

A new species of *Polylepis* (Rosaceae)
from Peru

Una nueva especie de *Polylepis* (Rosaceae)
para Perú



Abstract

Polylepis rodolfo-vasquezii, a new species of the Rosaceae family, is described and illustrated; from the buffer area of the Bosque de Protección Pui-Pui, Region of Junin, province of Satipo, Peru. This species is similar to *P. subsericans*, which is characterized by leaves with 1-3 pairs of leaflets and flexuose petioles; inflorescence pendulous 3-4 cm in length and 4 flowers with 3-4 sepals; cylindrical fruit with irregularly flattened spines. In contrast, *P. rodolfo-vasquezii* has leaves with only 3 leaflets; inflorescence 1-flowered, erect; flowers with 3 sepals and fruits oblong with three slightly flattened ridges.

Keywords: Buffer area, Bosque de Protección Pui-Pui, *Polylepis*, Rosaceae, Inflorescence 1-flowered, Andes, Peru.

Resumen

Polylepis rodolfo-vasquezii, una nueva especie de la familia Rosaceae, es descrita e ilustrada; proveniente de la zona de amortiguamiento del Bosque de Protección Pui-Pui, Región de Junín, provincia de Satipo-Perú. La especie es similar a *Polylepis subsericans*, que se caracteriza por tener hojas con 1-3 pares de foliolos y peciolos flexuosos; inflorescencia péndula de 3-4 cm de longitud con 3-4 flores y 4 sépalos; frutos cilíndricos, con espinas irregularmente aplanadas. Contrariamente *Polylepis rodolfo-vasquezii* tiene hojas con sólo 3 foliolos; inflorescencia erguida uniflora, flores con 3 sépalos y los frutos oblongos con tres crestas ligeramente aplanadas.

Palabras clave: Zona de amortiguamiento, Bosque de Protección Pui Pui, *Polylepis*, Rosaceae, inflorescencia 1-florada, Andes, Perú.

Introduction

Today, the few forests in the Andes above 3000 meters are being constantly replaced by new areas destined to agricultural and livestock activities that lead to the drastic reduction of these ecosystems; remaining only small relicts, where many plant species are disappearing and even those not yet known to science (Brian, 2012). These small forest relicts are mainly dominated by *Polylepis*. Although, in other forests, genera such as *Escallonia*, *Clethra*, *Hesperomeles*, *Baccharis*, *Buddleja*, *Alnus* are also present (Stahl, 2008).

The Rosaceae family comprises more than 3000 species with cosmopolitan distribution, grouped into four families and 14 tribes (Romoleroux, 1992; 1996). The Sanguisorbeae tribe has 14 genera, which are distributed in almost all continents, occurring the greatest diversity of species in the southern hemisphere, being *Polylepis*, *Tetraglochin*, *Margyricarpus* and *Acaena* the

most representative (Perez De Paz, 2004). *Polylepis* is distributed along the Cordillera of the Tropical Andes from Venezuela, Colombia, Ecuador, Peru, Bolivia to northern Chile and Argentina, which includes about 27 species (Kessler *et al.*, 2006; Mendoza & Cano, 2010; Galvez, 2013); however, this number is now reduced to 22 species, considering the synonyms (Tropicos.org, 2015).

According to recent publications, 19 species of *Polylepis* are recorded to Peru (Mendoza & Cano, 2011), number that also would be reduced only to 16 (Tropicos.org, 2015); among them *Polylepis besseri*, *P. canoi*, *P. flavipila*, *P. incarum*, *P. lanata*, *P. microphylla*, *P. multijuga*, *P. pauta*, *P. pepeii*, *P. racemosa*, *P. reticulata*, *P. sericea*, *P. subsericans*, *P. subtusalbida*, *P. tomentella*, *P. weberbaueri*; the greatest concentration of species occurs between 3000 - 4000 m, where *P. subsericans* reaches the highest elevations over 5100 m in the Cordillera Vilcanota

while *P. pauta* is recorded at lower altitude over 1800 m in Accanacu at Cusco region, being this one the most diverse area with about 10 species (Mendoza & Cano, 2010).

