

A New Species of Red Oak (*Quercus* sec. *lobatae*) From Central Mexico

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Abstract

Quercus pachucana F. Zavala-Chávez, a species of red oak (*Quercus*, subgenus *Quercus*, section *Lobatae*) belonging to the series *Mexicanae* from near Presa Jaramillo, Municipio of Pachuca in the State of Hidalgo, Mexico, is described here as new to science.

During fieldwork to study oaks from Parque Nacional El Chico, Hidalgo, México (Zavala, 1995), we found some individuals similar to *Quercus mexicana* Humb. & Bonpl. that had some peculiar morphological characteristics on their leaves. The margins of the mature leaves had one to four aristate teeth on each side of the blade. The pubescence on the lower surface and petioles was more persistent, which is not characteristic of *Q. mexicana*, according to descriptions of this species by several authors (Trelease, 1924; Martínez, 1953; McVaugh, 1974; Espinosa, 1979; Valdez and Aguilar, 1983; Vázquez, 1992; Zavala, 1995). In those descriptions, *Q. mexicana* leaves have entire margins, suggesting that this particular character is constant in this species. No author mentions toothed leaves, proposed here as a characteristic that could have recently appeared on individuals from the Parque Nacional El Chico.

In this note we propose that the presence of aristate teeth, together with the persistent pubescence on the lower leaf-surface and the straight margin of the cup, are taxonomic characteristics which the currently recognized species of the series *Mexicanae* (Trelease, 1924) do not have. Therefore, those characteristics are sufficient to distinguish these individuals as comprising a separate species of *Quercus*, section *Lobatae* (red oaks), series *Mexicanae*, as new to science.

Quercus pachucana F. Zavala-Chávez, *sp. nov.*

Arbor 4-6.5 m alti, ramuli juniores rubris pardi vel atropardus ad secundus annus, dense et subtiliter stellato tomentulosi cum aliquae pilus simplex; folia coriacea vel leviter ita, viridis et leviter vividus, caducae, elliptica oblongae, lanceolata vel oblanceolata, 3.5-8 cm longae, 1.3-3 cm lata, apice acutus vel obtusus, interdum rotundatus, plerumque brevis aristato, basi angusto, rotundata vel subcordata; marginem planum vel non nisi leviter undulata vel leviter revolutus et cartilagineus, cum 1-4 dentes in quoque latus et praecipue in dimidio distalis e lamina, plerumque 1-2, breviter aristato, vix sinuato vel conspicue prominens et prolongata, cum aristae ascendens; glans biannua, cupula fructifera hemisphaericae, cupuliformis, cum rectus marginem, nux ovata vel elliptica, interdum subesphaericae, 1/3 inclusa.

Small tree 4-6.5 m high, trunk 12-25 cm



Quercus pachucana seen growing in Hidalgo, Mexico.

thick at breast height, sometimes shrub-like and branched from the base; bark grayish, dark gray or nearly black, in irregular small thick and some concave plates, typically without becoming scaly. Buds 2-3.5 mm long, somewhat acute or with the apex finely rounded; branchlets reddish brown to dark brown in the second year, 1-1.5 mm thick, densely and finely stellate-tomentulose, with some simple hairs, the tomentum persisting in the second season when at least some hairs remain scattered, some pale lenticels somewhat evident. Stipules 4-5 mm long, linear, membranous, deciduous

