herbarium specimens, however, are showing all kinds of intermediate forms. This species has usually regular, radially symmetrical flowers. However, the flowers of one collection [Morawetz & Wallnöfer 11-6888: colour photograph in MORAWETZ (1993: Abb. 10 on page 277)] show a slightly zygomorphic corolla: one of the two sinuses of the outermost petal-lobe is ca. 3 mm deeper incised than all the others. All the collections cited below possess flowers with 4 (rarely 5), long exerted filaments of usually equal length. The apically deeply bifid styles are showing two different lengths: on some plants they only reach up to the throat, on others they are long exerted and nearly as long as the filaments. This phenomenon is perhaps correlated with androdioecy and should be studied in the field. The only slightly accrescent calyces are becoming indurate, thick and cupula-like in fruits. The character of flowers and fruits indicate, that this species belongs to the genus *Aegiphila*, which, however, is very close to *Clerodendrum*.

Other characteristics observed in the field: bark light brown, peeling off; twigs with radial pith rays in cross section; abaxial leaf surfaces light grey-green to light green; inflorescences situated (always?) below leaves; inflorescence axes and calyces green; calyx teeth often pink tinged; corolla tubes straight, ca. 1.5-1.8 cm long, whitish-green outside, white inside; corolla whitish-green to white outside, often pink tinged, white inside; filaments, styles and stigmata white; anthers reddish, old ones brownish; upper parts of infructescence axes and calyces reddish-brown, slightly violet tinged; immature fruits green, 1-3-seeded; interior of seeds white; flowering observed in July, August and October and fructifying in February.

Studied collections: Peru, Dept. Huánuco, Prov. Pachitea, western slope of the Sira mountains and adjacent lowland, ca. 26 km S of Puerto Inca, next to the junction of the Rio Pachitea and the Rio Yuyapichis (= Lllupapichis), biological field station of „Panguana“ (9°37' S, 74°56' W), primary lowland rain forest, 260 msm, (fl), 22. Oct. 1985, Morawetz & Wallnöfer 12-221085 [LZ, USM, W]; - same locality, (fr), 19. Feb. 1988, Wallnöfer 11-19288 [LZ, USM, W]; - same locality, (fl), 6. Aug. 1988, Morawetz & Wallnöfer 11-6888 [LZ, USM, W]; - same locality, (fl), 6. Aug. 1988, Gottsberger & Döring G12-6888 [ULM, USM, W]; - same area but: western slope of the Sira mountains ca. 24 km SE of Puerto Inca, slope of the valley of Rio Negro SE from the „Campamento Sira“ (9°28' S, 74°47' W), primary montane forest, 615 msm, (fl), 2. July 1988, Wallnöfer 111-2788 [LZ, USM, W].

***Styrax nui* B. WALLNÖFER sp. nov.**

Diagnosis: Differt a *Styrace foveolaria* foliis plerumque late lanceolatis, infra densissime pilis stellatis ramis longis dense intertextis, in sicco ferrugineis, in vivo intense aurantiacis tectis.

Type: Peru, Dept. Pasco, Prov. Oxapampa-Pasco boundary: Abra San Guttardo, divide between Chontabamba and Rio Paucartambo valley, ridge of mountain covered with shrubby „pajonal“ vegetation on rock of varying colors but apparently not sandstone, 2500-3000 m, 29 Dec. 1983 (fl: older buds), Foster, Chanco & Alban 7645 (holotype MO, photo W; isotypes not seen), „Treelet of 4 m; leaves bright orange below; new leaves completely orange; corolla white.“

