XI  *Genipa americana* L. (Marmalade Box):  
In Vitro Production of Iridoid Glucosides

S. Ueda\(^1\)

1 General Account

1.1 Distribution and Importance of the Plant

Rubiaceous plants of the genus *Genipa* grow throughout tropical America, and *Genipa americana* L. (synonym *G. caruto* H.B. & K.) (Fig. 1A) is native to the wet or moist areas of Cuba, Hispaniola, Puerto Rico, the Virgin Islands, and from Guadeloupe of Trinidad; also from southern Mexico to Panama, and from Colombia and Venezuela to Peru, Brazil, Bolivia, Paraguay, and Argentina. The fruit (Fig. 1B, C), which is edible and popular as a source for beverages, has many colloquial names: marmalade box in the former British West Indies, genipa, jagua or caruto in Puerto Rico and several other Spanish-speaking countries; genipapo, jenipapo or jenipa in parts of Columbia and Brazil; chipara, chibara or guanapay among Colombian Indians; carucarutoto, caruto rebalsero, or guaricha in Venezuela, tapoeripa in Surinam, lana in Guyana; bi, bicito or totumillo in Bolivia; huitoc, vito, vitu or palo colorado in Peru; maluco in Mexico; crayo, irayol de montana, guaitil or tapaculo in Costa Rica; irayol, tambor or tine-duentes in El Salvador; and guayatil colorado or jagua blanca in Panama (Morton 1987; Silva et al. 1977). This tree is strictly tropical and grows well in a humid atmosphere and deep loamy soil. The erect trunk of the tree with spreading branches is over 30 m in height. The leaves, deciduous, especially at the rapid lowering of ambient temperatures, are opposite but mostly clustered at the tip of the branch, oblong, 10–30 cm in length, and have a prominent midrib. The tubular five-petaled flowers are yellowish, and ca. 4 cm in width. The elliptic fruit, ca. 10 cm in length, and bearing a short hollow tube at the apex, contains white flesh, which turns yellow to bluish-purple and finally to jet-black on exposure to the air (Morton 1987). It was reported that the natives bathed their limbs and sometimes the whole body, when tired, in a clear juice obtained from the fruits, which turned everything it touched as black as fine and polished jet (Oviedo 18th century).

The tree first fruited in the Philippines in 1913 and is occasionally planted there (Morton 1983). It was introduced into Java in 1913 (Heyne 1950; Kasahara 1986).

---

Fig 1. A *Genipa americana* trees (Rio de Janeiro, 1990). B *Genipa americana* leaves and fruit (Rio de Janeiro, 1990). C–F *Genipa americana* fruits (Rio de Janeiro 1990). *Genipa americana* 2 years, 4 years (in summer), and 4 years (in winter) after redifferentiation from callus tissues induced from seedlings of *Genipa americana* collected at Bogor Botanic Garden, 1983, respectively.

\(^1\) Faculty of Pharmaceutical Sciences, Kyoto University, Sakyo-ku, Kyoto 606-01, Japan
Genipa americana L. (Marmalade Box)