

Two Notable Species of *Phoradendron* (Viscaceae) from La Mixteca  
Oaxaca (Mexico), and a New One Complemented \*

Jerzy Rzedowski<sup>1</sup> and Graciela Calderon Rzedowski \*\*

Institute of Ecology, Regional Center Bajío  
Apdo. Postal 386, 61600 Patzcuaro, Michoacan., Mexico.  
<sup>1</sup>Author for correspondence: jerzy.rzedowski@inecol.edu.mx

ABSTRACT

*Phoradendron perredactum*, a miniature leafless and practically acaulescent stem parasite of *Bursera discolor*, is described as new and illustrated. Two types of individuals were observed: the more common branched ones, less than 1 cm long with a prevalence of female flowers, and the scarcer usually solitary ones to 3 cm long, with a prevalence of male flowers. The description of *P. olae* Kuijt is complemented with information concerning male plants and hosts. Both plants occur sympatrically in the District of Huajuapán de León in northwestern Oaxaca, Mexico.

Keywords: Mexico, Oaxaca, *Phoradendron*, parasitic plant, Viscaceae.

---

\* Work performed with support from the Institute of Ecology, A.C. (account 20006), the National Council for Science and Technology and the National Commission for the Knowledge and Use of Biodiversity.

\*\* The authors thank Dr. Lourdes Rico by identifying the hosts of *Phoradendron olae* and Dr. Victor W. Steinmann for reviewing the text of the abstract in English.

## RESUMEN

Se describe como nuevo y se ilustra a *Phoradendron perredactum*, un parásito de ramas de *Bursera discolor*, planta diminuta, carente de hojas y también prácticamente de tallo. De ésta se observaron dos tipos de individuos, los más comunes ramificados, de menos de 1 cm de largo y con prevalencia de flores femeninas, y otros escasos, por lo general solitarios, hasta de 3 cm de largo, mayormente con flores masculinas. Se complementa asimismo la descripción de *P. olae* Kuijt con datos relativos a plantas masculinas y a hospederos conocidos. Ambas especies conviven en el distrito de Huajuapán de León, en el noroeste del estado de Oaxaca, México.

Palabras clave: México, Oaxaca, *Phoradendron*, planta parásita, Viscaceae.

The basin of the Balsas River excels by the abundance of endemic species, many of them quite local and little by little they are being discovered, because their territory has not yet been sufficiently explored from a biological point of view. One of its lesser known portions, especially in regard to the flora, is its eastern end and particularly the region drained by the tributary of the Mixteco River, part of the northwestern sector of the state of Oaxaca.

The vegetation of much of the region in question corresponds to the tropical deciduous forest that in many places has been destroyed or heavily disturbed. However, there are still many places that preserve the original biota in a slightly modified form.

The topic of this contribution is two species of *Phoradendron* that parasitize the trees in this region. Both are apparently rare plants and differ clearly from the bulk of the genus because one of them is almost devoid of leaves while the other is not only aphyllous but also has virtually no stem and is small.

The second seems to not have been described yet; the first has already been known for 14 years (Kuijt, 1997, 2003) based on materials collected in a nearby locality in the state of Puebla. This latter is completing the morphological and ecological information from populations sampled in Oaxaca.

### ***Phoradendron perredactum* Rzed. & Calderón, sp.n. Fig. 1.**

Fruticulus minutissimus fere acaulis aphyllus monoecius glaber; inflorescentiae (1)2-6 ab base caulinari vix perceptibile oriundae, 0.4-3 cm longae, segmentis plerumque 4-5, floribus per segmentum 2-28 in seriebus non dispositis; flores masculi trimeri antheris bilocularibus; flores feminei trimeri; fructus ovoideus vel aliquantum pyriformis, 4-5 mm longus, tepalis inapertis.

Diminutive shrublet, parasitic on relatively thick branches of *Bursera discolor*, practically devoid of stems and therefore leaves and cataphylls, essentially monoecious, the color of brown-purple, glabrous except for the presence of cilia on the margin of the bracts; inflorescences one or more often 2-6 starting from a barely perceptible caulinar base, from 0.4 to 3 cm long, usually with 4 or 5 segments, flowers 2 to 28 per segment, not arranged in rows; male flowers trimerous, anthers bilocular, pistillode tiny; female flowers trimerous; fruit ovoid to somewhat pyriform, 4 to 5 mm long, rough, brown-

purple, with tepals closed at the apex.

Type: Mexico, Oaxaca, 10 km NE of Mariscal, on the road to Huajuapán, tropical deciduous forest, alt. 1350 m, 2.XI.1976, J. Rzedowski 34790 (IEB isotypes to be distributed).

With respect to the distribution of the sexes, it should be noted that most of the inflorescences have both male and female flowers; however, there are two types of individuals:

the very common small one, projecting less than 1 cm from the surface of the host; inflorescences usually consist of several arranged in a more or less radial form; these inflorescences have fewer than 15 flowers, among which are predominantly or sometimes exclusively female;

the much rarer larger size, which can reach up to 3 cm high; usually consist of a single upright inflorescence usually with over 100 flowers, mostly male.

