

BISEXUALITY IN DATE PALM IN IRAQ

M.A KGAZAL
M.I. SALBI
I.S. ALSAADAWI
F. A. FATTAH
A.A.M. AL-JIBOURI

INTRODUCTION

The date palm (*Phoenix dactylifera* L.) is a tree species belong to the family *Arecaceae*. The genus *Phoenix* comprises 17 species which are distinguished from other palm genera by the leaf and leaflets morphology (5). All species in this genus are dioecious, with male and female flowers on separate trees. The structure of the staminate and pistillate flowers was described by DeMason and Tisserat (3). The occurrence of apparently bisexual flower in date palm was reported by (1,3).

This note reports on the occurrence of bisexuality in date palm in Iraq and to add further information on this important phenomenon.

As a result of field survey on date palm orchards in central Iraq, few male trees were found to have prominent bisexual flowers. Samples from the bisexual, male female trees were collected in February 1988, examined by stereo microscope and photographed. The flowers appeared spirally arranged on the rachillae. Generally, the male inflorescences have greater number of flowers compared with that of female inflorescences (Figure 1a-b). The inflorescences of bisexual male trees appeared similar to the inflorescences of normal male tree (Figure 1c). Both male and female flowers have three sepals at the base of the flowers. The male flower has six stamens and

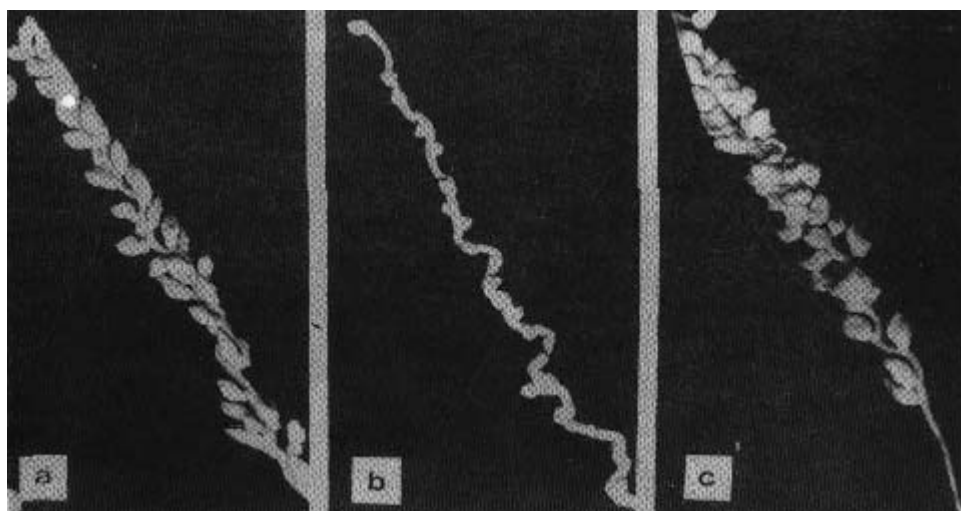


Figure 1: Rachilla from date palm *Phoenix dactylifera* L. inflorescence
a) flowers on male rachilla.
b) flowers on female rachilla.
c) flowers on bisexual rachilla.

From Department of Botany, Faculty of Agriculture and Biology,
Nuclear Research Center, P.O. Box 765, Baghdad, Iraq.

three rudimentary carpels (Figure 2a). On the other hand, bisexual flower was similar to male flower, but showed three well developed carpels which were similar to those of the pistillate flower (Figure 2c). When the bisexual flower was allowed to grow, a large number of parthenocarpic fruits was obtained (Figure 3). These fruits were similar to the normal parthenocarpic fruits produced by unpollinated female trees. It was also observed that the parthenocarpic fruits were set on inflorescences that formed at the late flowering.

These observation dose not confirm the finding of DeMason and Tisserat (3), who reported that this phenomenon is common in *Phoenix*, but also revealed that, the bisexual flower has the potential to develop into fruit under certain condition.

No attempts were made to isolate and quantify the endogenous growth regulators in the male, female, and bisexual flowers. However, the bisexuality in male tree of

date palm can be enhanced *in vitro* by application of growth regulators (3). Also several studies have been conducted on the genetic and hormonal regulation of sex-

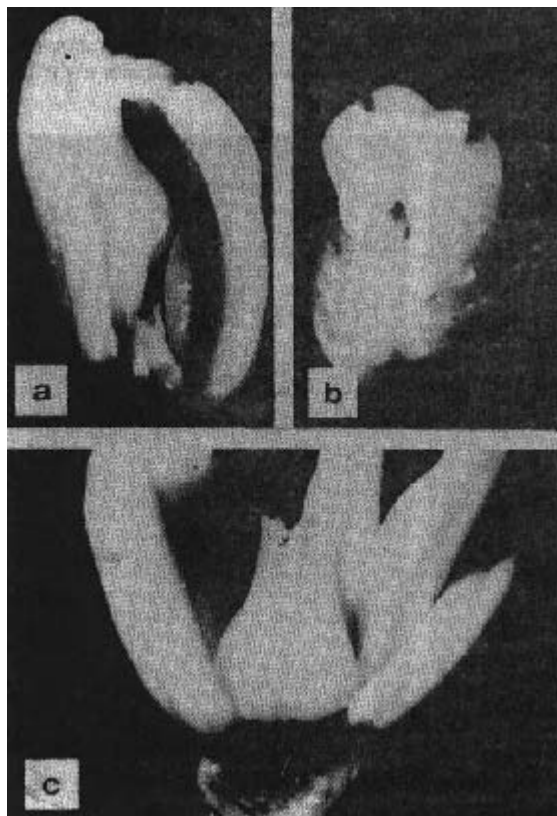


Figure 2: Flowers of date palm *Phoenix dactylifera* L.
 a) male flower with stamens and three rudimentary carpels
 b) female flower with three well developed carpels
 c) bisexual flower with stamens and three enlarged carpels.