The genus *Polylepis*, is generally characterized by trees up to 27 m with twisted trunks sometimes with many branches, the bark is reddish brown or bright brown, thin and exfoliating (rythidome) continuously falling off (Simpson, 1979; Pretell, 1985). Alternate compound leaves, imparipinnate and clustered twigs, each leaf has two fused or adnate stipules around the petiole, forming a sheath; the presence or absence of multicellular trichomes (glandular) extending along the upper surface of the petiole or unicellular trichomes present on the apical region of the petiole are useful for separating species (Simpson, 1979); the number of leaflets is variable according to the species, can be from 3 to more, mostly pubescent toward the back (Pretell, 1985); the shape of leaflets is highly variable, they can be ovate, serrate, with the apex acute or obtuse, also can be obovate, elliptical, orbicular with an apex strongly emarginate; in some cases the indument on the leaflets surfaces is specific for each species, although the density can vary within the same species, for example the group sericea have a long and silky indument; reticulata shows a matted indument and finally in *besseri* the indument is glandular, secreting a yellowish resin, dispersed across the surface of leaflets (Simpson, 1979). The inflorescences in simple clusters, rarely branched, generally long and pendulous like *Polylepis pauta*, in some cases are reduced to the axillary region of the leaves as in *Polylepis peppei*. The flowers are small and protogynous, they have characteristics associated to wind pollination, don't have petals; sepals are green, from 3 to 4 in number, they have no odor or nectar; the anthers are numerous,

with long purple filaments and abundant pollen; stigma broad and fimbriate (Simpson, 1979); the exerted stamens are variable in number, from 6 to 36 per flower (Mendoza, 2005), anthers sacs are red or purple and always have unicellular trichomes in all or part of the surface; each flower has a pair of protective bracts. The fruits are indehiscent achenes 1-seeded, the surface has protuberances that can take several shapes, named ridges, knobs, spines or wings and they are also characters for distinguish the species, the fruits are mostly dispersed by the wind, but it happens that many species of birds that live in trees can disperse the fruits trapped in their feathers (Fjeldsa, 2002). The seed is more or less fusiform, with thin or subcoriaceous testa (Simpson, 1979; Romoleroux, 1996; Mendoza, 2010).

Material and methods

The description of the new species presented in the article, is based on the material available of the *Polylepis rodolfovasquezii* sp nov., which was found in the sector Talhuis within the protected area Bosque de Protección Pui-Pui and in the buffer zone near to the rural community of Toldopampa both localities belonging to the District of Pampa Hermosa, Province of Satipo, Junin. The botanical collections were deposited in the herbaria: MO, USM and HOXA. We realize the morphological description corresponding to external characteristics observed in the botanical collections. During the processes of description and analysis, we used the key species for the genus *Polylepis*; proposed by Simpson B. (1979) and Kessler M. (2005). The vegetative parts were examined in detail, especially petioles, leaflets, hairs, glandular hairs, flowers and fruits, which

