

COMMON ANTIGENS IN HOST-PARASITE RELATIONSHIP*

It has been shown in mammalian systems, that antigenic closeness between a host and a parasite, leads to a stable host-parasite relationship (host 'tolerance') while antigenic disparity leads to host resistance to the parasite (host 'intolerance')¹⁻³. Although the plant does not produce an immune system similar to that in animals, the concept that common antigens between host and parasite might have a role in disease development found some support in plant pathology as well^{4,5}. The present investigation is an attempt to see if this concept is applicable in vascular wilt of cotton.

Experiments were designed to look for possible common antigens between two species of cotton, *Gossypium arboreum* L. and *G. hirsutum* L. and a virulent Indian strain of *Fusarium vasinfectum* Atk. Earlier work has shown that this strain is highly pathogenic to *G. arboreum* but not to *G. hirsutum* although it infects and colonizes both to varying degrees⁶. In order to exclude errors owing to non-specific reactions in the final results, the following fungi and plants were included for reference; *Fusarium solani* (Mart.) App. et Wr., *F. culmorum* (W.G. Sm.) Sacc. and *Pyricularia oryzae* Cav. none of which are known parasites of cotton, and *Abelmoschus esculentus* (L.) Moench, and *Phaseolus mungo* L. plants that are not known to be infected by *F. vasinfectum*.

The extraction of the fungal antigens was as described in an earlier paper⁷. For host antigens the initial steps of extraction were the same as outlined by DeVay and co-workers⁴. The material was extracted under liquid nitrogen using polyvinyl pyrrolidone and sodium ascorbate with a pestle and mortar. Further homogenization was done in a VirTis homogeniser. The extractant used was phosphate-buffered saline at pH 7.2. The antigens were purified further by the same procedure as

for fungi⁷. The antigens mixed with Freund's complete adjuvant were administered intramuscularly in a course of six injections to white rabbits (each weighing approximately 1.5 kg). Antisera were collected on 23rd day by bleeding the ear veins and stored at 0° C with merthiolate as preservative. The antisera against the two species of cotton were tested by the agar-gel double diffusion method with their antigens in homologous and heterologous reactions. The antigens of *A. esculentus* and *P. mungo* were also allowed to react with the two antisera. *G. arboreum* formed three lines of precipitation in homologous reactions and two in heterologous reaction with *G. hirsutum* while the latter showed two antigens in homologous as well as heterologous reactions. *A. esculentus*, which belongs to the same family as cotton, shared an antigen with both the species of cotton. *P. mungo* produced no precipitation with either species of cotton.

Using the same technique, the antisera and antigens of the two species of cotton were tested against the antigens and antisera, respectively, of all the test fungi. The antisera of the two species of cotton on reacting with the antigens of *F. vasinfectum*, or the antisera of the latter on reacting with the antigens of the former two, formed a single precipitin band indicating the presence of a common antigen (Fig. 1). However, such a result

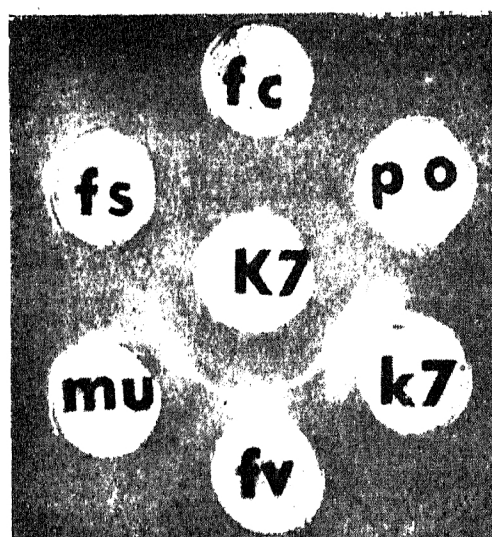


FIG. 1. Antigen of *G. arboreum* in the central well (K7) reacting with homologous antiserum (k7) and with heterologous antisera of *G. hirsutum* (mu), *Fusarium vasinfectum* (fv), *F. culmorum* (fc), *F. solani* (fs) and *Pyricularia oryzae* (po).

was not observed in any of the reciprocal reactions involving the other test fungi and the two cotton species, or in those between *F. vasinfectum* and the other plants.

The results of this investigation indicate the presence of a common antigen between the pathogen *F. vasinfectum* and its hosts. However, this

concept of a common antigen between a host and parasite as related to disease development ought, in our opinion, to place emphasis on *parasitism* rather than on *pathogenesis*. The intrinsic ability of the Indian strain of *F. vasinfectum* to infect and colonize (*i.e.*, to parasitize) both the species of cotton, although disease manifestation is seen *only* in *G. arboreum*, is compatible with this idea.

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July 11, 1974. S. VENKATARAMAN.

* Memoir No. 114 from the Centre for Advanced Study in Botany.

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