

INTERSPECIFIC INCOMPATIBILITY AND INVIABILITY
PROBLEMS IN FOREST TREES

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There are two principal types of genetically-controlled barriers to hybridity in immature forest tree seed. These are (1) incompatibility or blocking prior to fertilization, and (2) embryo inviability, resulting in abortion of the zygote at some stage after fertilization.

An incompatibility system characterized by inability of the pollen tube to penetrate the stigma has been found in some poplar crosses. The block has been successfully overcome by use of a mixture of incompatible pollen and compatible, genetically-dead but physiologically-active pollen.

The problem of arrested pollen tube growth in the maternal tissue has been overcome in self-incompatible plants by irradiation of the pollen or style and by high-temperature treatment of the plant. Pollen irradiation is being tested in interspecific crosses of pines.

Embryo inviability is the typical hybridity barrier in soft pines and has also been described in spruces. Failure may occur at the critical point when the embryo must initiate independent protein synthesis.

At present, the prospects of overcoming interspecific barriers in trees appear better in cases of incompatibility than in cases of embryo inviability. The importance of genetic selection of individuals for crossability must be considered in addition to the application of special techniques for by-passing internal blocking systems.

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