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Lina Lu

Inner Mongolia Agricultural University, China

Xiao He

Inner Mongolia Agricultural University, China

Jin Yi

Inner Mongolia Agricultural University, China

Qingfeng Li

Inner Mongolia Agricultural University, China

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Megasporogenesis ,microsporogenesis and development of male and female gametophytes in *Ceratoides arborescens*

LU Lina , HE Xiao , YI Jin and LI Qingfeng

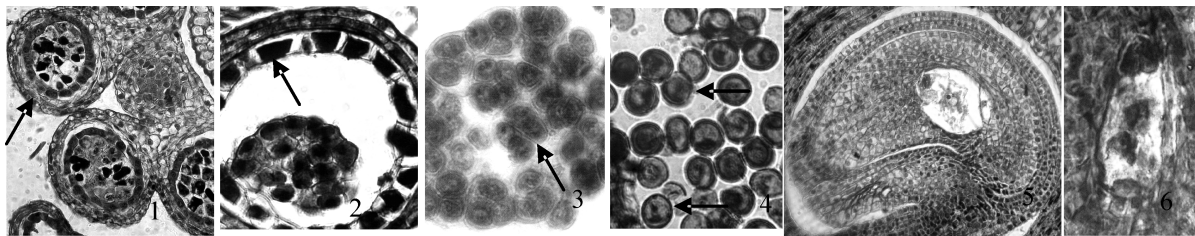
College of Ecology and Environmental Science , Inner Mongolia Agricultural Science , E-mail :lln810210@163 .com

Key words : megalosporogenesis ,microsporogenesis gametophyte genesis ,*Ceratoides arborescens*

Introduction *Ceratoides arborescens* is an important forage in arid and semi-arid grassland with high feeding value . It is also good at fixing sands and has strong drought resistance . Previous studies on different *Ceratoides arborescens* community have found main problems with its community degeneration included low seed setting rate and high seed abortion rate . In this study , an effort was made to explore the possible reasons for the failor of seed production with particular interesting in the development of megasporore and microsporore , male and female gametophytes .

Materials and methods Experiments were conducted in the grazing experimental site of Inner Mongolia Agriculture University in Huhhot . Flowers and buds at different developmental stages were collected from late June to early August in 2005 and 2006 . Collected flowers and buds were fixed with Carnoy's solution [Ethanol ,chloroform ,acetic acid(3 :5 :1)] , and preserved with 70% alcohol . Fixed materials were cut into slices of 8—10 μ m thickness and stained with iron alum haematoxylin . Starch was stained with PAS method . Morphogenesis features were observed and taken pictures with Olympus optic microscope .

Results The anther has four chambers .The development of anther wall is elementary type , which is composed of epidermis , endothecium ,1~2 middle layers and one tapetum layer . Middle layer begins to disappear when the archesporial cell moves into microspore mother (Pic .1) . The tapetum belongs to glandular type and begins to disorganize at the stage of tetrad . It contains two or many nucellus at late stage (Pic .2) . The cytokinesis of microspore mother cell in meiosis is simuteneous and most of the tetrads are tetrahedral . Decussation are also observed (Pic .3) . Empty pollen grains are abserved at the stage of haploid nuclear microspore . Mature pollen is 2-cells (Pic .4) . Ovule is anatropous , bitegminous and crassinucellate . Micropyle is formed by the inner integument (Pic 5) . The megaspore mother cells undergoes meiosis division to form a linear tetrad and the chalazal megaspore is the functional one .The embryo sac is Polygonum type . Polar nucleus do not inosculate before fertilization , which is surrounded by a lot of starch grains (Pic .6) . The shape of egg is similar to a pear with big nuclear , appears no polarity . Antipodals are short-lived . Synergids have filiform apparatus (Pic .6) .



Explanation of pics : (pic .1 ,3 ,4 ,6 \times 400 , pic .2 \times 1000 , pic .5 \times 200) 1 .Middle layer disappear ; 2 .Tapetum cell with two nucellus ; 3 .Tetrad , 4 2-cells pollen grain ; 5 .Ovule ; 6 .Mature embryo sac (two antipodals , two polar nucleus and starch , egg , synergids and filiform apparatus) .

Conclusions The development of megaspore and female gametophyte is normal . However , the existance of empty pollen grains in the normal developed anther wall at the stage of haploid nuclear microspore was an abnormal phenomenon .

Reference

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