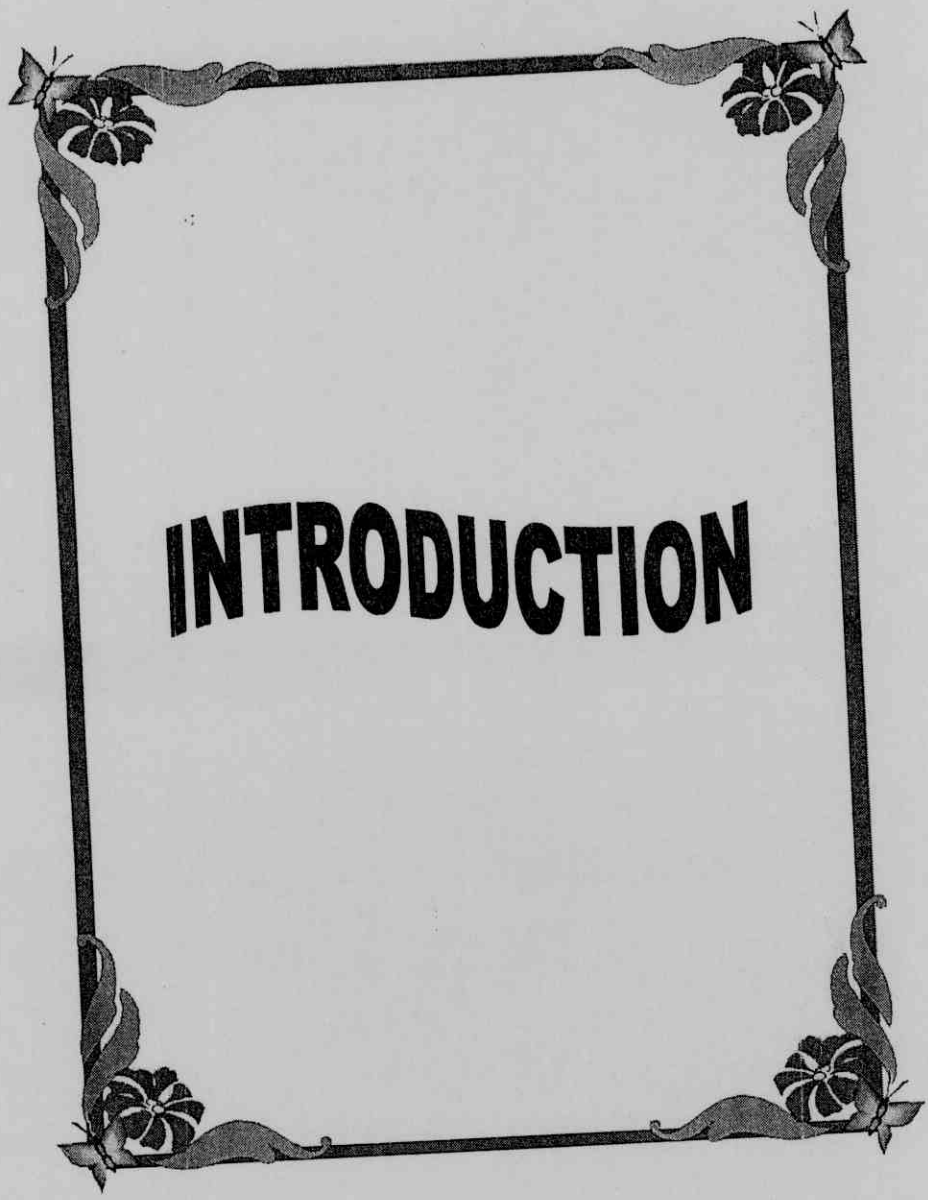

INTRODUCTION

I- INTRODUCTION

Plum is one of the important stone fruit crops of the world. Plums are generally consumed fresh, with the exception of a small quantity used for canning and beverage preparation. Plums with high sugar content and firm flesh are dried without the removal of stone and are called prunes.

Also, pear fruit has a great nutritive and economic values as it produce high net return.

Plum and pear cultivation is mainly concentrated in the Delta of the Nile valley which is very expensive and limited. The total cultivated area of plum reached (3044) feddans produced (15523) metric tons while pear is (7557) feddans produced (35441) metric tons according to the latest Agricultural Ministry statistics*. The horizontal extension of either plum or pear required to get out of the narrow valley. The reclaimed soil grower suffer from low available water, and nutrients, as well as salinity problems. They overcome these problems by establishing artisan wells, increasing nutrient applications, and finding out strains of rootstocks that are tolerant to drought and salinity stresses which is very expensive and time consuming .Plum trees are sensitive to drought and salinity stresses while pear trees are more tolerant to these stresses. The term drought often conjures up visions of low rainfall areas, dustbowls and scared plants **(Kaufmann, 1981).** Saline soils termed as those having high amounts of soluble salts (Na^+, Ca^{++}, Mg^{++}, SO_4^{--}, Cl^- and HCO_3^-). However, saline water is that water which contain sodium chloride as predominant salt, but

* According to the yearly Bull. Agric. Econ. and statistics. Ministry of Agriculture & Land Reclamation of Egypt, 2003

all salts are present in variable proportions and combinations that have been called brackish water **(Gupta, 1979).**

Plum and pear are commonly propagated by grafting. Different rootstocks for both of Plum and pear are available that include new introductions. These rootstocks are variable in their characteristics *i.e.*, tolerance to drought, salinity, diseases and nematode. Evaluation of most of these rootstocks, specially those newly introduced, is needed to categorize them and identify the aim of their use. Evaluation by using traditional methods is misleading in some cases as results of the interaction of different stresses (Environment, soil and plant factors) in the same time with the studied stress. Evaluation should be done under aseptic and controlled conditions to reflect the exact symptoms of the stress. In vitro evaluation technique is valuable in this respect. Moreover, establishing of new rootstocks efficient in tolerating drought and salinity is of great interest. This can be achieved by establishing a breeding program and preparation of different genetic constituents through inducing mutations and genetic variations. Mutation is the change in genetic information which can be categorized into four categories **(Lernes, 1928)** as follow:

a- Introgentic or point mutation and this deals with gene mutation.

b- Changes in group of genes on the chromosome, these deal with chromosomal aberration.

c- Changes in the whole chromosome, this is related to chromosome mutation.

d- Changes in the whole chromosome set, this induce polyploidy.

Mutation and genetic variabilities can be achieved naturally or induced either physically by irradiation or chemically by chemical mutagens (colchicine and sodium azide).

Identification of genetic variabilities or mutations require specific cytological procedures. The most recent technique in this consern is the Fingerprinting techniques. This technique is valiable in determining the genetic information about the tested plants. Fingerprinting is the mostly used technique for keeping local and international strains from losses and changes.

The ultimate goals of this study are to find out the best *in vitro* propagation protocol of Marianna 2624 (plum rootstock) and evaluation of both Marianna 2624 and *Pyrus betulaefolia* (pear rootstock) for the range of drought and salinity tolerance. Also, to determine the best dose of Gamma rays and the suitable concentration of either colchicine or sodium azide that induce the highest genetic variabilities and mutations.