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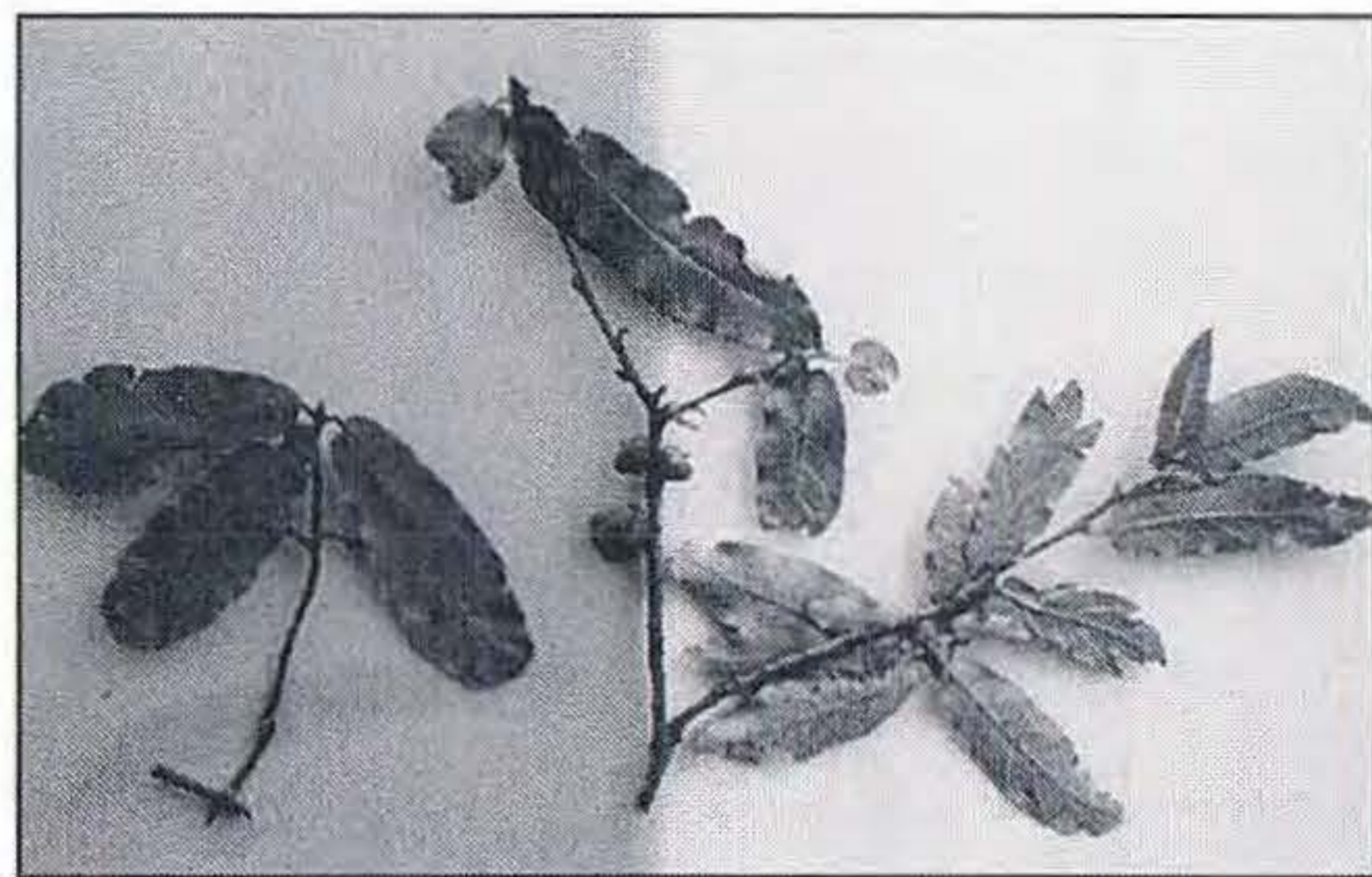
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when the leaves are nearly fully grown. Young leaves shortly and uniformly pubescent, with hairs that do not completely hide the epidermis, dark green above. Mature leaves coriaceous or slightly so, green and slightly glossy, deciduous in winter-spring, mainly elliptic, oblong, lanceolate or oblanceolate, 3.5-8 cm long, 1.5-3 cm wide, 2-4 times as long as wide; acute, subacute or obtuse at the apex, sometimes rounded, commonly shortly aristate; base mainly narrow, rounded or subcordate, usually with one side lower than the other one. Margins flat or slightly undulate or revolute and cartilaginous, with 1-4 teeth, usually with 1-2 on each side on the distal half of the blade. Slightly evident or raised and conspicuously prolonged into aristae 0.5-2.5 mm long, ascending, sinus u-

shaped and margins slightly folded to the lower leaf-surface but not rolled. Veins 6-9 on each side, commonly 7-8, ascending, branched and anastomosing before the margins, the larger ones prolonged into the aristae. Lower leaf-surface opaque, green or grayish green, smooth except in the areas where the primary veins are slightly impressed and pale, pubescence stellate and uniformly persistent nearly to the base of the blade and midvein; lower leaf-surface yellowish pubescent, somewhat bullate, the bulles visible with a magnifying glass (2 x) and if the hairs are removed, the primary veins are seen to be slightly raised. Most hairs stellate and persistent, some easily rubbed off. Mid vein more densely hairy with some simple hairs. Petioles reddish brown, darkened with hairs, 2.5-8 mm long, 1.5-2 mm wide near the base, persistently stellate tomentulose. Acorns biennial, mostly solitary or paired, sometimes in threes, sessile or on a peduncle 3-5 mm long and 1-1.5 mm thick; cup hemispheric or deeper, with margin upright, 0.8-1 cm wide, 0.3-0.5 cm deep, scales reddish brown or yellowish brown, tightly imbricated, canescent, plane, margins ciliate, apex blunt or nearly rounded, nut 1-1.3 cm long, 0.8-1 cm wide, ovoid or elliptic, usually hemispheric, brown or

photo by Fernando Zavala-Chavez



Paratype (left, larger leaves) and isotype (right, smaller leaves) specimens of *Quercus pachucana*, a newly described species of oak from Mexico.