Shrub to treelet of 2-4 m; young twigs subterete, covered with a very dense, tomentose, ferruginous-brown, uniform indumentum, of stellate hairs; older twigs glabrescent and becoming dark with age; young leaves covered on both surfaces with the same indumentum as the young twigs, in vivo according to Foster & al. 7645 orange; petioles 6-10 (-12) mm long, 1.5-2 mm thick, covered with the same indumentum as young stems; lamina of adult leaves coriaceous, broadly lanceolate to elliptic, 4-8 cm long, 1.5-3.5 cm wide, broadest near middle, rarely obovate, basally cuneate, apically mostly acute, sometimes obtuse, on margins entire, flat, rapidly glabrescent on adaxial surfaces, abaxially covered with a densely interwoven, persistent, in sicco ferruginous-brown, in vivo (according to Foster & al. 7645) bright orange indumentum of stellate, long- and many-branched hairs (single hairs not recognizable); older leaves in sicco often grey-brown; main vein impressed adaxially, prominent abaxially; secondary veins 7-10 on each side, subparallel to slightly curved, flat or only slightly impressed adaxially, slightly prominent abaxially; inflorescences (infructescences) axillary, simply racemose or composed of few racemose partial-inflorescences (Wurdack 1452), (2-) 3.5-6.5 cm long, mostly shorter, rarely as long as the subtending leaf; inflorescence axes, pedicels, bracts and calyces densely covered with a ferruginous-brown, uniform indumentum, of stellate hairs; bracts of flowers linear-subulate 2-6 (-10) mm long, distal ones generally shorter as the lower ones, shed on fruits; pedicels 3 mm, on fruits up to 7 mm long, 1.5-2 mm thick, with two small bracteoles; calyces 3 mm long, 3-4 mm wide, cup-shaped, outside tomentose (see above), inside glabrous, apically with 5 inconspicuous teeth; older still closed corollae (no open flower present) 5 mm long, exceeding calyces by 3 mm; petals 5, valvate, 1.5 mm wide, basally connate, forming a tube, outside densely covered with an appressed, whitish-grey indumentum of stellate hairs, inside glabrous, except margins and apex, which show few-branched, white, stellate hairs; stamina 9, 4 mm long, connate on lower half forming a tube, which is on both sides glabrous; anthers 2 mm long, those of one whorl slightly smaller; connectives 2 mm long, 0.5-0.8 mm wide, flattened, exceeding thecae laterally by 0.2-0.3 mm, on both sides densely covered with stellate hairs, basally on adaxial side with slightly longer hairs (barbellate); thecae 2 mm long, very narrow; ovaries globose 2 mm in diameter, densely covered with ferruginous, stellate hairs, incompletely three locular, with only one, basifixed ovule per locule; styles 1.5 mm long, glabrous, acuminate; fruits oblong, in sicco 11-13 mm long and 9 mm wide, densely covered with ferruginous-brown, stellate hairs; calyces persistent on fruits, mostly irregularly split.

Paratypes: Peru, Dept. Amazonas, Prov. Bagua, Cordillera Colán E of La Peca, humid elfin forested ridge W of peaks, 9600 ft., 28 Aug. 1978 (fr), Barbour 3254 (MO 2x), „Shrub to 2 m with firm red brown fruits.“; - Dept. Amazonas, Prov. Chachapoyas, summit of Cerro Malcabal (Cerro Tumbé) 3-6 km SW of Molinopampa, 2850-2900 m, 20 July 1962 (fr), Wurdack 1452 (F, K), „Bushy tree of 4 m; fruit tan.“

Styrax nui belongs as third species to *Styrax* section *Foveolaria* (RUIZ & PAVON) PERKINS, which comprises according to PERKINS (1907, 1928) *S. foveolaria* PERKINS from Peru and *S. obtusifolius* GRIESEBACH from Cuba. It is closely related to *S. foveolaria*, which is distinguished by the following characters: leaves ovate, apically mostly obtuse; indumentum on abaxial leaf surfaces heterogeneous, composed of a dense layer of whitish to light brown stellate hairs and taller, isolated tufts of ferruginous-brown stellate hairs especially along the hardly visible tertiary veins; indumentum on primary and secondary veins on abaxial surfaces ferruginous-brown.

Styrax foveolaria PERKINS

This species was known until now (see BRAKO & ZARUCCHI 1993) only from the type collection: Peru, Dept. Huánuco, Pillao, 1787 (fl & fr), Ruiz s.n. (lectotype not chosen; isotypes: BM; BR; FI, photo at WU; G 7x; MA 7x, photo at WU; P 3x). Two new collections from Peru can here be reported: Dept. San Martín, Mariscal Cáceres, Rio Abiseo National Park, forest patch (P12) above timberline Puerta del Monte, montane rain forest, ca. 7°S, 77°W, 3200 m, 7 Sep. 1985 (fr), Young 1574 (MO 2x ex F); „Tree 10-15 m.“; - Dept. Pasco, Prov. Oxapampa, Santa Barbara, Ceja de selva, forest appears to be primary (dominants: *Clusia* and *Weinmannia*, Bryophyte rich), 10°22'S, 75°39'W, 3200-3300 m, 3 Aug. 1984 (fl buds), Smith 8159 (G 2x ex MO); „Tree 13 m, 14 cm DBH; pubescence rusty; fruits [missing on the sheets!] green.“