The plant is rare, known only from the collection from a single tree and was not found upon return to the original site, although it is likely to have been overlooked owing to its tiny size.

Its only recorded host, *Bursera discolor*, was described from the central part of Guerrero and has been collected in the eastern part of the Balsas basin and in the coastal region of Oaxaca; was also cited in the states of Colima, Michoacán and Mexico, but having recently seen the reports in question, these are based on misidentified specimens. This tree is relatively common in the Mixteco river basin and this is where one would focus the search for other populations of the parasitic species being described.

*Phoradendron perredactum* differs from other known species of the genus in its almost complete reduction of the stem and the tiny size of the whole plant in which only the haustorium and inflorescences are conspicuously manifested. In this habit shows an obvious analogy with *Arceuthobium minutissimum* J.D. Hooker, a parasite of pine, known from the Himalayas.

With respect to their affinities with other components of the genus, I do not have a clear idea. The new taxon definitely does not seem to be related to the sympatric *P. olae* (or the probably close *P. californicum* Nutt.), confirming the notion that the trend in leaf reduction has been developed independently and in parallel on multiple phyletic lineages in *Phoradendron*. As for the nearly aphyllous condition of the plant, monoecious and with short inflorescences, *P. aphyllum* Steyermark, described from Venezuela, resembles *P. perredactum*, but these characters are also found in several other species of the genus unrelated to each other, so that there is insufficient basis for developing a close bond. Nor with another aphyllous species *P. fragile* Urban, known from Brazil, which shows features that approximate the latter.

An interesting aspect worth investigating is whether, based on the drastic decline of photosynthetic surfaces, there is still chlorophyll in the tissues of *P. perredactum* and if the plant can be considered a hemiparasite, as is the case with other species in the family Viscaceae.

The species name (*perredactum* = extremely small) refers not only to the fact of its diminutive size, but especially to the almost total elimination of its exposed vegetative portions.

