

**STUDIES ON POLLEN GERMINATION AND TUBE GROWTH
OF THE INCOMPATIBLE POLLINATIONS OF STRAIN
KANPUR LOTNI x KANPUR LOTNI BELONGING
TO *BRASSICA CAMPESTRIS* L.**

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Brassica campestris. L (Mustard) has several compatible and incompatible strains. In the incompatible strains, the incompatibility barrier has been recognised to be situated in the stigmatic region. The cuticle of the stigma has been pointed out to be the compatibility barrier by Christ (1959) in *Cardamine pratensis*. In all cases investigated until now, pollen of plants, which have a cuticular layer on the stigmatic surface had a cuticle-breaking enzyme system also. In plants where the incompatibility barrier is active at the stigmatic level, it is possible to get normal seed set by disrupting the stigmatic region or by by-passing the stigma and applying pollen directly on to the conductive tissue of the stile (Kroh, 1956). The present study was aimed to test the incompatibility reactions during self pollination in the self-incompatible strain Kanpur Lotni (KL) of *Brassica campestris* and also to find out a means to break the incompatibility barrier so as to get normal seed set.

Material and Methods

Self-incompatible Kanpur Lotni was used for studying the behaviour of incompatible pollen on incompatible style. Bud pollination, hand pollination of the open flowers, pollination after scrapping of the stigma and pollination after removing the stigma were done using the same self-incompatible plant as the male and female parents. In each group 100 styles were collected at intervals of one hour, two hours, six hours and twenty-four hours after pollination. The styles were then fixed in 1:3 acetic-alcohol for 72 hours and then preserved in 70% alcohol. Styles were treated with acid-fuschin light green stain, incubated for 6 hours at 50° C cooled overnight and squashed. Hydrolysing for 5-10 minutes in N/10 HCL was done to get better spreading of tissues.

Results and Discussion

Bud pollination

Most of the pollen grains germinated on the immature stigma at one hour after pollination. At 2 hours, tubes were progressively longer. However at 6 hours, the majority of the growing tubes had swollen tips indicating their impending rupture

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At 24 hours, a few normal growing tubes could be detected deep down in the stylar tissue, growing towards the ovules. Normal seed set was obtained.

Pollination of mature flowers

There was no pollen germination after one hour, or two hours but about 10% of the grains showed minute tubes after 6 hours and 24 hours. Even at 24 hours after pollination, the tubes were as short as those on the bud pollinated styles after one hour. This indicated that germination was very slow and also the germinated grains did not produce functional tubes. No seed set was observed.

Pollination after scrapping the stigma

No germination of the grains was observed up to 6 hours after pollination. However at 24 hours after pollination there were narrow normal tubes as long as those on the bud pollinated styles after 6 hours. Apparently these tubes were functional since normal seed set was observed later.

Pollination after removal of stigma

Germinated grains were found on styles 6 hours after pollination and on those after 24 hours of pollination normal elongating tubes were observed. Here also though germination was slow, the tubes were normal seed set was also obtained.

It is clear from the present studies that the inhibitory substance that prevents normal tube growth and fertilization in self-incompatible pollination of *B. campestris* is concentrated in the stigmatic tissue of mature flowers. But in the buds, this substance is either absent or of a very low concentration so as to allow germination of the pollen grains and tube growth and when pollinated after scrapping off the stigmatic surface, germination is found to be very slow. However, at 24 hours after pollination, normal growing tubes could be observed which indicated the possibility of a normal fertilization later. When the entire stigma was removed germination, though slow, was not as slow as in the case where only the stigmatic surface was removed and here also normal tubes could be seen about 21 hours after pollination. The concentration of the inhibitory substance seems to decrease from the stigma downwards because the germination and tube growth were faster when pollen grains were applied directly on to the lower stylar tissue and some tubes were even able to penetrate deep into the style in a normal manner. Therefore, applying the pollen grains directly on the stylar tissue by-passes the stigmatic barrier and thus allows normal pollen tube growth, fertilization and seed set.

Summary

In the incompatible pollination of strain Kanpur Lotni x Kanpur Lotni of *B. campestris*, the inhibitory substance preventing self-fertilization was found to be concentrated on the stigma and the stylar region adjacent to it. Applying the

pollen grains directly on the stylar tissue after removal of stigma was found to by-pass the stigmatic barrier and thus allowed normal pollen tube growth, fertilization and seed set.

Acknowledgement

The author is thankful to Dr. S. N. Kakar, Dean, Basic Sciences, Haryana Agricultural University, Hissar, for his help and suggestions and also for providing the necessary facilities.

സംഗ്രഹം

ബ്രാസിക്വ കോപെസ്ട്രീസസ് സ്ത്രീഷീസിൽ ഉൾപ്പെട്ട സ്വയം പൊരുത്തമില്ലാത്ത ഒരു വി. ഫി. ടി. (ffissaiocQ) കാബ്ലർ ലോട്ട്നിയിൽ സ്വപരാഗണം rosgnigecnjoo സ്വബീജസംയോജനം ഫല വത്താകാതിരിക്കുന്നതിനു കാരണമായ സംഭവകവസ്തു അതിലെ സ്റ്റിഗ്മയിലും തൊട്ടുചേർന്ന സ്റ്റൈൽ ഭാഗത്തുമായി കേന്ദ്രീകരിച്ചിരിക്കുന്നുവെന്നു ഈ പഠനത്തിൽ കണ്ടു. സ്റ്റിഗ്മ നീക്കം ചെയ്തശേഷം പരാഗരേണുക്കളെ സ്റ്റൈൽ കലയിൽ നേരിട്ടു നിക്ഷേപിക്കുന്നതു വഴി ഈ സ്റ്റിഗ്മ മാറിക തടസത്തെ fflot(s<>os>CBonroo അങ്ങനെ പരാഗകഴലിന്റെ സ്വാഭാവികവളർച്ച, ബീജ സംയോഗം, വിത്തു പിടിത്തം എന്നിവ സാധ്യമാക്കിത്തീർക്കാമെന്നും കണ്ടു.

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(M. S. received: 7-9-1974)