

## SHORT COMMUNICATIONS

YUCATECAN MAYAS KNOWLEDGE OF  
POLLINATION AND BREEDING SYSTEMS

In a study of the composition and structure of Mayan homegardens in Tixcaltuyub and Tixpeual, Yucatan, Mexico (March-April and July, 1988) special effort was made to determine the amount of knowledge possessed by the gardeners in regard to pollination and breeding systems of the garden's common trees and shrubs. In interviews with the homegarden owners, questions were designed to test their knowledge of plants regarding names and functions of flower parts, pollination, breeding systems in general, etc. The questions seemed pertinent as many of the homegarden trees and shrubs are planted for fruit production involving native and introduced plant species. Information of this type is lacking in ethnoecological or ethnobotanical studies of native cultures (Bawa, *per. comm.*). Do contemporary Mayans utilize knowledge of plant reproductive systems in managing their gardens?

The homegarden owners interviewed recognized flower parts, nectar production as "honey," and pollen. There was a clear recognition of stamens as masculine and the ovary as feminine, and that the fruit was the result of ovary transformation. Homegarden owners recognized hermaphrodite and dioecious plants but did not recognize flowers with different sexes in one plant. The most surprising finding was lack of knowledge of the pollination process. Although many homegarden owners keep honeybee hives, the connection between bee foraging visits (whether for pollen or nectar) and pollination resulting in fruit set is totally lacking.

The information was obtained by utilizing dioecious species as examples of the pollination process. Several homegarden plants are dioecious, i.e., *papaya* (*Carica papaya*: Caricaceae), *kumché* (*Jacaratia mexicana*: Caricaceae), *chaká* (*Bursera simaruba*: Burseraceae), *abal* (*Spondias* sp.: Anacardiaceae), *uaya* (*Melicoccus bijugatus*: Sapindaceae); all are highly esteemed fruit trees (except *chaká*) requiring pollination for fruit set. Since these plants are grown for their fruit production, only females are important; male plants are considered worthless and usually eliminated from the garden unless they possess alternative values, as shade (*M. bijugatus*) or nectar for honeybees (*Spondias* sp.). Male individuals are considered to be the result of "bad seed" or having experienced some problem during development; many are eliminated when space is needed for other plants or other homegarden structures.

Important questions arise as a result of these observations: How is fruit production maintained with a seemingly low male to female plant ratio? Does the reduction of male individuals affect the genetic composition of the dioecious species homegarden populations? Several possibilities should be considered in the future: (1) the present male to female plant ratio is sufficient to insure proper pollination; (2) the bees could obtain pollen in the surrounding forest patches (but we have seen only *abal* and *chaká* in the wild); (3) the Maya may have selected for parthenocarpic races of dioecious trees, but we have no evidence for or against this process; and (4) as a result of management pressure (cutting out male trees), some plants may undergo sex reversal. All possibilities should be explored, but we think that emphasis should be placed on number four, because of the relative ease whereby breeding systems can change

(Richards 1986). *Papaya* is a good example of these changes, plants of this species may undergo sex reversal (Crane & Walker 1984; McGregor 1976). Is it possible that the long history of manipulation has produced changes in the homegarden plants breeding systems?

Presumably the ancient Maya carefully manipulated plants in the forest (i.e., *pet kot*, succession) and in homegardens. Is it possible that the knowledge of the relationship between insect vectors and fruit production has been lost because the gardeners no longer need to worry about breeding systems or pollination? At present, most of the fruit producing species are hermaphroditic and were introduced after the Spanish conquest (i.e., *citrus*, *tamarindo*, *mango*), and now the Italian honey bee is the main pollinator.

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V. Rico-Gray, J.G. Garcia-Franco, and A. Chemas  
Moreles 3-1  
Xalapa, Veracruz 91000 Mexico