A further collection probably from Bolivia, may represent an other undescribed species of this section: Huayconi 10-1100 ft., May 1866 (fl buds), Pearce s.n. (K), „shrub 6-10 ft., white“. This locality is however not traceable and is maybe identical (?) with „Cerro Huaicani“ at 16°08'S, 67°34'W. According to a handwritten itinerary (with only scarce information) kept at Kew, Pearce was collecting during April 1866 in Sandillani, the following May in Huayconi and during June in Moro (5000 ft.).

The younger leaves of this specimen are covered on both surfaces with a homogeneous, intensively rusty indumentum of densely interwoven stellate hairs, like *S. nui*. The adult leaves are obovate, apically acute, basally rounded or slightly cuneate, glabrescent abaxially and becoming grey-brown abaxially. More herbarium material is needed to classify this population.

Zamia urep B. WALLNÖFER sp. nov. (Fig. 1)

Diagnosis: Planta dioica, usque ad 0.4-0.5 m alta; truncus subterraneus, oblongus, cir. 10 cm longus, diametro 2.5-3 (in sicco 2-2.5) cm; folia in toto 48-65 cm longa, numero 1-2 (-4), arcuata, paripinnata, (3-) 4-juga; petioli 24-38

(-49) cm longi, semper sine aculeis; rhachis 9-12 (-15) cm longa, sine aculeis; foliola coriacea, opposita vel subopposita, lanceolata usque ad elliptica, 11-20 cm longa, 3-6 cm lata, basin versus attenuata, apicem versus caudato-acuminata, margine serrata, basin versus integra; pedunculus strobili microsporangiati erectus, 18-22 cm longus, diametro 2-3 mm; strobili microsporangiati erecti, dilute brunnei, cylindrici, 3.5-4.5 (-6) cm longi, 6-8 mm lati; pars distalis microsporophyllorum hexagonalitruncata; pedunculus strobili megasporangiati erecti, 13-16 cm longi; strobili megasporangiati dilute brunnei, in toto 3.5-4.7 cm longi, 1.5-2.3 cm lati; megasporophylla microsporophyllis similia sed majora.

Type: Peru, Dept. Huánuco, Prov. Pachitea, western slope of the Sira mountains ca. 20-24 km SE of Puerto Inca, crest of the mountain range going west to east from „Campamento Oro“ (9°29' S, 74°50' W) to the „Campamento Sira“ (9°28' S, 74°47' W), primary montane rain forest, 660 msm, (fertile, microsporangiata), 15. July 1988, Wallnöfer 112-15788 [W, holotype; LZ, USM, isotypes].