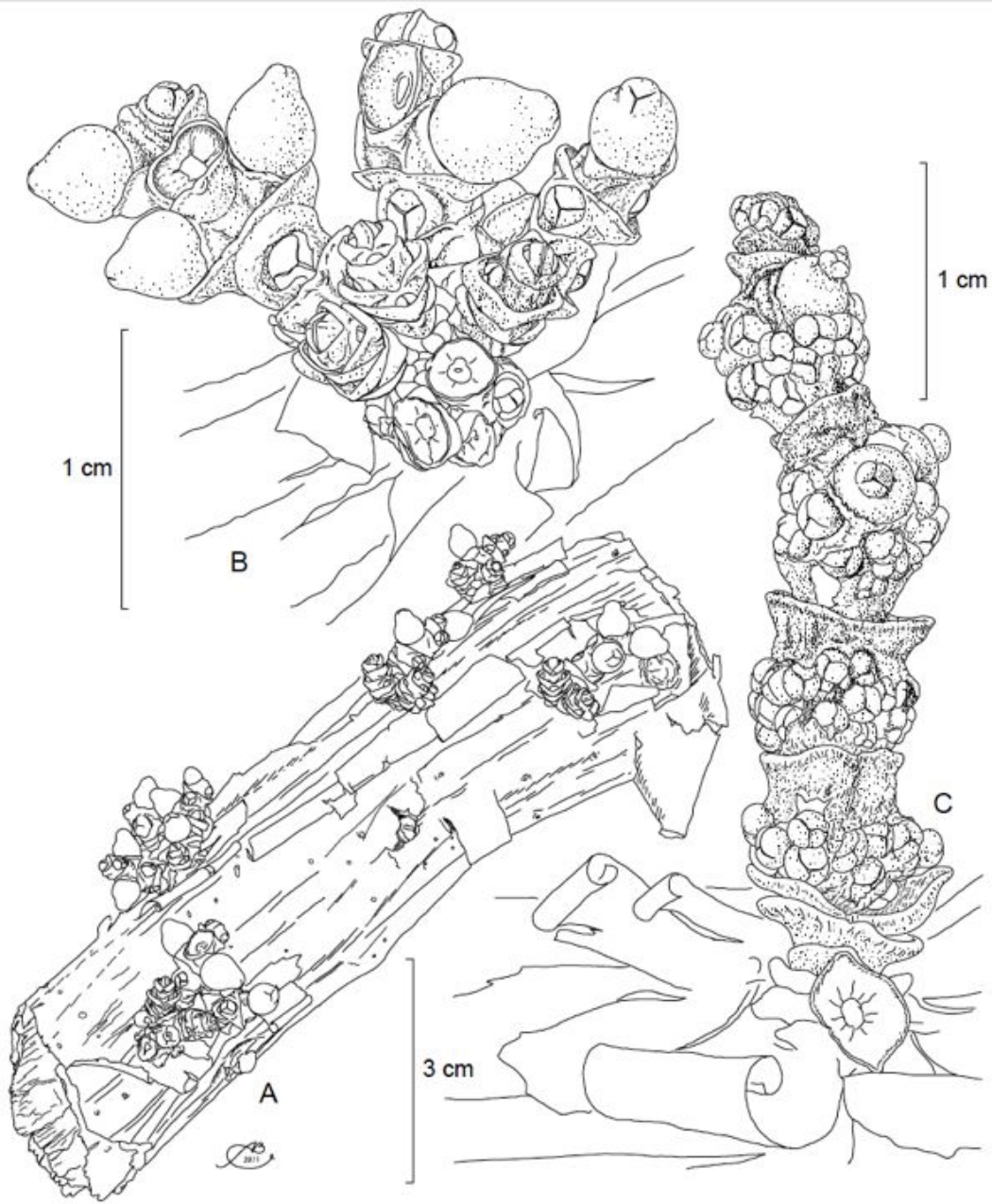


Figure 1. A. Several individuals proliferating on a branch of *Bursaria discolor*; B. a small branched individual; C. larger unbranched individual. Illustrated by Alfonso Barbosa

**Phoradendron olae** Kuijt, *Brittonia* 49: 185. 1997. Type: Mexico, Puebla, location “Le Tigre”, 2.5 km NW of San Pedro Las Palmas, municipio Jolalpan, alt. 1281 m, tropical deciduous forest, NW exposure, 6.I.1990, Razo and García IIIc35 (MEXU, isotype IEB).

Shrub up to 60 cm in height and diameter, profusely branched, glabrous, dioecious; stems log-like, covered with thick young pruinosa, giving them gray-greenish color, more mature ones up to 1 cm in diameter, brown-gray to blackish-brown, internodes to 4 cm long, the basal branches provided with one (or sometimes two) cataphyll pairs, each pair partially bonded together, their apices reddish-brown, at least in youth; leaves tiny, usually triangular in outline, 2-5 mm long, acute to acuminate at apex, thick and fleshy, deciduous; inflorescences solitary or arranged in pairs at the nodes, pruinose in youth, their bracts reddish-brown; male up to 3 cm long, with 3-6 segments, each segment with 2-14 flowers, these usually arranged in 4 longitudinal rows; female to 3.5 (4) cm long, with 3 to 5 segments, each segment with 2 flowers in opposite positions; fruit ovoid to subglobose, up to 5 mm in diameter, purple-red at maturity, its tepals closed.

To date the plant is only known from two collections made in the type locality and a nearby location. The following additional examples are now recorded:

Mexico, Oaxaca, 10 km NE of Mariscala, on the road to Huajuapán de León, alt. 1350 m, 26.X.1979, parasite of *Acacia cochliacantha*, male plant, J. Rzedowski 36514 (IEB); female plant, J. Rzedowski 36516 (IEB)., 5 km E of Mariscala, on the road to Huajuapán de León, alt. 1350 m, 17.II.1983, parasite of *Leucaena pallida*, male plant, J. Rzedowski 38055 (IEB); female plant, J. Rzedowski 38056 (IEB).

An additional remark that should be added is that the species is not frequent or abundant in the region Mariscala. In turn, male individuals are harder to find than female.

#### LITERATURE CITED

- Kuijt, 1997 J. *Phoradendron olae* Kuijt, a new species from Mexico pivotal in the taxonomy of the genus with comments on *P. californicum* Nutt. *Brittonia* 49: 181-188.
- Kuijt, J. 2003 Monograph of *Phoradendron* (Viscaceae). *Syst. Bot. Monogr.* 66: 1-643.

Received in February 2011  
Accepted in March 2011

## POSTSCRIPT

When the article was in the editorial process, thanks to the attentions of biologists Esteban Martínez and Rosalinda Medina, it became known to the authors a notice that in the state of Morelos in 2010 a plant with similar characteristics as those of *P. perredactum* had been found. Shortly before delivery of the issue and going to press we received the corresponding herbarium material and a comparison of it with those from Oaxaca indicated that it is the same species. The only observed difference is the color of ripe fruit; the samples from Morelos are clearly red-orange, while in Oaxaca they are invariably brown-purple. It is possible that this apparent discrepancy is due to the different times of the year in which the samples were obtained.

The data of the plants found in 2010 are:

Mexico, Morelos, Cuernavaca municipio, 1.9 miles N of the entrance to Cuentepec, alt. 1508 m, vegetation altered lowland deciduous. Parasitic herb 1 cm, flowers orange with green and fruits orange. 1.IV.2010. E. Martínez et al. 42151 (IEB, MEXU).

The photograph taken at the scene of the collection indicates that the host is a species of *Bursera* with exfoliating yellowish bark, or in the *B. fagaroides* group (which also includes *B. discolor*).

This finding suggests that the new taxon is probably not so rare, but that it may have gone unnoticed by its diminutive size. It is hoped that it is also present in the states of Guerrero and Puebla.

The authors thank Rosalinda Medina and Esteban Martínez graciously received, as well as permission to include here the pertinent information, including a photograph of the tree branch obtained by collectors in Morelos.



*Phoradendron perredactum* from Morelos. Photographs by Esteban Martínez