

Caesalpinia paraguariensis

Abstract

Caesalpinia paraguariensis (Fabaceae): forage tree for all seasons. Aronson, J and Toledo, CS. 1992. *Economic Botany*. 1992, 46: 2, 121-132.

Guayacan (*Caesalpinia paraguariensis*) is an under- exploited multipurpose tree legume of the semi-arid Chaco region of southern South America. Aspects of the tree's botany, ecology, biogeographical distribution and past and present uses are presented, and its importance as a source of fodder for domestic livestock including cattle is emphasized; other economic uses include wood, tannin production, bee forage, ink and dye, medicine and amenity planting. A typical phenogram of the tree is presented, showing that the abundant, and annually reliable, fruit crop lasts nearly year-round. Nutrition data on pods, seeds and leaves are given, as are characteristics of the wood. Merits of *C. paraguariensis* are discussed in comparison with various tree legumes frequently used in dryland reforestation and agroforestry programmes.

Table 1. Protein and lipid content of pods (without seeds), seeds (incl. testa) and leaflets of *Caesalpinia paraguariensis*, *Faidherbia albida*, *Prosopis chilensis*, *Tamarindus indica* and *Ceratonia sislqua*.

	Pods		Seeds		Leaves	
	CP%	EE%	CP%	EE%	CP%	EE%
Guayacan	10.1	-	-	-	17.8	-
F. albida	27.4	4.0	20.5	16.4	20.2	3.1
P. chilensis	11.0	2.0	35.2	5.3	23.5	2.9
T. indica	10.1	1.0	18.3	7.4	15.8	9.6
C. siliqua	6.9	1.2	18.5	2.0	-	-

The most important use of the Guayacan has not been previously described, let alone developed through purposeful management and germplasm selection. We refer to the usefulness of this tree as a source of valuable forage for livestock. Four traits are worth noting here.

1. The nutritional characteristics of Guayacan pods, seeds and leaves compare favorably with those of several widely-planted legume trees considered important sources of forage (Table 1).

2. The fruit production of mature Guayacan trees is also equal to or greater than that of most forage trees found in semiarid and arid regions. Preliminary data on 20 marked trees indicate an average yearly yield of 5.0 + 3.0 kg pods per tree per year (Saravia Toledo, unpublished data). If 40 trees were preserved per hectare, this would represent approximately 200-240 kg of pods/ha/yr of high quality forage.

3. Only about 10% of pod fresh weight consists of seeds, the hard coats of which render them indigestible to livestock. The rest of the pod is all useful cattle food, similar in consistency to dry carob pods (Aronson and Ovalle, unpublished data).

4. Mature Guayacan trees (10-20 years) bear their fruits over an extended period each year, despite inter-annual variations in rainfall or temperature extremes. This productivity stands in sharp contrast to that of many leguminous taxa and other trees (e.g., beech (*Fagus*), oak (*Quercus*) and *Pistachia*), that tend to have heavy yields in "mast" years, and very little fruit in intervening years. In many *Prosopis* and *Acacia* species, good fruit crops are typically produced only every 2nd or 3rd year, at least in the Chaco region, in Chile and in the SW USA. Guayacan, by contrast, offer reliable and plentiful forage in the Chaco, even in years of severe drought (e.g., 1988-1989). Although tannin content is high (15-23%) in some pods, this apparently does not affect palatability or digestibility for livestock. Cyanogenesis has not been found in this species). Most forage trees in the Chaco (e.g., *Acacia* and *Prosopis* spp. and *Ziziphus mistol*) drop nearly all their fruits within a brief period at the beginning of the rainy season (Nov.-Dec.). By contrast, Guayacan pods ripen over 7 to 9 months, including the critical drought period when little else is available for livestock in the Chaco.

In summary, the high nutritional value of Guayacan leaves, seeds and, especially, pods (Table 1), combined with the exceptionally long period of fruit drop (7-9 months), and regular annual production of pods makes this species as promising as an important forage tree as any of the more than 80 other indigenous tree and large shrub species in the semiarid to subhumid Chaco regions.