NOTES ON ECONOMIC PLANTS

An endangered and potentially economic tree of Mexico: *Tilia mexicana* (Tiliaceae).—*Tilia mexicana* Schlecht. is considered endangered for the Mexican flora (*1*). This tree inhabits the canopy of the montane cloud forest (or lower montane forest), which is one of the types of vegetation covering less area and historically more disturbed in Mexico (*2, 3*). Here we show that *T. mexicana* is a resource with potential economic value, and would like to draw attention to the present state of conservation and to its irrational use.

Tilia mexicana is distributed in 14 states of Mexico, from the northern states of Chihuahua and Coahuila to the southern states of Guerrero and Oaxaca. Even though a relatively large geographical distribution, the populations of this species are confined to the lower montane forest, which covers less than 1% of Mexico (*4, 5*). The type locality is the Sierra de Chiconquiaco in central portion of the state of Veracruz (*6*), where we have only registered 49 individuals. These exhibit an aggregated distribution pattern in sites with low disturbance (steep slopes), and a random distribution pattern in sites with high disturbance (flat areas subject to grazing).

Morphological description. *Tilia mexicana* is a tree up to 35 m in height and 1 m in diameter. The wood is white and soft, with strong fibers in the inner portion of the trunk. Winter buds are small, glabrous, and obtuse. Leaves are ovate-lanceolate, glabrous when mature, oblique at the base, not cordate; ca. 10 cm long and ca. 6 cm wide; the apex short and narrow, smooth on both sides, with 2–3 pairs of primary veins, acutely serrate with gland-tipped teeth; stipules deciduous; petiole ca. 3 cm long; bracts are wide. Flowers are fragrant, yellow or white, in cymes; peduncle adnated at the base, regular or long; foliar bract membranose; ovary superior, 5 locules, stigma pentalobulated; stamens > 80, arranged in three to five antipetal fascicles. Fruit is simple, dry, indehiscent (nut) of ca. 0.40 cm wide; seed one of ca. 0.2 cm wide and 0.3 cm long (*6, 7, 8, 9*).

The phenological cycle of *T. mexicana* starts at the end of October with all trees fully defoliated. Foliar buds begin to develop during February, followed by full leaf expanse. Floral buds are present at the beginning of April with peak flowering at the end of June. Fructification starts in July, and most fruits are wind-dispersed by September.

T. mexicana is known locally in Jalisco as "sirimo", "tilio" in the state of Mexico, and "jonote" in the central part of the state of Veracruz (*10*). However, these names are also used for other species like *Ternstroemia pringleii* Rose and *T. sylvatica* Schlecht. & Cham. (Theaceae), and *Taonabo oocarpa* Rose and *Clethra quercifolia* Lindl. (Clethraceae).

The main uses for this plant are medicinal. The infusion of flowers is used to treat enterocolitis, gastroenteritis, haemorrhoids, hepatic and nephritic colics, ailments of the gall bladder and heart, and as a nerve tranquilizer, the latter is the most generalized use (*11, 12*) During five years of field work in the central portion of the state of Veracruz, we have observed that shepherds use the young leaves of *T. mexicana* as fodder to feed sheep and goats, and also, that the bark is used to make ropes. Some of the chemical constituents of the flower and leaf extracts of *T. mexicana* are alkaloids, glucosides, saponins and essential oils. The latter, when applied to dogs and rabbits, helps lower blood pressure (*11, 12*). The inflorescences of this species are sold year-around in the markets of towns located in the central portion of the state of Veracruz. However, we have observed that during the flowering months of *T. mexicana* (April–June) there is an increase in sales of inflorescences of this species, since it is believed that the medicinal effect is greater when the infusion is made with fresh flowers. The current cost of a bundle of inflorescences is $0.30 dollars, and a tree can yield up to 2000 bundles, thus the profit of one tree per year is ca. $600.00 dollars.

Over exploitation of inflorescences dramatically decreases the chance of this species to recruit new individuals, coupled with habitat deterioration and the extremely damaging technique used to cut inflorescences (i.e., trees may be felled or many branches broken off), the chances are nil for the survival of this species

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without an efficient management and conservation plan. Finally, *T. mexicana* is both an attractive tree and a threatened species, with a potential for rational economic exploitation. However, there is a clear need for studies that consider its rational management, exploitation, and conservation (e.g., *13, 14*).

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The search for "Kaladana" (*Ipomoea*, Convolvulaceae).— There has been a long-standing confusion involving plants known as "nil" and "kaladana," partly because they were introduced to Europe from different regions at different times with distinct local names. A renewed interest in these plants began after Canonica et al. (*1*) reported phytoecdysones under the name "kaladana," but actually extracted from a mixture of *Ipomoea* species (Verdcourt, pers. comm. 1998). That confusion carried through into 1998 when several cancer researchers contacted me looking for a source of "kaladana." These oncologists were interested because the phytoecdysones extracted from the seeds of "kaladana" have activities that show promise toward learning more about gene function. The following discussion deals with some of the problems caused by identifying plants by common names.

Plant Identity. In scientific literature both "nil" and "kaladana" are common names most frequently applied to *Ipomoea nil* (L.) Roth (often incorrectly called *I. hederacea* Jacq.). However, the name "kaladana" is also used to refer to *I. turbinata* Lag. (syn. *I. muricata* (L.) Jacq.). That remains as true today as it was when the plants and common names were first discovered by Europeans.

"Nil Arabum." Gesner (*5*) was the first European to refer specifically to plants as "Nil Arabum," because the medicinal Indian seeds were introduced into Europe from Persia. He and some other Renaissance Europeans thought plants mentioned by Arabic writers Avicenna [b. 980-d. 1037] and Serapio [ca 1070] might be *I. nil,* but identities were controversial even in the 1500s (*5, 6*). The first Asian literature to record what is known today as *I. nil* was a Chinese book of medicinal plants written in 1578 (*2*). The oldest Greek and Indian literature (*3, 4*) does not include an *Ipomoea* that may be identified as that species. Over time, knowledge of the range of the plants grew, and by 1732, Europeans knew "Nil Arabum," not only from Europe and Middle Eastern countries, but also in