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Application Of SEM For Studying Physiology Of Flowering In Rice (*Oryza sativa* L.)

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The advantage of the Scanning Electron Microscope (SEM) to study flower development in crops is the clarity of its images. Timing of bud initiation is of major importance, as it sets in train the processes of floral differentiation, anthesis, pollination, fertilization and fruit maturation. Shoot apices of rice (*Oryza sativa* L.) were dissected under a stereomicroscope magnified 9 to 40 times. The developmental stage of the apices was identified. The SEM technique was applied to study on the floral morphogenesis changes. Apices were fixed in 1% glutaraldehyde in 0.1 M phosphate buffer, pH 6.8, by adding fixative during dissection and then exposing to fixative for 2 h, during which time they were continuously rotated. The apices were then washed with three changes of 0.1 M phosphate buffer pH 6.8. Postfixation was with 1% osmium tetroxide in phosphate buffer pH 6.8 for 1 h. After washing in three changes of distilled water and dehydration using a graded ethanol series (30% to 100%), apices were critical –point- dried through carbon dioxide and stored in a desiccator for 2 d before being mounted on aluminium SEM stubs. The stubs were dagged with dag solution 154. The apices were examined and photographed using a Jeol JSM 6400 scanning electron microscope operating at an accelerating voltage of 7 kV coupled with Robinson backscattered electrons. Apices without pronounced swelling were considered vegetative. There was a flag leaf covering each apex. The first evidence of flower initiation appeared as a mounding of the apex (Figure1). Then the primary branch primordium and secondary branch primordium developed and differentiated to spikelet primordium. Rudimentary glume, empty glume, lemma and palea were then seen. Following, stamen primordium and pistil primordium were seen (Figure2). The lemma and palea began to enclose the flower bud at about the same time that stamen and pistil began to develop. When the lemma and palea completely covered the flower, stamen and pistil also finished their development. The SEM technique showed great detail in the structural and physiological changes in rice (*Oryza sativa* L.).

References

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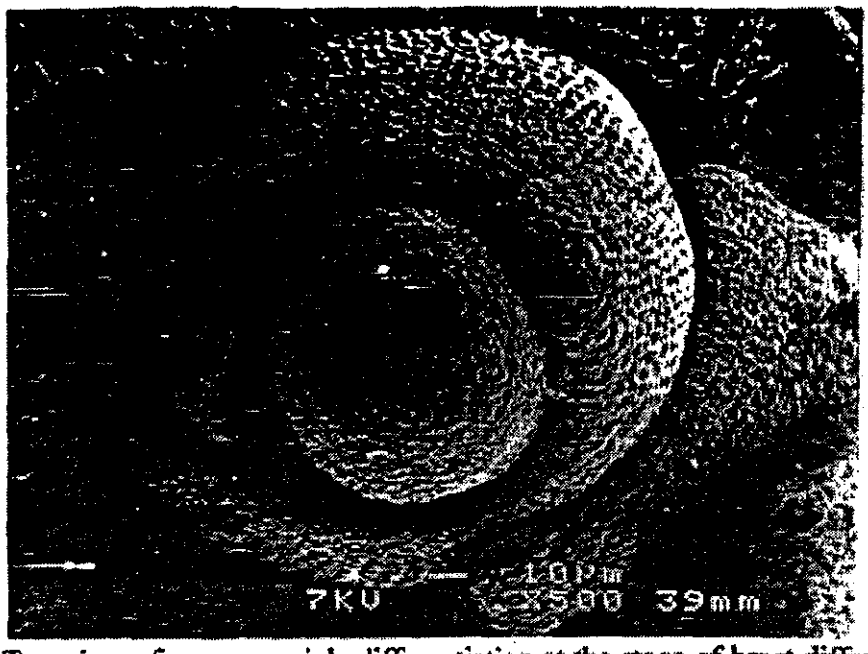

Figure 1. Top view of young panicle differentiation at the stage of bract differentiation (×500). am, apical meristem ; pbp, primary bract meristem ; fl , flag leaf.

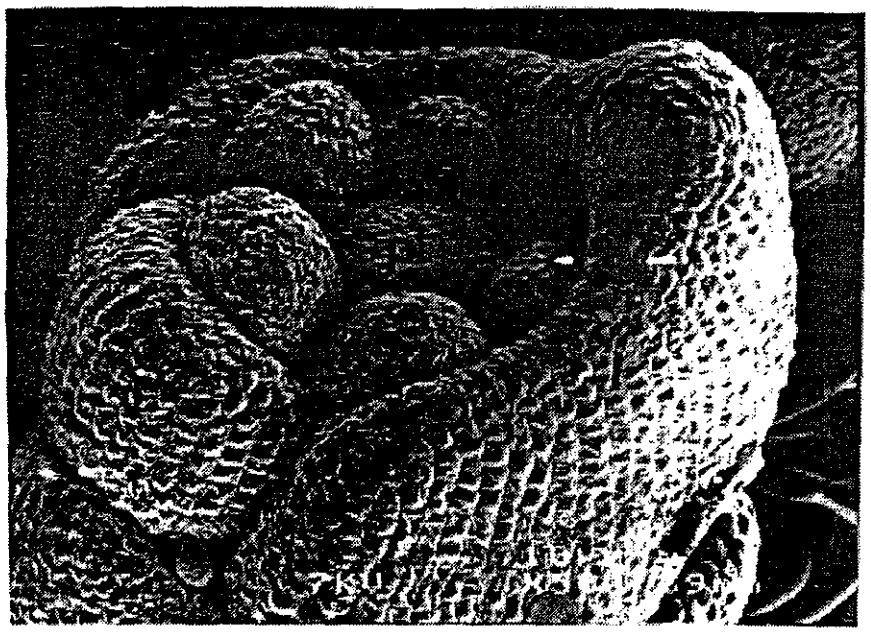

Figure 2. Obligue top view of spikelet primordium at the early stage of lemma/palea encircling : note that the stamen primodia and the primordia differentiation (×450). l , lemma ; p , palea ; s , stamen ; pt, pistil.