Terrestrial, dioecious plant up to 0.4-0.5 m; **t r u n k** subterraneous, straight, oblong, ca. 10 cm long, 2.5-3 (in sicco 2-2.5) cm wide, gradually tapering into the principal root, markedly constricted near lower (distal) end, in vivo brown outside, light brown inside, containing a little transparent, rubberlike sap; **c a t a p h y l l s** 1-3.5 cm long, ca. 5-8 mm wide at base, gradually narrowed towards apex, grey to light brown, densely covered with ribbonlike, whitish to brown hairs on abaxial surfaces; **l e a v e s** 1-2 (-4), 48-65 cm long, arcuate, simply pinnate, ending distally with a 4-6 mm long, hairy mucro; **p e t i o l e** 24-38 (-49) cm long, always lacking spines, in sicco ± trigonous, ca. 2 mm in diameter, canaliculate adaxially, nearly flat distally, glabrous, in vivo greenish-brown, brown or light brown basally; **r h a c h i s** 9-12 (-15) cm long, spineless, glabrescent; **l e a f l e t s** coriaceous, opposite or subopposite, arranged in (3-) 4 pairs, broadly lanceolate to elliptic, mostly asymmetric, 11-20 cm long, 3-6 cm wide, broadest near middle or slightly below, gradually narrowed into a ca. 0.5-1 cm long, indistinct petiolule; leaf apices long acuminate; margins sharply serrate, proximally entire, slightly revolute; teeth 0.5-1 mm long, 8-19 on each side, distally a few mm, proximally 1-2 cm distant from each other; veins near middle of leaflets 19-23, subparallel, markedly impressed on adaxial surfaces, strongly prominent on abaxial surfaces, each one 2-3 times branching dichotomously from leaf base towards apex and terminating in the teeth of leaf margin; lamina ± shiny, glabrous, in vivo darker green and with markedly raised (bullate) intercostate areas adaxially, ± dull, glabrescent (only with some sparse ribbonlike, rusty-brown hairs along veins), in vivo lighter green abaxially; **p e d u n c l e s** of **m i c r o - s p o r a n g i a t e** **s t r o b i l i** erect or slightly inclined, brown, 1 (rarely 2) per plant, 18-22 cm long, 2-3 mm in diameter, terete in vivo, glabrous except the distal 1.5 cm, which are densely covered with irregularly branched trichomes; **m i c r o s p o r a n g i a t e** **s t r o b i l i** erect, light brown, cylindrical, 3.5-4.5 (-6) cm long, 6-8 (in vivo up to 10) mm wide, usually ending distally in a 4-5 mm long, sterile, conical tip; anthesis proceeds from base to apex of strobili; **m i c r o -**

s p o r o p h y l l s hexagonal-truncate distally (with steeply inclined, irregular facets, surrounding in vivo a flat, in sicco flat or slightly depressed, terminal facet), densely covered with short, branched and intricate trichomes; horizontal axes of these hexagonal-truncate structures 2-3.5 mm, vertical axes 1.8-2 mm; **m i c r o s p o r a n g i a** 1 mm in diameter, in vivo yellowish to light brown, dehiscing by longitudinal sutures; spores in vivo whitish-light brown; **p e d u n c l e s** of **m e g a s p o r a n g i a t e s t r o b i l i** erect (sometimes inclined), brown, 13-16 cm long, 3-5 mm in diameter, basally trigonal, towards apex \pm terete, glabrous except the distal 0.5-1 cm, which are densely covered with irregularly branched trichomes; **m e g a s p o r a n g i a t e s t r o b i l i** erect, light brown, 3.5-4.7 cm long, 1.5-2.3 cm (in vivo up to 2.5 cm) in diameter, proximal, fertile part barrel shaped, 2.5-4 cm long, distal (sterile) part conical, 0.7-1 cm long, 5 mm wide at base; shape and indumentum of **m e g a s p o r o p h y l l s** the same as those of microsporophylls, but the terminal (distal) facet with a distinct, horizontal groove on younger strobili; hexagonal-truncate structures with horizontal axes of 12 mm and vertical axes of 7 mm (those of younger strobili 7, respectively 4 mm); ovules ca. 4 mm long in sicco; mature seeds unknown.

E c o l o g y: This species is quite frequent on certain, often stony hill-sides, which are covered with a more or less thin earth-layer at elevations between 260 and 700 m.s.m. On places with thicker earth-layers (e.g. Panguana, see below) it is more rare, but the individuals are more robust. Only a few individuals are reaching the fertile stage at the same time. Plants with megasporangiate strobili are very rare.

P a r a t y p e s: Peru, Dept. Huánuco, Prov. Pachitea, western slope of the Sira mountains and adjacent lowland, ca. 26 km S of Puerto Inca, next to the junction of the Rio Pachitea and the Rio Yuyapichis (= Llullapichis), biological field station of „Panguana“ (9°37' S, 74°56' W), primary lowland rain forest, 260 msm, (sterile), 24. Nov. 1988, Wallnöfer 15-241188 [LZ, USM, W]; same locality, (fertile, microsporangiate), 11 May 1989, Listabarth 11-11589 [USM, W]; same locality, (fertile, megasporangiate), 11 May 1989, Listabarth 12-11589 [USM, W]; same locality, (fertile, megasporangiate), 1 Febr. 1993, Listabarth 14-1293 [USM, W].