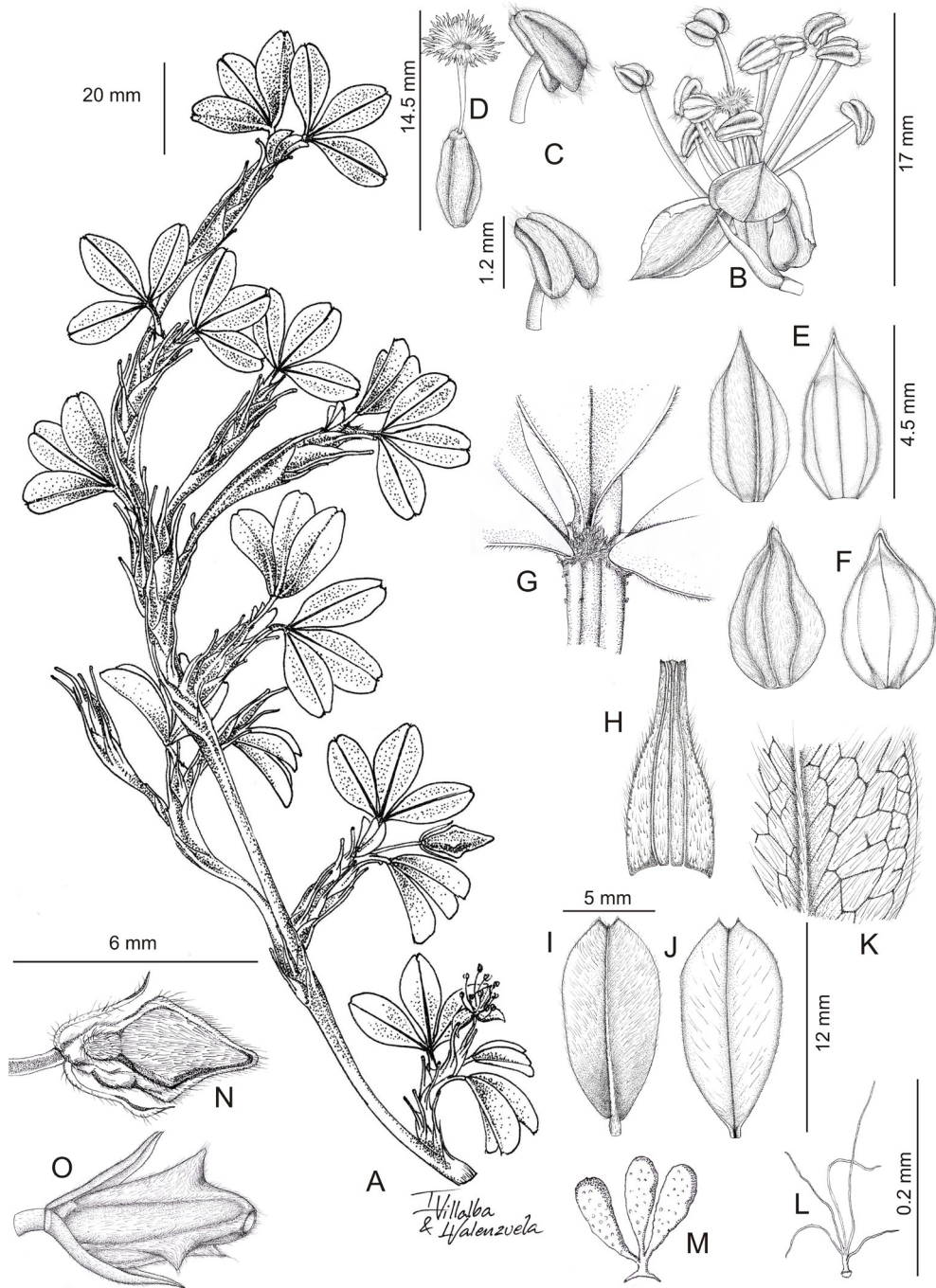


Fig. 1. *Polylepis rodolfo-vasquezii* L. Valenzuela & I. Villalba. A. Flowered branch; B. Flower; C. Stamens (anthers); D. Gynoecium; E-F. Sepals; G. Leaflets attachment (40x); H. Petiole; I. Leaflet lower surface; J. Leaflet upper surface; K. Leaflet lower surface detail (40x); L. Dendritic trichome; M. Clavate glandular trichome; N. Immature fruit; O. Mature fruit. Drawings by I. Villalba & L. Valenzuela from the Holotype: LV 28873.

