

MINORU HIIZEKI AND WILLIAM F. GRANT

Genetics Laboratory, Macdonald Campus of McGill University, Ste. Anne de Bellevue 300, Quebec.

CALLUS, PLANTLET FORMATION, AND POLYPLOIDY FROM CULTURED ANTHERS OF LOTUS AND NICOTIANA. Can. J. Bot. 49: 2041-2051, 1971

AntHERS of Lotus corniculatus (a wild strain, cv. Empire and Viking) and L. caucasicus were cultured on agar-solidified media in an attempt to induce haploid plants. Calluses were readily obtained from the anthers, and chromosome number determinations on the callus tissues showed cells of different euploid and aneuploid chromosome numbers but no haploid cells. From these calluses, tetraploid and octoploid plants were regenerated. Except for some pollen grains which hypertrophied, the germ cells produced mature pollen but did not progress beyond this stage to initiate calluses. These results indicate that the calluses were derived from somatic tissues of the anthers rather than from the germ cells. Only a few cell divisions of the pollen grains occurred when they were cultured directly on agar-solidified medium. The induction of haploid plants by means of anther culture was successful for Nicotiana tabacum (cv. Wisconsin 38, Balhi 34, Hicks Broadleaf) but not for N. affinis. The autoradiographic study showed that uninucleate pollen differentiated into embryoids both before and after DNA synthesis for the first mitosis but not in any other developmental stage of the germ cells. The initiation of embryoids was concomitant with an increase in size of the pollen grains and vacuolization. Embryoid formation from pollen grains followed the same developmental process as in normal embryogenesis. Exogenous plant hormones, indole-3-acetic acid and kinetin, were responsible for embryoid formation, although they were not essential for initiation.