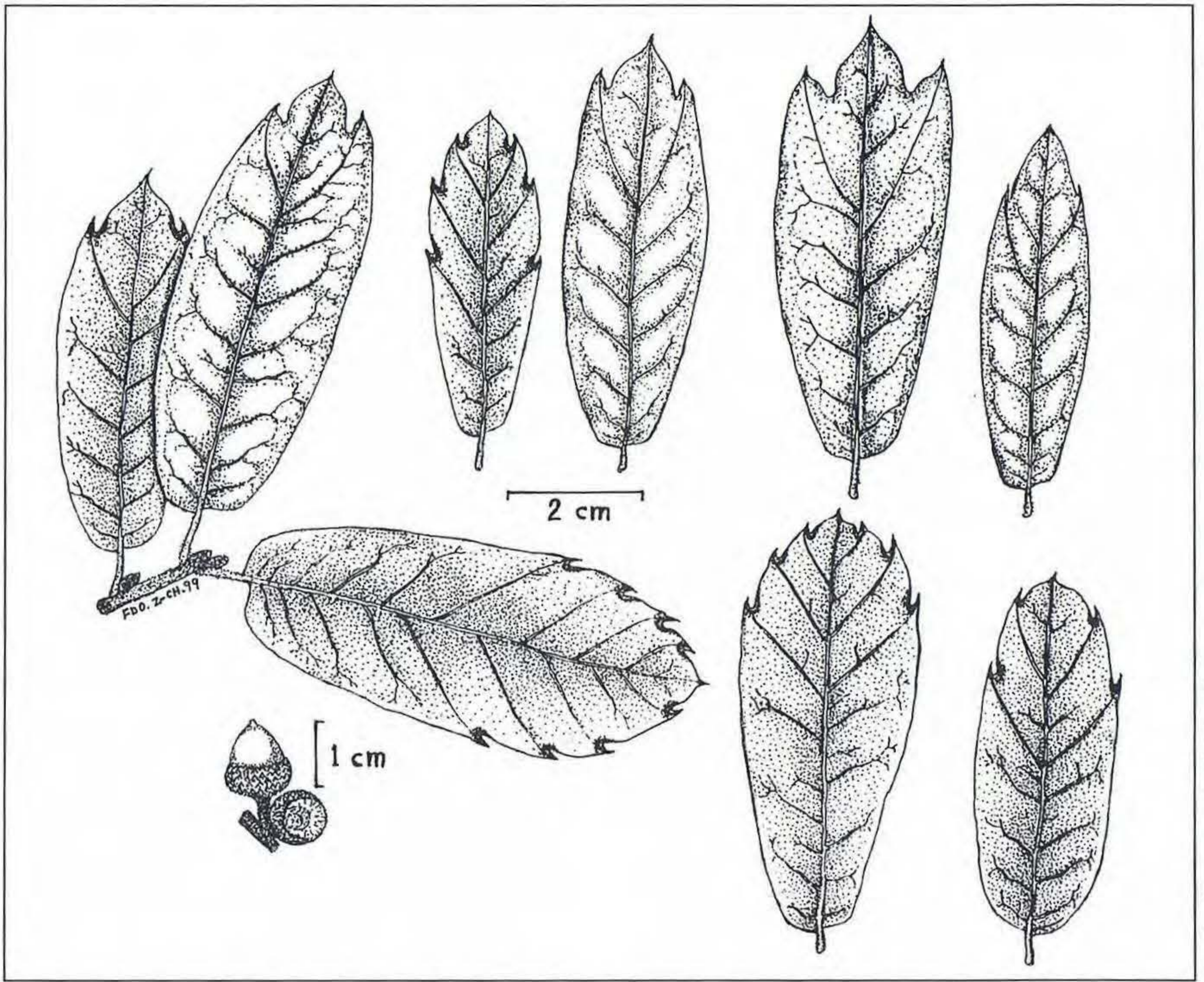


Figure 1. Foliage, buds and fruits of *Quercus pachucana* from Hidalgo, Mexico.

yellowish brown when mature, about 1/3 included; flowering in January to March, fruits maturing in August to November.