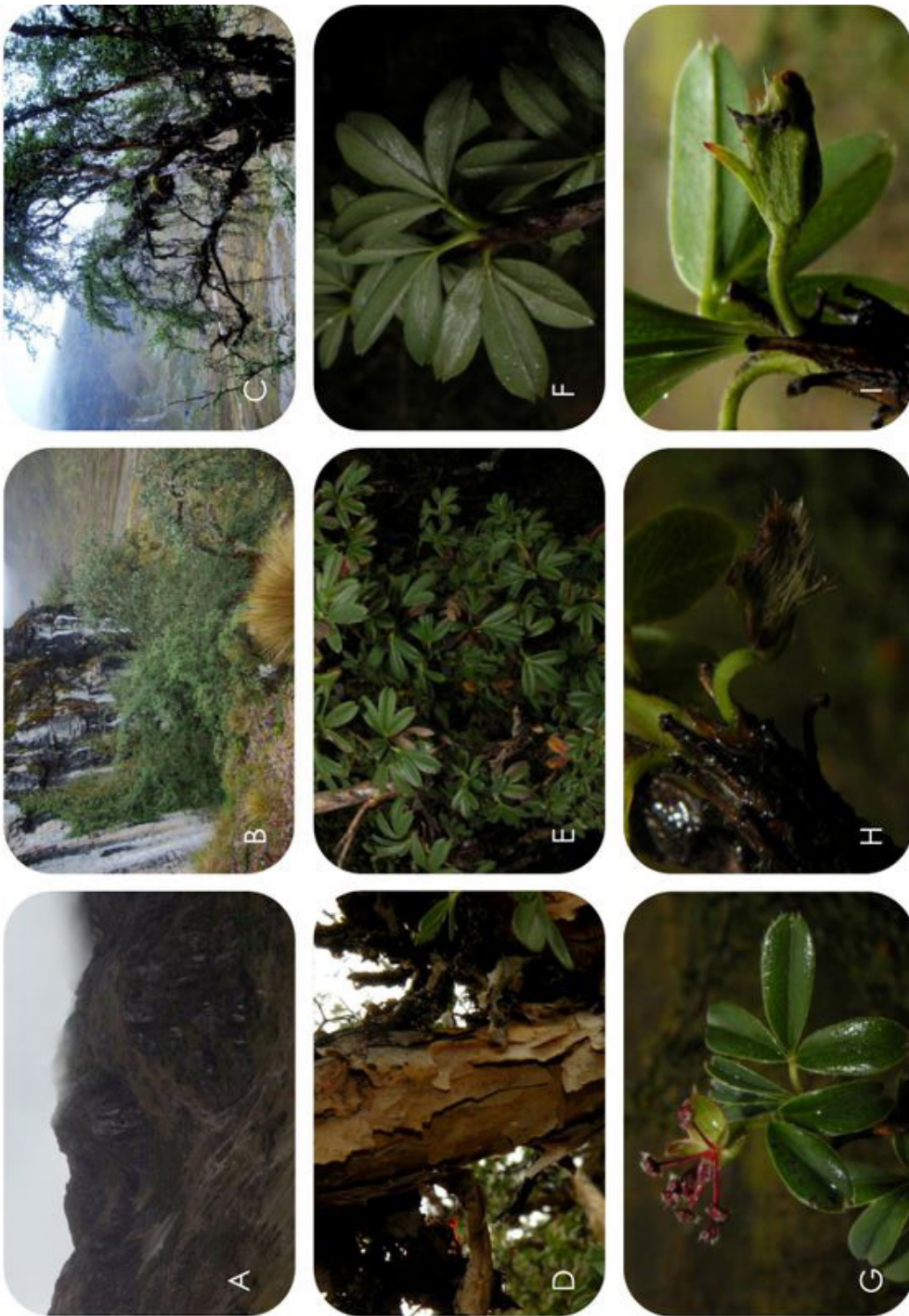


Fig. 2. *Polylepis rodolfo-vasquezii* L. Valenzuela & I. Villalba; A, B. Habitat; C. Habit; D. Bark; E. Branches; F. Leaves; G. Flower - leaflets; H. Inmature fruit; I. Mature fruit. Picture by L. Valenzuela (JBM 2015).

