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SHORT COMMUNICATION

ETHNOBOTANY, DISTRIBUTION, AND CONSERVATION STATUS OF *Ticondendron incognitum* IN NORTHERN OAXACA, MEXICO

GARY J. MARTIN
Department of Anthropology
University of California
Berkeley, CA 94720

and

SERGIO MADRID
Estudios Rurales y Asesoria, A.C.
Escuela Naval Militar No. 420
Colonia Reforma
Oaxaca, Oaxaca, México 68050

The description of new species and genera of plants is the bread-and-butter work of tropical plant taxonomists, but finding a new family is a rare event. Recently, two Costa Rican botanists named a new species of cloud forest tree, *Ticodendron incognitum* Gómez-Laurito and Gómez P., the sole member of a new genus and a new family, Ticondendraceae (Gómez-Laurito and Gómez P. 1989, 1991), placed in the Fagales (Hammel and Burger 1991). The tree had puzzled botanists from Mexico to Costa Rica for many years, but evidence from forestry and ethnobotanical research in Oaxaca, Mexico suggests that local people of the Sierra Norte had discovered its identity, utility, and local distribution long ago.

The data presented here are derived from two independent studies carried out between 1985 and 1992 in the northern Sierra of Oaxaca. One of us (GJM), aided by local collectors, conducted an inventory of useful plants in indigenous communities of the Sierra Norte. Ethnobotanical data were recorded for more than 5,000 specimens of plants in seasonal evergreen, cloud, pine-oak, and tropical deciduous forest (de Avila and Martin 1990; Martin and de Avila 1990). Most of the collections were made in a Mixe-speaking community, Totontepec, and in a Chinantec-speaking community, Santiago Comaltepec.

The other co-author (SM) coordinated an inventory of timber species in the cloud forests of Santiago Comaltepec as part of a larger forestry project in the state of Oaxaca. Working with local Chinantec-speakers, he measured the distribution, density, height, and diameter of trees along a transect from 500 to 2,500 meters, sampling a total of 210 sites. For purposes of analysis, this altitudinal range was split into four strata: (1) from 500–1,000 meters above sea level; (2) 1,001–1,500 meters; (3) 1,501–2,000 meters; (4) 2,001–2,500 meters. The sampling sites were spread more or less evenly across these strata.

DISTRIBUTION

In the cloud forests of Santiago Comaltepec, *Ticodendron* trees were found between 850 and 2,150 meters above sea level, with the densest populations occurring between 1,100 and 1,400 meters. This agrees with the altitudinal limits for the species throughout its geographical range: according to Hammel and Burger the tree is found from 500 to 2,400 meters, being most common between 750 and 1,500 meters (Hammel and Burger 1991:89, 91).

Of the total of 210 sites, *Ticodendron* was detected in 102, distributed in the following manner among the four strata: (1) 5 sites; (2) 38 sites; (3) 47 sites; (4) 12 sites. Of a total of 4,508 trees corresponding to more than 30 genera measured in the inventory, 258 were individuals of *Ticodendron*, confirming it as one of the most abundant species of the cloud forest.

The trees were separated into three size classes, roughly correlated with age. Size classes were based on the diameter at breast height (dbh): small (young) individuals with a dbh of 10–20 cm.; medium (middle-aged) individuals of 20–30 cm.; large (adult) individuals of more than 30 cm. The average density, height, and diameter of trees in these classes are given in Table 1.

In their original description, drawn from Costa Rican and Panamanian collections, Gómez-Laurito and Gómez P. gave the range of tree height as 7–20 meters, and the diameter range as 0.40–0.80 meters dbh. The average heights observed in the Comaltepec cloud forest fall within this range, but the average diameters are less than half the Central American dimensions, even though the Oaxaca measurements were taken at 1.1 meters, a slightly lower level than most dbh evaluations.

TABLE 1.—Average density, height, and diameter of three size (age) classes of *Ticodendron incognitum* in the cloud forest of Santiago Comaltepec.

