STUDIES ON STORAGE DISEASES OF FRUITS AND VEGETABLES

IV. Control of Guava Fruit Rot Caused by *Pestalotia psidii* and *Colletotrichum gloeosporioides* with Aretan

ARETAN, an ethoxyethyl mercuric chloride (6% Hg) compound is cheaper than many fungicides and antibiotics which have been evaluated for checking *Pestalotia psidii* Pat. and *Colletotrichum gloeosporioides* Penz. rots of guava. It has given very promising results with a number of diseases caused by diverse pathogens[1-3]. The efficacy of this fungicide in checking these two rots of guava was evaluated and the results have been presented in this note.

Preliminary *in vitro* study was carried out employing food poison technique. When the organisms were grown on Asthana and Hawker's medium 'A' supplemented with this compound, it was noted that 1 and 50 ppm of the compound was sufficient to completely check the growth of *P. psidii* and *C. gloeosporioides* respectively. These effective concentrations of the compound were then evaluated for their efficacy in checking the two diseases on artificially infested guava fruits (variety 'Safeda'). Both pre- and post-inoculation treatments were given by dipping the fruits in effective concentrations of the compound for 2 minutes. The treated fruits were incubated for 8 days at 28° C in glass chambers.

No sign of rotting was observed on the fruits treated with fungicide either before inoculation or after inoculation. Fruits infected with *P. psidii* and given pre-inoculation treatment became slightly soft but the softness could not be attributed to the activity of pathogen because its presence could not be detected in the fruits. As both the rots could be successfully checked by a low concentration of aretan, the compound may be recommended for the control of these diseases.

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EFFECTIVENESS OF KNOWN *Sr* GENES FOR SEEDLING RESISTANCE AGAINST INDIAN STEM RUST RACES IN WHEAT

WHEAT rusts pose a serious threat to wheat production in India through the high yielding varieties programme, during the last decade. The problem has attracted particular attention with *Kalyan Sona,* one of the most important contributors to wheat revolution, developing susceptibility to all the three rusts. It is now realised that if the gains made in wheat production are to be consolidated, stabilisation of production by breeding varieties, resistant to rusts is essential. A recognised way of achieving the objective of breeding durable resistance is the incorporation of diverse genes for resistance into a variety. Rational planning of an effective breeding programme in this direction requires :

(*a*) Information on the effectiveness of known genes for resistance against rust races prevalent in India and (*b*) Identification of genes for resistance in parents to be used in the crossing programme. Since information available on both the points in the context of Indian rust flora is meagre, a programme of genetics of rust resistance is initiated at this Institute. Information on *Sr* genes, effective against Indian stem rust races is summarised in this report.

From surveys of rust infection and analysis of samples, collected from different parts of the country, race 21 (Singh, personal communication) of stem rust is found to be widely prevalent in India. For virulence, races 15, 15 C, 34 A, 42, 42 B and 122 rank important, for the varieties under cultivation in India. A logical strategy for breeding varieties that will give a rust free crop is to incorporate genes, for resistance against the 7 races listed above. Perusal of the rust reaction pattern recorded in Table I indicates that combination of genes Sr 5, Sr 6, Sr 8, Sr 9 *b* and Sr 11 will effectively meet this purpose. In fact it will provide a fair degree of overlap for resistant genes against an individual race. A combination of *Sr* 6 and *Sr* 9 *b*, for example, will provide two genes for resistance against races 11, 15 C, 21, 40 and 117 A. Rust sample analyses, during the last two years have shown that race 21 has constituted 50% of the collected samples in 1971–72 and as much as 90% in 1972–73 (Singh, personal communication). The desirable combination of genes suggested in this report (*i.e., Sr* 5, 6, 8, 9 *b* and 11) will provide 5 different genes for resistance against this most prevalent stem rust race. From studies on adult plant resistance, a similar view has been expressed[1] that a combination of *Sr* 11 and other genes may impart a fair degree of field tolerance. It is also seen that

TABLE I

Infection types on monogenic Sr *lines and stocks with known gene(s) when inoculated with 16 Indian* P. graminis *races*