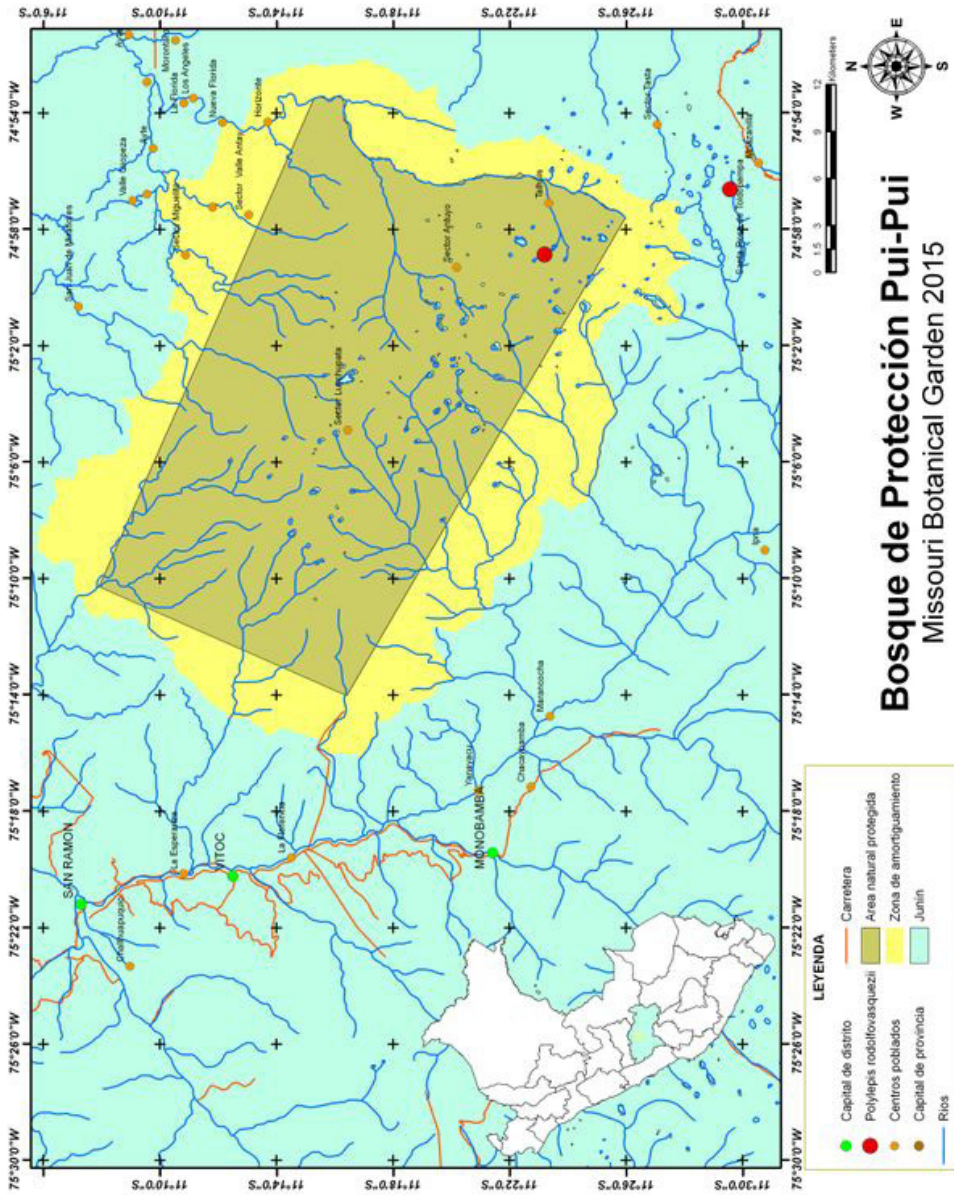


Fig. 3. Ubication of *Polylepis Rodolfo-vasquezii* L. Valenzuela & I. Villalba

were observed using a stereoscope Olympus (40x) optical microscope Leica (150x) USB digital microscope (250x). In the same way to improve the botanical descriptions, we help us with digital photographs to details of all vegetative parts including the habit, for this we used a Sony digital camera (12MP 50x). Were made, drawings to detail what was observed, which served as comparison material and discussion with similar species. Finally, to take into account the geographical distribution of the species, geographical coordinates of the location, that were taken through a GPS 60 CSX.

