STUDIES CONCERNING GROWTH AND FRUITING OF SOME MANGO VARIETIES

BY

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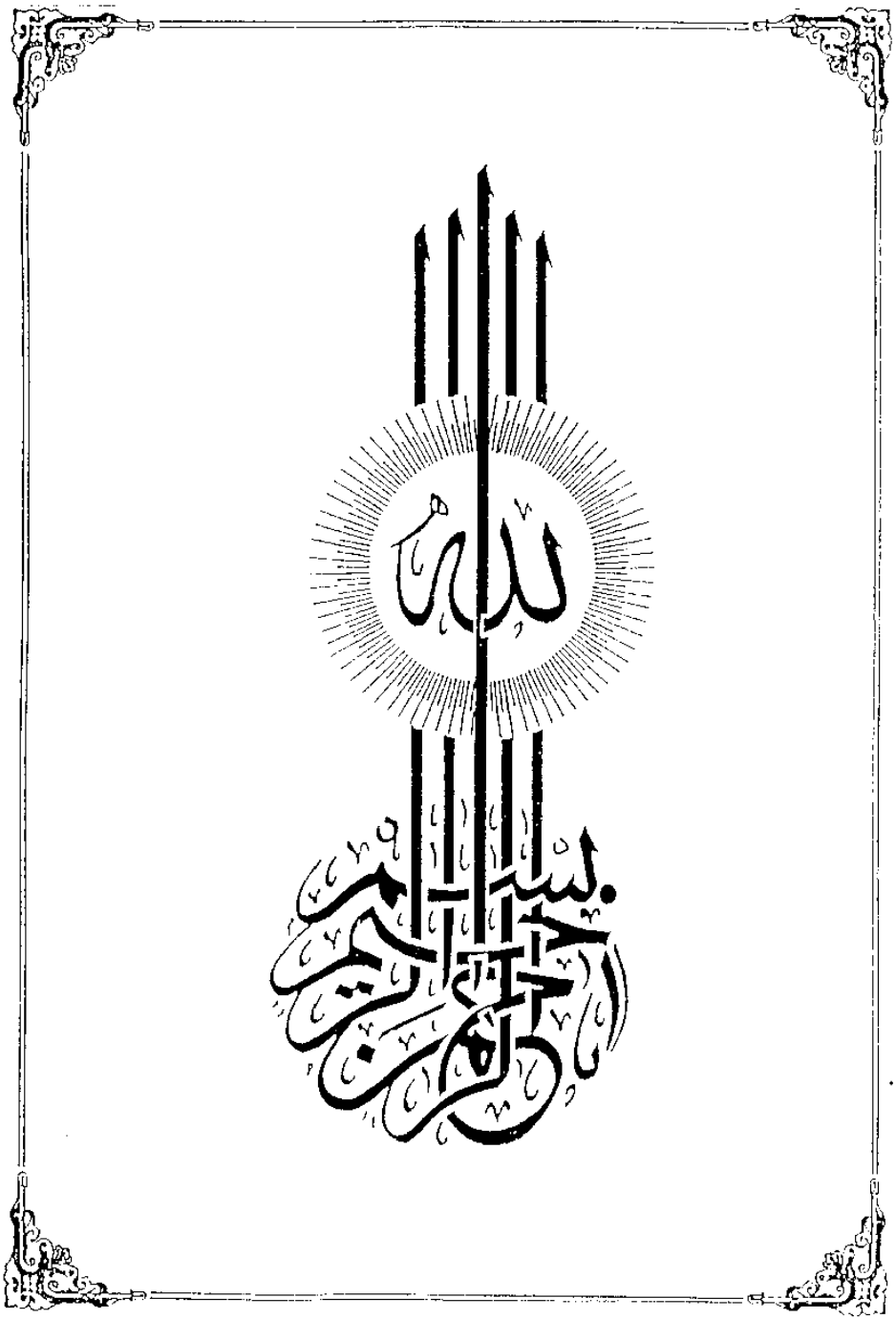

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INTRODUCTION

"Mangifera indica L." commonly known as mango belongs to the family "Anacardiaceae". The members of this family are trees or shrubs with inconspicuous flowers often produced in large clusters. The fruits frequently being attractive and edible.

The mango is native to South Eastern Asia from India to the Philippines. It has been cultivated in India for at least 4000 years and over 1000 varieties are recognized there to day. Mango culture gradually spread to tropical and sub-tropical countries throughout the world. Now, it is an important fruit crop in India, Ceylon, Philippines, Indonesia, Java, Thailand, Burma, Malaya, South East Africa, Australia, Brazil, Mexico, the United States and Egypt.

In Egypt, it was first introduced in 1825 and spread steadily thereafter until now.

Aim of the study

In Egypt, Mango is the third major fruit which covers an area of about (25000) feddans* . Out of this area 21216 feddans are fruiting trees (Table 1) and

the rest are nonfruiting (under bearing trees). However, studies on mango trees in Egypt still few and those which investigated the growth and fruiting habit of the mango trees are rather few.

In Tahrir Province (Southern Sector), on the other hand, mangos are planted as solid blocks, its acreage reaches about 1200 feddans. Taimour variety (which is characterised with excellant fruit quality), occupies about 40 % of this area as shown in Table (2). But, because of the negligible yield of the trees (for unknown reasons), this variety is considered uncommercial under the prevailing conditions of Tahrir Province.

Furthermore, it is expected to increase mango acreage in Tahrir Province and the other new cultivated land. Thus,it was suggested to investigate the growth and fruiting habit of this variety (Taimour), comparing with another fruitful variety (Zebda) planted under the same conditions, in an attempt to understand the performance of these two varieties in this new area. Simultaneously, to throw some light upon the causes of the crop failure of Taimour variety, under the conditions of Tahrir Province.

