Magnolia virginiana in Cuba: distribution, demography and conservation situation

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Introduction

Magnolias are probably the best-known group of woody plants. They are highly appreciated in gardens not only because of their large and fragrant flowers, spectacular flowering display, and fruits, but for the plants' shape and brilliant leaves, too (Callaway, 1994). However, even where they are not commonly used in gardens, no student of botany is completely unaware of this intriguing group since its phylogenetic position makes magnolias an obligate subject of any plant systematics course.

The genus *Magnolia* is distributed in Southeast Asia and in America, from the southeast of North America to the north of South America, including the Greater Antilles (Treseder, 1978; Callaway, 1994). In Cuba, there are nine species, nine subspecies and one variety of magnolia (León & Alain 1951, Bisse 1988, Imkhanitzkaja 1991, 1993, Palmarola *et al.* 2008). All Cuban species are distributed in the central and eastern Cuba mountain ranges (Imkhanitzkaja, 1991).

The Cuban population of *M. virginiana*, discovered in Majaguillar swamp in 2005 (Oviedo *et al.*, 2008), constitutes the most southern population of this species, since all other populations are confined to North America (Azuma *et al.* 2010). Moreover, this is the only native Cuban magnolia that grows in the lowlands and in the western region of the country (Oviedo *et al.*, 2008). The first investigation of the population of *M. virginiana* in Majaguillar swamp, which was conducted in 2005, resulted in the first description and mapping of the population structure, and identified the main threats to its conservation in this locality. In 2010, a second survey was conducted to monitor the population situation and search the swamp border for other individuals of this species.

Habitat

Magnolia virginiana grows only in Cuba in the Majaguillar swamp (Fig. 1) which is located in the northern part of Matanzas province in western Cuba. Majaguillar swamp, in its widest sense, encompasses a surface area of 462 km^2. At its core, when one excludes the drier peripheral areas and the coastal mangroves, is the proper wetland: a roughly rectangular territory of 13 by 6 km, consisting of sub-coastal freshwater swamps. At both

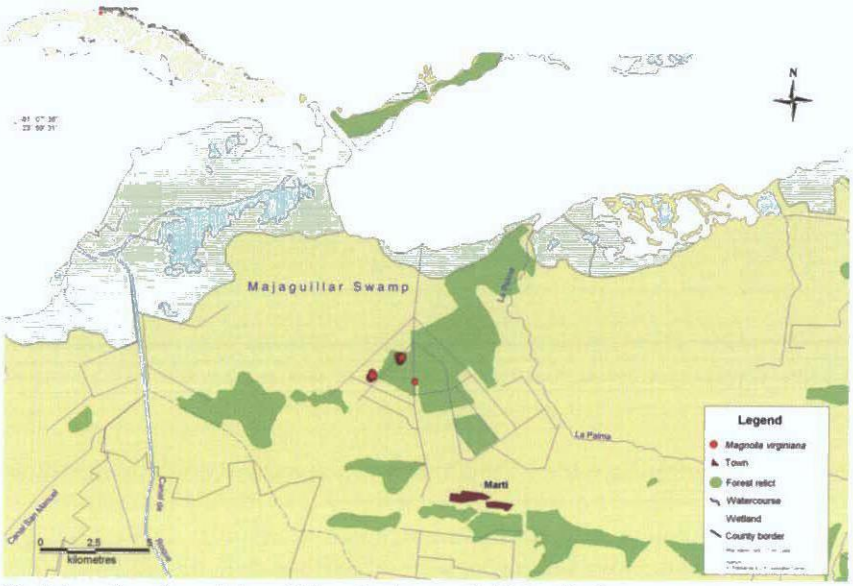

Fig. 1. Location of population of *Magnolia virginiana* in Majaguillar Swamp, Martí Town, Matanzas province, Cuba.

ends drainage canal systems have been built. The wetland itself is almost completely covered by an herbaceous community with scattered patches of trees, some of them completely composed of *M. virginiana*. The current use of this swamp is mainly as pasture land for cattle, forestry and oil exploitation.

Description

In Cuba, *M. virginiana* grows as a multi-stemmed shrub about 4-7 m high with a crown diameter of up to 10 m (Fig 2). Large trunks are quite rare (Palmarola *et al.* 2008). Young branches and undersides of leaves are covered with sparse silvery hairs, usually persisting for a short time. Leaf blades are lanceolate or narrowly elliptic, 7.5-17 × 2.3-5 cm, medium green above, glaucous beneath; the base is narrowly cuneate, the apex, narrowly acute. Flower buds are protected by pubescent bud scales.

