INTRODUCTION

I. INTRODUCTION

Pear fruits are greatly required for their high nutritive value and high net return. Pear trees as pome fruits were tolerant to poor drainage. fine soil texture, and low chilling requirements for buds. These conditions encouraged pear growers to horizontal extension of pear orchards. The earliest record of pear cultivation in Europe is that provided by Homer who around 1000 B.C., wrote that pears were "one of the gifts of golds".

Rootstocks are of great importance in the intensive cultivation of pear trees. The advantages of using rootstocks include: the avoidance of juvenility , uniformity of tree performance, control of yield and fruit quality as well as to develop tolerance to diseases, pests and unfavorable soil factors.

Pear plants mainly propagate by grafting the scion on the suitable rootstocks. Large numbers of rootstocks may be used for pear but the most suitable one is communis pear *(Pyrus communisn)* rootstock had an excellent vigor, adaptable to different soil types, and compatible with most pear varieties and it is spread in most pear farms as their effect in producing high yielding and excellent fruit qualities but it is not resistant to fire blight.

Recently, a new pear rootstock (Betulaefolia pear) appeared betulaefolia pear (*Pyrus betulaefolia)* rootstocks had an excellent vigor, adaptable to different soil types, and compatible with most pear varieties and it is resistant to fire blight

(Cameron *et al.*, 1969). But the fruit yield and qualities are lesser than grafted on communis pear .

Fire blight disease is the dangerous problem for pear specially those grafted on communis pear. Large numbers of pear farms were destroyed as a result of fire blight disease.

The only alternative is finding out a new rootstock effective in controlling fire blight and encouraging high yielding as well as fruiting qualities. Establishing a breeding program for producing a new rootstock for pear combine the best characters of communis pear and tolerance of fire blight is the most important step in overcoming fire blight problem .

Conventional breeding programs needing high costs and long time to accomplish the required goal. The best alternative is employing biotechnology in achieving this goal through protoplast isolation and fusion to establish somatic hybridization between communis and betuleafolia pear rootstocks and in turn produce new rootstock valuable in producing high yield and fruit quality as well as in the same time good tolerant to fire blight disease .

Protoplast technology has a potential application in the genetic improvement of Pear rootstocks. Pear protoplast were also used for studies of host –pathogen interaction with bacterium responsible for fire blight, *(Erwinia amylovora)*, and a novel methodology for the precocious selection of plants according to there responses vis a vis the pathogen developed **(Brisset *et al.* 1990).** Protoplasts are particularly valuable for methods of plant improvement since the cell wall is not present

for interfering during fusion and injection or uptake of foreign DNA.

Protoplasts provide the starting point for many of the techniques of genetic manipulation of plant in particular the induction of somaclonal variation, somatic hybridization and transformation .

The ultimate goal of this study is establishing a protocol for protoplast isolation and culture of both rootstocks by using different experiments in this respect *communis* and *betuleafolia* pear. Also, studying the obstacles facing protoplast isolation and culture as well as utilizing of this technique in future in breeding program to produce new rootstock in pear through protoplast fusion (somatic hybridization) or genetic transformation.