Size class (Age)	Average density (trees per hectare)	Average height in meters	Average diameter in meters
Small (Young)	4.9	11.2	0.11
Medium (Middle-aged)	6.5	15.6	0.21
Large (Adult)	17.3	20.6	0.46
Population Average	28.7	17.9	0.35

ETHNOBOTANY

Our ethnobotanical collections demonstrate the importance of making sterile specimens when no fertile material of a given species is available. Prior to learning the identity of *Ticodendron incognitum*, we had collected vegetative material

of the tree in Comaltepec and Totontepec, and had puzzled over its identity. After recognizing the species in the 1989 publication by Gómez-Laurito and Gómez P., we encouraged local collectors to search for fertile material. Some of the resulting specimens had fruit, which enabled us to verify the tentative identification, and to provide more data on the little known Mexican populations of this species.

From these collections and from further interviewing, we learned that the Mixe name is ***almendras kup,*** (almond tree), and the Chinantec name *'ma^{L} 'u'^{H} gwii^{LH}*, (squirrel peach tree).[1] Both names make mention of the green, fleshy drupes of *Ticodendron,* which to the Mixe resemble the fruits of *Terminalia catappa* L. (Combretaceae) (called *almendras* in local Spanish) or, in the eyes of the Chinantec, rosaceous fruits such as peaches and cherries. One of the Central American common names given by Gómez-Laurito and Gómez P. is *duraznillo* (little peach), which is reminiscent of the Chinantec name.

The Mixe use the tree trunks as roofing beams *(horcones)* for house construction. Both the Mixe and the Chinantec consider it an excellent firewood; it is said to burn like oak *(Quercus)* wood, one of the most esteemed fuels. The Chinantec note that the fruits are eaten by squirrels, and large numbers of the gnawed endocarps can be found on the forest floor.

CONSERVATION STATUS

On a walk through the cloud forest near the community of La Esperanza, Comaltepec, many felled trees of *Ticodendron* can be observed. The path is covered with fresh leaves, evidence of the firewood cutters who have worked in the area. The villagers say that they must go increasingly further away from the village to find trees; they have now arrived in the high-density zone between 1,100 and 1,400 meters.

Although the current effect of firewood cutting on *Ticodendron* populations in the Sierra Norte is probably minimal, social and economic changes in the state of Oaxaca could lead to increased exploitation in the future. In the markets of the central valley of Oaxaca, large quantities of oak *(Quercus* spp., Fagaceae) and alder *(Alnus acuminata* Kunth, Betulaceae) are sold daily as firewood (Martin 1992). Much of the wood is harvested by impoverished Mixtec speakers from mountain villages to the west of the valley, and the local supplies are rapidly disappearing. If easily accessible populations of hardwoods become depleted, what will be chosen as an alternative fuel source?

The Chinantec of the Sierra Norte, blessed with communal lands that extend across a broad range of ecological zones, have produced and marketed diverse agricultural and forest products for centuries. Will they add to their repertoire of productive activities by beginning to cut hardwoods from the cloud forest? If so, *Ticodendron* may be one of the first trees to feel the bite of the chain saw. Many valuable hardwoods such as *cedros* (various species of Meliaceae) and *aguacatillos* (various species of Lauraceae) would bring a higher price as timber, but machinery and technology are lacking to pull the massive trunks up precipitous slopes. Firewood brings a lower price, but transport is relatively simple when the wood is cut to size.

Apart from *Ticodendron,* the cloud forest trees most heavily harvested for firewood correspond to two species that were found to be relatively abundant in the forest inventory: *Pseudalmedia oxyphyllaria* J.D. Sm. (Moraceae), and *Calyptranthes chytraculia* L. var. *americana* McVaugh (Myrtaceae). Various species of *Quercus,* from higher up on the mountain, are also prized. Unlike some shrubby species in the temperate dry forest that are used as a source of fuel, these trees branch only near the crown. This morphology requires that the whole tree by chopped down when harvesting the wood, rather than selective pruning of branches.