Fig. 2. *Magnolia virginiana* subsp. *oviedoae* plant habit.

Fig. 3. *Magnolia virginiana* subsp. *oviedoae* fruit (left), and flower (right).

Flowers are smallish, with 3 almost ribbon-shaped, greenish-white sepals, each with a rounded tip and 7-8(-9) narrowly obovate petals; stamens are numerous, flattened, and acute; pollen is pale or whitish; gynoecium and polyfollicle are narrowly ellipsoidal or cylindrical (Fig. 3).

Three subspecies have been described for *M. virginiana*: subsp. *virginiana*, subsp. *australis* and subsp. *oviedoae* (Palmarola *et al.*, 2008). The first two subspecies usually have broader, elliptic leaves with a more broadly cuneate base and cuneate acute tip, larger flowers with wider sepals and petals, and a broader spheroid-cylindrical or ellipsoidal gynoecium and fruit.

Population structure

In 2005, we counted 245 clusters during the surveys conducted in the swamp grassland and swamp forest border. The clusters were distributed in two subpopulations (Fig 4). The southern subpopulation contained 97 clusters and the northern one 147. Only one plant was found outside of these two areas. The northern subpopulation has an abundance of mature plants including some young seedlings. In contrast, the southern one has very few mature plants and no young seedlings, even though there are more total individuals in that subpopulation. It is possible that the number of young seedlings may be underestimated due to the difficulty in detecting them within the dense herb layer. According to our data, the clusters produce flowers when individuals have reached 1.5 m in height. However, this result may be biased since some of these 1.5 m tall plants are actually mature ones that had been cut back by fire (Fig. 4).

In 2010, the number of clusters in each subpopulation does not differ significantly in comparison with the 2005 census. However, another 36 plants were found within the swamp forest of the southern subpopulation.

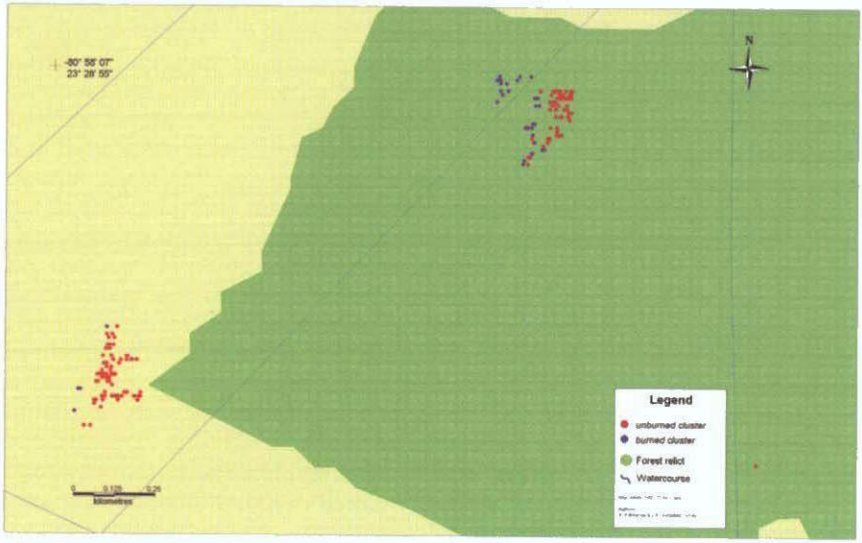

Fig. 4. Subpopulations of *Magnolia virginiana* in Majaguillar Swamp, Matanzas, Cuba in 2005.

Conservation situation

The whole area has been modified and drained for human use, either for cattle grazing or as *Casuarina equisetifolia* L. plantations. However, fires seem to be the main threats for *M. virginiana* subsp. *ovidoae* (Fig. 5). In fact, fires have damaged 28% of the clusters. Both subpopulations contain burned clusters, but the southern one has the highest quantity of burned clusters. This may be the consequence of the southern subpopulation's close proximity to forestry plantations and human managed areas. The proportion of burned clusters per subpopulation does not differ between the different censuses.

Fig. 5. *M. v.* subsp. *oviedoae* young plants sprouting after fire.

The long-term conservation of *M. virginiana* subsp. *ovidoae* in Cuba rests on the establishment of a protected area in its habitat or at least on changing the management scheme of this ecosystem. Restoring the natural flooding cycle and the vegetation may help to restore a more natural fire regime, if any. At the same time, botanic gardens could grow this plant in *ex situ* collections, introduce it in the horticultural market, display it and

provide key information about it and, hence, raise awareness about this highlighted species.

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