Line/Stock	RACE															
	11	14	15	15C	21	24	34A	40	42	42B	117	117A	122	184	194	222
Hope Mq^{10} (*Sr*1 or *Sr*9*d*)	0	;1	4	4	4	4	3	4	4	3	4	;1+	4	4	4	3
Thatcher Mq^{10} (*Sr*5)	4	0;	4	4	0;	3^n	4	4	0;	4	0;	;1	4	0	;1–	3
Kenya 58 Mq^{10} (*Sr*6)	0	4	3	;1	2, 3^n	4	3–4	0;1	1;	;1–	4	0;	4	4	3	3
Egypt Na 101 Mq^{11} (*Sr*7)	0	3	3	4	4	4	3	3	3	4	NT	3	4	4	NT	3
I *Sr*7*b* — Ra	3	;1	3	4	4	4	3	3	4	4^c	4	3	4	4	4	3
I *Sr*8 — Ra	4	3	3	3^c	2	3	4	3	4	3	NT	0	2, 2–	0;	NT	3
Red Egyptian Mq^6 (*Sr*9a)	0	1	4	4+	4	4	4	4+	4	4	4	3	4	4	3–4	3
Kenya 117A Mq^6 (*Sr*9b)	..	..	0;	;+	;–2	..	..	1	4	NT	..	;1	..	..	..	..
Gammenya (*Sr*9*b*)	0;	4	..	..	..	3–	;1–	..	..	NT	0;	..	3	0	;1	0;
Egypt Na 95 Mq^4 (*Sr*10)	4	;1–	4	3	3–4	1, 3^n	3	4	1, 3	4^c	4	0;	4	4^c	3–4	3
Lee Mq^{10} (*Sr*11)	4	2–2≡	4	4	;1–	3	3	;1	2=2≡	4	4	4	4	4	0; 1	0; 1
Marquis (*Sr*12)	NT	NT	NT	4	4	NT	NT	4	NT	NT	NT	NT	4	NT	NT	NT
Khapstein Mq^{10} (*Sr*13)	2	2–2≡	3	3	4^n	3–4^n	3	3	4	4^n	4	;1	4	3	;1	3
Khapstein Mq^{10} (*Sr*14)	0	;1–	4	4	4	4^n	4	4	4	4^c	4	2=2≡	4	0	4	3
Thew (*Sr*15)	4	0;1	3	1·3	4	3–4	4	1, 3	3	4^c	0	0; 2–	4	3	3–4	3
I *Sr*16 — Ra	4	4	4	4	4	3	4	4	3–4	4	4	4^n	4	4	4	3
Spica (*Sr*17)	3	1^c	3	X	3	3	4	4	3	4^c	0	;1–	4	0	0	3

0 = Immune; 0; = Nearly immune; 1, 1^c, 1– and 1+ = Very resistant; 2 ≡ 2 =, 2–, 2 and 2+ = Moderately resistant; 3, 3^c, 3^n = Moderately susceptible; (4, 4^c, 4^n and 4+ = Very susceptible; X = Mesothetic; NT = Not tested.

among the known genes tested for resistance, the genes *Sr* 1, *Sr* 7 *b*, *Sr* 9 *a*, *Sr* 13, *Sr* 14 and *Sr* 16 are largely ineffective for races of stem rust important, at the moment, in India.

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LEAF SPOT OF *PRUNUS CORNUTA* STEUD. INCITED BY *POLYSTIGMA RUBRUM* (PERS. EX. FR.) DC.

A SEVERE red spot on the leaves of *Prunus cornuta* Steud. was noticed at Khadrala (H.P) in June, 1974. *Prunus cornuta* Steud. a deciduous species growing at elevation of 2,000 metres to 3,033 metres has a good potentiality as root stock for cherry, as grafts on it make vigorous growth as compared to those on *Pr. cerasoides* D. Don. which is already in use as rootstock for cherry.

The infection occurred from April to May immediately after the new leaves formed. The characteristic symptom of the disease appeared as yellow circular or irregular lesions on lower surface of the leaf blade. In advanced stage, these lesions turned dark red and were scattered over the entire leaf. The spots measuring 7 mm to 9 mm in diameter were raised on the underside and lowered on the upper surface of the leaf. The red lesions surrounded by yellow margin consisted of numerous stromata. In the later stage of disease development, the infected leaves got dried and detachment of diseased spots took place leaving "shot hole". The attack of disease restricted to foliage only.

Efforts to culture the causal agent on potato-dextrose agar were unsuccessful, since it happened to be obligate parasite[15]. However, the pathogenicity test was initiated by inoculating the young leaves of *Pr. cornuta* with suspension of ascospores. The symptoms of the disease developed after 30 to 45 days of inoculation. Inoculation through pycniospores could not induce the disease. The fungus has been identified as *Polystigma rubrum* (Pers. ex. Fr.) DC. and the specimen deposited at CMI, Kew, Surrey, England, under IMI succession No. 185885.

Polystigma rubrum, being widely distributed pathogen in several countries, is reported to attack a large number of stone fruit plants such as Almond[1-3], Damson[15-18], Plum[1-4,7-10,12,14,19], *Prunus domestica*[17], *Pr. spinosa*[5,11] Prune, Apricot[6] and *Pr. insititia*[8]. Besides, the fungus has been reported earlier on Almond[16] from India, but there is no report on *Pr. cornuta* and hence this appears to be new host record for this country.

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A NEW LEAF BLIGHT OF INDIA RUBBER CAUSED BY *PHOMA GLOMERATA* (CORDA) WR. AND HOCHAPF. IN INDIA

A DISTINCTIVE leaf blight of India rubber (*Ficus elastica* Roxb.) was noted in the late winter of 1971 in New Delhi. Both the surfaces of affected leaves (young and old) bore necrotic, irregular spots, measuring several cm in diameter, and