The Chinantec are relatively unconcerned about the felling of these trees for firewood, and perhaps they have good reason. They have observed that, because of the quantity of the fruit fall, gaps are quickly filled by saplings, and the population regenerates. Yet direct harvesting is not the only danger. Slash-and-burn agriculture is destroying an increasing amount of primary forests as coffee cultivators prepare fields for planting corn, beans, chiles, bananas, and other subsistence crops. The heat from fires quickly destroys fruits littered on the ground and the emergent seedlings. When the agricultural plots are abandoned, secondary vegetation quickly regenerates, but the Chinantec say that *Ticodendron* and other primary forest trees do not return.

SPECIMENS

Hammel and Burger (1991:92) cited four specimens from Oaxaca, from three different localities. In the expanded list that follows, a number of new collections are cited, all from the three previously known localities. The herbaria are cited using the standard abbreviations from Index Herbariorum, a standard botanical reference. The condition of each specimen is noted as sterile (st) or fruiting (fr); no flowering material has been collected yet in Oaxaca.

MEXICO, OAXACA: Municipio de San Miguel Chimalapa, Cerro Salomón, 1,850 m, 21 Aug. 1986 (fr), Wendt et al. 5380 (MO); Municipio de Santiago Comaltepec, La Esperanza, 1,600 m, 30 Sep. 1987 (st), López Luna 49 (MEXU, MO, UC); Municipio de Santiago Comaltepec, La Esperanza, 1,600 m, 8 Jul. 1990 (fr), López Luna 656 (CAS, MEXU, MO, NY, TEX, UC); Municipio de Santiago Comaltepec, La Esperanza, 1,600 m, 29 Apr. 1991 (fr—old fruit collected beneath tree), López Luna 694 (F, K, MEXU, MICH, MO, NY, TAES, TEX, UC, US); Municipio de Totontepec, 2 km SW de Totontepec, 1,900 m, 17 June 1986 (fr), Torres & Téllez 8620; Municipio de Totontepec, 1,900 m, 8 Sep. 1986 (st), Rivera Reyes 440 (MEXU, UC); Municipio de Totontepec, 1,900 m, 12 Apr. 1987 (st), Rivera Reyes 721; Municipio de Totontepec, 1,900 m, 11 Mar. 1990 (st), Rivera Reyes 1387 (MEXU, UC).

Notes on the collectors and their collections.—Thomas Wendt, collections manager at Louisiana State University, has worked extensively in Chimalapas, an area of seasonal evergreen, cloud, and pine-oak forest situated in the northeastern corner of Oaxaca state near Chiapas. Working with Zoque-speaking collectors, he focused on the woody vegetation of this previously little known zone, which includes one of the last reserves of tropical forest vegetation in Mexico. The

Zoque collaborators had seen *Ticodendron* previously, but did not know if it had a local name, or if it was used in the community. These same collectors were able to give Zoque names to the majority of forest tree species they observed.

Ricardo López Luna and Jose Rivera Reyes worked as collectors in the ethnobotanical survey supervised by Gary Martin. Ricardo López L. also participated in the forestry inventory carried out by Sergio Madrid. They are continuing to make voucher specimens of useful plants in their communities, and are seeking flowering material of *Ticodendron*.

Rafael Torres and Oswaldo Téllez are botanists from the National Herbarium of Mexico, housed in the Instituto de Biología of the Universidad Nacional Autónoma de México. During their extensive collecting in the state of Oaxaca, they discovered fruiting material of *Ticodendron* in the Sierra Norte.

NOTES

[1]Superscript letters refer to *L*ow, *M*edium, and *H*igh tones; additional detail on Chinantec and Mixe transcription can be found in Anderson (1989) and Schoenhals and Schoenhals (1965).

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