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Original scientific paper

ANATOMICAL ANALYSIS OF SOME STAGES OF EMBRYOGENESIS IN SUGAR BEET (*BETA VULGARIS* L.)

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The paper presents some preliminary data from an anatomical analysis of some early stages of embryogenesis in sugar beet. Explants were obtained from plants of a diploid, monogerm, male sterile genotype grown in the field. Opened flowers were taken from the basal part, middle and top of lateral branches. Smaples were fixed in Carnoy II and embedded in paraffin. Sections were cut using a microtome at 10 μm and stained with safranin and haematoxylin. Several stages of embryo development were examined histologicaly by light microscopy: fertilized egg cell, first division of the zygote before formation of the cell wall, and eight-celled embryo with suspensor. In the different stages of embryogenesis a plasmatic membrane could be seen around the embryo which has an important role in the absorption and transport of nutrients, until the formation of the nuclear endosperm. The formation of two ovules was observed inside one ovary chamber, of which one aborts.

Key words: sugar beet, embryogenesis, zygote, plasmatic membrane, ovule.

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INTRODUCTION

Embryogenesis plays a central role in the life cycle of flowering plants. Ever since the process of double fertilization was documented, scinetists have attempted to unravel the changes that occur within developing seeds. One obstacle in achieving this goal is the location of embryos within the plant and their relative inaccessibility to experimental manipulation, particularly at the early stages of embryogenesis.

In higher plants embryogenesis serves to specify meristems and plant body patterns, to differentiate the primary plant tissue types, to generate a specialized storage organ essential for seed germination and seedling development, and to enable the seed to lie dormant until conditions are favorable for postembryonic development.

From a descriptive point of view, plant embryogenesis can be divided into three general phases: (1) postfertilization-proembryo, (2) globular-heart transition and (3) organ expansion and maturation (Goldberg *et al.*, 1994).

Genetic factors play an importnat role in morphogenesis. Genetics provides a complementary approach to the study of plant embryo development by allowing the identification of genes with essential functions during this stage of the life cycle. Recently, both genetic and molecular approaches have been used to identify genes responsible for various embryogenic processes (Meinke, 1991).

Sugar beet is an important economic crop plant which has been the subject of intensive breeding activity, but little is known about its reproductive biology. In order to throw some light on enbryogenesis in sterile and fertile genotypes of sugar beet, a detailed anatomical analysis of fertilized ovules was initiated. The present communication presents preliminary data obtained by anatomical analysis of some early stages of embryogenesis.

MATERIAL AND METHODS

Explants were obtained from plants of a diploid, monogerm, male sterile genotype grown in the field. Opened flowers were taken from the basal part, middle and top of lateral branches.

Permanent slides were prepared as follows:

- explants were fixed in Carnoy II, for 24 hours
- after washing they were dehydrated and embedded in paraffin
- longitudinal section, 10 μm thich, were prepared with a microtome.

Sections were glued with Mayer fixative and a dilution of 4 ml 36% formaldehyde in 32 ml of water