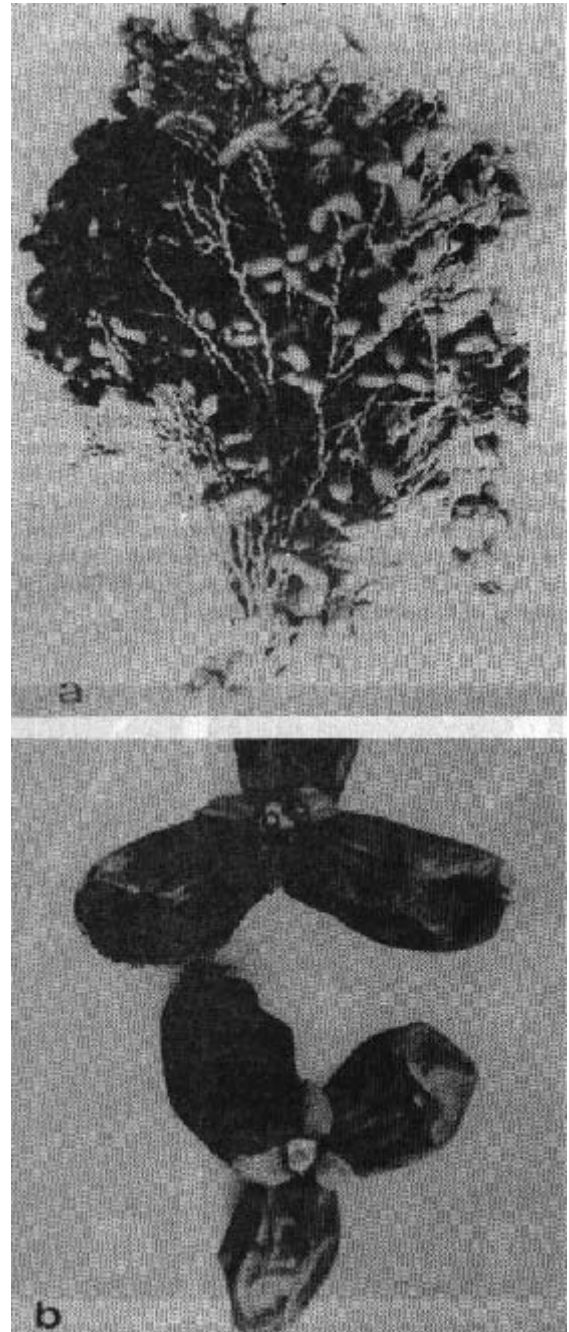


Figure 3: Parthenocarpic fruits from bisexual date palm *Phoenix dactylifera* L.
 a) bunch with large number of parthenocarpic fruits.
 b) close up of dried parthenocarpic fruit. Note that the three carpels similar to those on unpollinated formed on unpollinated female trees.

uality in other dioecious plants (2). It is believed that the genus *Phoenix* is probably related to the coryphoid palms, which are considered as the most primitive group among the palm family (5).

The primitive flower in palms is thought to be perfect with three sepals, three petals, six stamens in two groups and three sperate carpels (5,6). Various species of coryphoid palms have perfect flowers and are either monoecious or dioecious (4). Although *Phoenix* is a dioecious, it has dimorphic flowers (3). It seems that phoenicoid and coryphoid palms are more closely related to each other than to other palms because they have retained many primitive characteristics (4).

The presence of small carpels in the male flowers on male trees and rudimentary anther in the female flowers may confirm that date palm is phylogenetically related to other palm species as was suggested by DeMason and Tisserat (3).

In Iraq, the origin of male cultivars is unknown and they remain as one of the major obstacles in date palm breeding. Thus, the presence of male bisexual flowers in date palm and the possibility of pistil development in male flower, may encourage further work to develop a complete bisexual male trees through which a complete seeded fruit can be developed. Such a success may help in identification of the parents of male cultivars and explain phylogenetic relationships among the date palm cultivars.

REFERENCES

1. Al-Beker AJ : *The date palm Baghdad: Al-Ani Press, Iraq, 1972.*
2. Chailakhyan MK : *Genetic and hormonal regulation of growth flowering and sex expression in plants. Am J Bot, 66:717-736, 1979.*
3. De Mason DA, Tisserat B : *The occurrence and structure of apparently bisexual flowers in date palm, Phoenix dactylifera L. (Arecaceae). Bot J Linn Soc, 81:283-292, 1980.*
4. DeMason DA, Stolte KW, Tisserat B : *Floral development in Phoenix dactylifera. Can J Bot, 60:1437-1446, 1982.*
5. Moore HFJR : *The major groups of palms and their distribution. Gentes Herbarum, 11:27-41, 1973.*
6. Uhi NW, Moore HE : *Androecial development in six polyandrous genera representing five major groups of palms. Ann Bot, 45:57-75, 1980.*

Correspondence:

A. Kgazal
 Department of Botany,
 Faculty of Agriculture and,
 Biology Nuclear Research Center,
 P.O. Box 765,
 Baghdad, IRAQ.