Trees of this species grow in oak forests, romerillo (*Pseudotsuga macrolepis*)-oak forests and fir (*Abies religiosa*)-oak forests, with *Q. deserticola*, *Pinus rudis*, *Q. crassifolia* and *Q. mexicana* in the first; *Q. mexicana*, *Q. rugosa*, *Pseudotsuga macrolepis* and *Q. laurina* in the second; and with *A. religiosa*, *Pinus rudis*, *Q. laurina* and *Q. rugosa* in the last. They

can be found at 2800 to 2900 m elevation, on the Sierra de Pachuca, close to Presa Jaramillo, belonging to El Cerezo, Pachuca, Hidalgo, México. *Q. pachucana* appears to form hybrids with *Q. mexicana*, because some herbarium specimens have leaves with one or two aristate teeth, but the majority of the leaves are entire. With respect to this, Vázquez (1992) mentions the presence of leaves of *Q. mexicana* with one or two aristate teeth, but the majority of

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leaves are entire.

Holotype: Hidalgo, Mpio. Pachuca, near Presa Jaramillo, north of the town of El Cerezo, in oak forest with *Pseudotsuga macrolepis*, *Q. laurina* and *Q. rugosa*, at 2810 m elevation and northeast aspect, 31/August/1990, Fdo. Zavala-Ch. 1020. (Herbarium CHAP, Isotypes: to be distributed).

Paratype: Hidalgo, Mpio. Pachuca, 500 m east from Presa Jaramillo, near El Cerezo, in oak forest with *Pseudotsuga macrolepis*, at 2800 m elevation and southwest aspect, 16/March/1990, Fdo. Zavala-Ch. 987. (Herbarium CHAP)

Additional specimens examined: Hidalgo state, Mpio. Epazoyucan, M. Medina-Cota 2546 (CHAP), place El Guajolote; Coahuila state, Mpio. Saltillo, J. A. Villarreal and A. Carranza 4232, located some 20 km north of Saltillo, National Board number 57 (CHAPA). The specimens examined from both localities were identified as *Q. mexicana* and they had some leaves with one or two little and short subapical aristate teeth. However, they were immature and do not correspond to *Q. pachucana*, because the majority of their leaves are entire. Perhaps they are hybrids between *Q. pachucana* and *Q. mexicana*.

The new species *Q. pachucana* is known at the present time only from

Hidalgo, within the Municipio Pachuca. The name of this species is derived from the Municipio in which it was found, although the same name also applies to the mountain system where the site is located.

Trelease (1924) and Martínez (1953) refer to *Q. mexicana* as the typical species of the series *Mexicanae* Trel., with groups of trees of middling size with slender tomentose branchlets and usually glabrescent, ovoid buds. Leaves are small to medium in size and generally lanceolate or oblong, short petiolate, chiefly entire, tomentose, although glabrescent or glabrate on the blistered lower surface. Fruits are biennial and medium-sized, shortly pedunculate, cup scales adpressed, canescent and with obtuse apex.

The series *Mexicanae* includes eight species and seven taxonomic forms from the Mexican Plateau (Trelease, 1924), of which only *Q. axillaris* Fournier and *Q. subscrispata* Trel. have leaves with short aristate teeth. But they are characterized by leaves soon glabrescent, veins little impressed and annual fruits. This differs from *Q. pachucana* which has leaves with persistent pubescence in the second season or later, veins normally impressed and, particularly, biennial fruits. Moreover, *Q. axillaris* and *Q. subscrispata* are nowadays considered as synonyms of *Q.*

castanea Née (Muller and McVaugh, 1972; McVaugh, 1974; Zavala, 1995), which is placed in a different series (*Castaneae*) by Trelease (1924).

Q. pachucana differs from *Q. mexicana*, *Q. imbricariifolia* Trel., *Q. colimae* Trel., *Q. crassipes*, *Q. malifolia* Trel. and *Q. obovalifolia* Fournier (mentioned by Trelease, 1924) in having dentate leaves, while those species possess entire leaves. Furthermore, of those species only *Q. mexicana* and *Q. crassipes* (and now *Q. pachucana*) are accepted at the present time and the remainder are synonyms of *Q. crassipes* (Muller and McVaugh, 1972; McVaugh, 1974; Zavala, 1995).

Quercus pachucana can be easily distinguished from the other species of the series *Mexicanae* with the help of the following key:

1. Margin of the leaves entire, with or without aristate apex.

a. Leaves generally plane and more or less thin, primary veins ascending; margin of the cups of the acorns straight — *Q. mexicana*

b. Leaves commonly revolute and more or less coriaceous, primary veins near parallel or not clearly ascending; margin of the cups of the acorns involute or at least thickened — *Q. crassipes*

2. Margin of the leaves dentate-aristate, particularly on the distal portion of the blade and often nearly to the apex; margin of the cups of the acorns straight — *Q. pachucana*

Acknowledgements

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