Results

Taxonomic treatment

Polylepis rodolfo-vasquezii L. Valenzuela & I. Villalba sp nov. (Fig. 1-2)

TYPE: Peru, **Region of Junin**, Satipo, Pampa Hermosa, rural community of Santa Rosa de Toldopampa, buffer area of the Bosque de Proteccion Pui-Pui; 4221 m, Lat. 11°29'33.5", Long. 74°56'37.8", 21-IV-2015, L. Valenzuela 28873, C. Rojas Tello (Holotype, HOXA; Isotype: USM, MO).

Tree up to 10 m; twisted trunks with short rhytidome whitish brown to reddish brown. The leaves are compound alternate and imparipinnate, grouped toward the ends of the twigs arranged in groups of three, trifoliolate, 20 mm long; leaflets sessile and articulated to the petiole, mostly hairy to the lower surface, elliptical, 11-12 x 4.8-5 mm, apex emarginate, with a notch 1 mm wide and 0.5 mm deep; the leaves have a pair of stipules fused around the petiole forming a sheath hirsute 5-7 x 3-4 mm; channeled petioles, 11-12 mm long, apical end with unicellular filamentous dendritic trichomes, grouped into a strand of 0.2 x 0.2 mm, the petiole margins have glandular multicellular clavate trichomes in groups of

three. Axillary inflorescences, one for each leaf, 1-flowered. Flowers 17 mm long; laxly hirsute pedicels 4 x 0.5 mm with 2 slightly hispid bracts 4 x 3 mm; sepals 3, hairy on the lower surface, glabrous in the upper surface, two of them equal, erect, narrow, elliptical and concave 4.5 x 2.7 mm, one is different elliptical, convex, with acute apex revolute at anthesis 5 x 3 mm; androecium with 3-5 pairs of stamens (first pair 3 mm, second pair 4 mm, third pair 5 mm, fourth pair 6 mm and fifth pair 7 mm), dorsifixed anthers 1.2 x 1 mm, lanuginous; gynoecium 14.5-15 mm long, ovary inferior 4-5 x 2-3 mm, stigma irregularly fimbriate 2 x 0.6-1 mm, with small lamellae. Fruits in achenes 6 x 3 mm, indehiscent, strongly hirsute, with three slightly flattened ridges; with a single seed.

Discussion

Polylepis rodolfo-vasquezii is similar to *P. subsericans*, this species is known only from Cusco, Ayacucho, Apurimac and Lima and differs by having 1-3 pairs of leaflets slightly crenate towards the apex, petioles flexuose, the lower surface with erect trichomes, the inflorescence 3-4 cm long, pendulous, with 3-4 flowers, 4 sepals and 12-13 stamens, the fruits are cylindrical with spines or more or less flattened ridges. While *P. rodolfo-vasquezii* has only three leaflets emarginate at the apex, the lower surface hirsute with flexuose trichomes; inflorescence erect, 1-flowered, with 3 ovate sepals, two of them similar concave and one distinct convex and reflexed at anthesis, sometimes one deciduous; flowers 17 mm long with 3-6 pairs of stamens; oblong fruit with 3 ridges.

Distribution and ecology

This species is only known from the buffer area, in the rural community Santa

Rosa de Toldopampa and within the protected area of Bosque de Protección Pui-Pui in Jatun Talhuis sector, forming small remnants at 4000-4400 m altitude (Fig. 3). Sterile specimens were collected within the protected area in October 2014; specimens with flowers and fruits were collected in April 2015 at 4221 m. *P. rodolfo-vasquezii* prefers to grow on rocky slopes, accompanied by other less abundant tree species of the genera *Gynoxis*, *Escallonia*, *Hesperomeles* and *Clethra*.

Current state

Polylepis rodolfo-vasquezii is threatened because of the extraction of timber for housing construction, the making of tools and use as fuel is a very frequent activity. On the other hand, the indiscriminate burning of *Polylepis* forests for the expansion of pastures destined to livestock grazing is causing an irreversible reduction of these small remnants, even within the protected area.

Eponymy

This new species is dedicated to Botanist Rodolfo Vásquez Martínez the Herbario Selva Central Oxapampa (HOXA), in recognition of his scientific work in Peru on the Andean forests and forest Amazon; for his contribution to science and knowledge, dedication and time in the training of professional botanists and ecologists from Peru.

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