Table (1): Fruiting mango acreage and its production in Egypt from 1966 till 1969.

Year	Total fruiting acreage		Total production in tons	Average production per feddan in tons
1966	17363	feddans	53153	3.0
1967	17549	"	43361	2.4
1968	18899	"	33859	1.7
1969	21216	"	29733	1.4

* According to the Horticultural Department. Ministry of Agriculture, Egypt, 1969.

Table (2): Mango acreage and production** in Tahrir Province in 1969 and 1970 seasons.

Variety	Acreage (feddan)	%	1969 Production (Kg.)		1970 Production (Kg.)	
			Total	Per fedd.	Total	Per fedd.
Taimour	453	38.5	13744	30	46235	102
Pirie	186	15.8	53031	285	61673	331
Zebda	116	9.8	87498	754	56914	491
Hindy Bi Sinnara	114	9.6	15147	133	38146	335
Mabrouka	85	7.3	80969	953	33355	392
Dababa	67	5.7	5150	77	4557	68
Misk	19	1.6	10169	535	29678	1562
Other budded varieties	122	10.4	21312	174	10515	86
Seedy trees	16	1.3	38326	2395	14922	933
Total	1178	100.0	325346	276	295995	251

** According to statistical section, Southern Sector, Tahrir Province (1969 - 1970).

REVIEW OF LITERATURE

The Literature of the present investigation has been reviewed under six main headings :-

I. Growth Habit.

II. Flower Bud Induction.

III. Mango Inflorescence and Sex Distribution.

IV. Viability of Pollen Grains.

V. Fruit Set and Fruiting.

VI. Fruit Drop.

I. Growth Habit

A) Growth cycles :-

The growth of mango tree tends to be in cycles (vegetative flushes), which take place mainly in Spring, Summer and Autumn and depends chiefly on the climatic conditions (3, 6, 9, 12, 14, 17, 23, 32, 37, 39, 41, 45, 46, 63, 64, & 70).

In India, many studies were carried out on the growth cycles of the mango tree under the prevailing conditions of the different localities.

In Lyallpur (Punjab), the growth initiation in Langra variety took place practically during each month commencing from April and ending with August (45 & 46).

Under North Indian conditions, the first flush of Langra and Bombai varieties appeared in February - March, the second in April - May and the third in August - September - October. With the end of rains and beginning of Winter, the trees showed a brief check in growth during November and December (39).

Under the conditions of Western India (Bihar), the mango trees produced new vegetative flushes thrice in the year. The first flush was put forth in the early Spring (February to March), the second during March and April or later and the third in early Winter (October - November), besides some occasional flushes in between these main flushes (14 & 45).

Under Sabour conditions the main growth flushes in most varieties were in January - February, June - July and October - November (37).

In Kodur (South India), mangoes put forth two main flushes, one from February to June and the second from October to November (45).

Under Delhi (sub-tropical) conditions, the varieties Dasheri and Chowsa produced five growth cycles between mid March and November (23).

A recent investigation under West Bengal conditions, showed that the shoots of Himsagar variety (moderately regular bearing) produced four successive flushes, while the shoots of Langra, Bombai and Fasli (irregular bearing varieties) did not produce more than three flushes in any year (41).

Another recent study under Basti conditions, showed that the main growth periods were March - July, March - July and February - November for the varieties Dashehari, Langra and Nisar Pasand respectively, with a peak in June for the Dashehari variety and May for both the Langra and Nisar Pasand varieties (70).

In the dry zone of Ceylon, only one or rarely two periods of active growth were found in some mango varieties, while in the wet zone, the same varieties produced 2 - 6 growth flushes (6).

In the state of Sao Paulo (Brazil), the vegetative growth in 10 varieties of mango for the period (1950 - 1959) took place between August and February in 4 distinct periods each of 4 to 6 weeks (63 & 64).

In Egypt (at Giza), the vegetative flushes of "Pirie" variety appeared in March, June, July, August and September in the "Off" year, while in the "On" year, the flushes appeared in March, April, May, June, July, September and October. The corresponding flushing periods in "Hindy Bi Sinnara" variety were March, June, August and September for the "Off" year and April, May, September, October and November for the "On" year (3 & 12). On the other hand, a recent investigation was carried out under the same conditions (in Giza) on "Hindy Be Sinnara" and "Mabrouka" varieties and showed that the trees of both varieties produced three main growth cycles, the first was early in April - May, the second was in mid June, while the third took place in July - August (16).

B) Nature of blooming shoots :-

Many workers reported that the mango shoot in order to have the greatest chance of producing flower

buds, had to attain a certain age (6, 9, 13, 16, 20, 23, 31, 32, 38, 39, 42, 46 & 47) and a physiological maturity by the time of flowering (16, 37, 39 & 45).

1- Age of the shoot :

In Philippines, it was found that the Carabao mango shoots, in order to produce flowers had to attain a certain length, girth, size and number of leaves (13).

In India, many workers studied the behaviour of the vegetative shoots in the next year in some mango varieties :-

In Lyallpur, the Langra mango shoots which flowered in the subsequent year made most of their extension growth early in the season and ceased growing about a month earlier as compared to shoots that did not flower. This was consistenly observed over a period of four years on about 1300 shoots of April, May, June, July and August flushes. The early flush (April - May), was more conductive to flowering than those appeared in subsequent months (39 & 46).

Under Sabour conditions, it was reported that only the Winter vegetative flushes initated flowers the