SABATO (1990) reports only *Zamia poeppigiana* MARTIUS & EICHLER and *Z. obliqua* A.BRAUN from Peru in his review of the South American *Cycadaceae*. This author mentions, however, some other, still unidentified populations from the north-eastern Amazonian lowland (Dept. Loreto) of Peru. One of these populations resembles *Z. manicata* LINDEN ex REGEL (SABATO 1990, WRINKLE 1993). STEVENSON & HILL (1995) are mentioning, however, only *Z. poeppigiana* and *Z. ulei* DAMMER for Peru. *Z. urep* seems to be related to *Z. ulei*, which is known from Brazil (SABATO 1990, STEVENSON & HILL 1995), Ecuador (DODSON 1994), Peru (BRAKO & ZARUCCHI 1993, STEVENSON & HILL 1995) and Colombia (STEVENSON & HILL 1995). Other related species probably are *Z. cunaria* DRESSLER & D.STEVENSON and *Z. dressleri* D. STEVENSON recently described from Panama (STEVENSON 1993). All these species differ, however, from *Z. urep* in being larger and taller, having aculeate petioles and shortly stalked strobili.

Zusammenfassung

Styrax mui sp. nov. (*Styracaceae*) und *Zamia urep* sp. nov. (*Cycadaceae*) werden aus Peru beschrieben. *Clerodendrum ulei* HAYEK wird in die Gattung *Aegiphila* (beides *Verbenaceae*) transferiert. Neue Fundorte von *Styrax foveolaria* PERKINS werden genannt.

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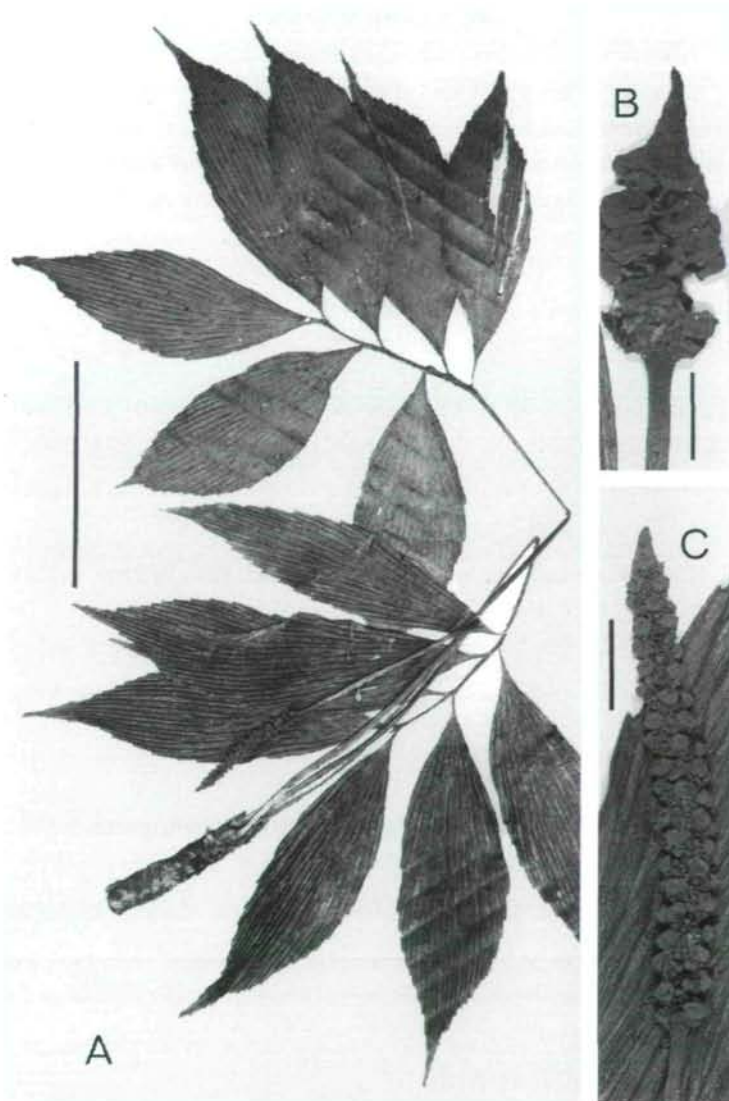


Fig. 1: *Zamia urep* B.WALLNÖFER sp. nov. A: holotype; B: megasporangiate strobilus (Listabarth 12-11589); C: microsporangiate strobilus from holotype (long bar = 10 cm; short bar = 1 cm).

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