Table 1 *Reaction of powdery mildew of the parents, F_1, F_2 and various backcross generations of two wheat crosses*

Generation cross	No. of plants: Resistant (R)	No. of plants: Susceptible (S)	Genetic ratio (R:S)	χ^2 value	*P* value
WL 711	0	16			
CPAN 1922	15	0			
CPAN 1946	19	0			
F_1: CPAN 1922 WL 711	0	16			
F_1: CPAN 1946 WL 711	0	13			
F_2: CPAN 1922/WL 711	61	191	1:3	0.08	0.7–0.8
F_2: CPAN 1946/WL 711	16	197	1:15	0.59	0.3–0.5
Backcrosses					
CPAN 1922^2/WL 711	63	69	1:1	0.27	0.5–0.7
CPAN 1922/WL 711^2	0	85			
CPAN 1946^2/WL 711	15	53	1:3	0.31	0.5–0.7
CPAN 1946/WL 711^2	0	69			

basic material for breeding powdery mildew-resistant varieties of wheat.

20 May 1988; Revised 8 July 1988

1. Upadhyaya, M. K., Kumar, R. and Singhal, N. C., *Indian J. Genet.*, 1972, **32**, 242.
2. Dhaliwal, H. S., Bains, S. S. and Multani, D. S., *Ann. Appl. Biol.* (*Supplement*), 1987, **110**, 122.

SEASONAL EFFECT ON INFECTION BY COCONUT STEM BLEEDING PATHOGEN, *THIELAVIOPSIS PARADOXA*

K. K. N. NAMBIAR, ANIL KUMAR, KALPANA SASTRY and Y. JOSHI

Division of Plant Pathology, Central Plantation Crops Research Institute, Kasargod 670 124, India.

STEM bleeding is an important disease of coconut which has been reported from almost all coconut-growing countries[1,2]. Recently, involvement of *Thielaviopsis paradoxa* (de Seynes) Von Hohnel as a primary causative agent of the disease has been established[3]. There is no information on the effect of different seasons on infection by this pathogen. Hence the present study was undertaken and the results are presented in this paper.

T. paradoxa isolated from the affected trunk of coconut was inoculated on the trunk, at about 75 cm height from the ground, using inoculum grown on 2 cm long bits of sterilized coconut rachis[3]. An uninoculated bore-hole made on the opposite side of the inoculated trunk served as the control. A total of 29 palms including both West Coast Tall (WCT) and Chowghat Orange Dwarf (COD) were inoculated at CPCRI Farm during different months and periodically observed for symptom production. The observations on depth and size of lesion as recorded in December, 1987 are presented in table 1.

When the amount of decay in young WCT palms inoculated at different periods was compared, the maximum lesion depth/size was recorded in palms inoculated during or after monsoon (July to November). The lesion size was comparatively less in palms inoculated during April–May.

Young WCT palms (10–12 years) showed generally more internal decay as compared to 45–60 year-old palms. The infection progressed up to a depth of 7–7.5 cm in young palms inoculated during July–November as against 5.5 cm in old palms after 24 months of inoculation. The lesion size for both age groups, however, did not vary much. The infection was rather low and delayed during summer months. In general, the extent of decay increased with progress of time.

When young palms of WCT and COD inoculated in April 1987 were compared, the size and depth of lesion were slightly more in the former variety. But this requires confirmation by testing more palms since the number of dwarf palms inoculated was inadequate.

The results thus showed that the establishment of infection was quicker and the decay was more in palms inoculated during July–November irrespective

Table 1 *Lesion size and depth in coconut stem (West Coast Tall variety) of different ages, inoculated with Thielaviopsis paradoxa during different periods*

		Palms of 10–12 years				Palms of 45–60 years			
Date of inoculation	Months after which observations were taken*	Palm no.	Duration (months) for appearance of first symptoms	Lesion depth (cm)	Lesion size (cm)	Palm no.	Duration (months) for appearance of first symptoms	Lesion depth (cm)	Lesion size (cm)
26.11.1985	24	Not inoculated				1, 2, 3, 4	1½–2	4.5 3.5 5.5 4.5	7 × 3 5 × 2.5 17 × 3 12 × 2
28.4.1986	20	Not inoculated				1		0	0 × 0
						2		0	0 × 0
29.5.1986	19	1, 2	6	2.5 3.0	4 × 2.5 4 × 2.0	1, 2	6–8	0.5 2	4 × 2.5 3.5 × 2.5
31.7.1986	17	1, 2	2	4.0 0.5	6.5 × 2.5 7.5 × 2.5	1, 2	2	3.5 5	5 × 2.5 7 × 3.5
27.9.1986	15	1, 2	1½–2	6 3	7 × 2 5 × 2.5	Not inoculated			
29.11.1986	13	1, 2	2	7 7	7 × 2 5 × 2	1, 2, 3	2–2½	2 3 2	5.5 × 2 12 × 6 5.5 × 2.5
6.4.1987	9	1, 2, 3**, 4**	6–7	3.5 2 2 1.5	4.5 × 2 3 × 2.5 3 × 2 3.5 × 2	Not inoculated			
4.7.1987	6	1, 2	2	3 3	3.5 × 2.5 3 × 2	1, 2	2–2½	3 4	2.5 × 2 4.5 × 2.5

*Observations were taken on 22 December 1987; **Chowghat Orange Dwarf.

of the age of the test palms. Young palms tend to be more susceptible than the older ones. Enhanced decay in palms inoculated in July–November may be due to prevalance of high humidity and comparatively moderate temperature during this period (table 2). The present finding is significant in the context of standardizing techniques for screening coconut germ plasm for resistance to stem bleeding disease.

Table 2 *Meteorological data (mean temperature and relative humidity) during the period of the experiment*

	Temperature (°C)		Relative humidity
Month	Minimum	Maximum	range (%)
November 1985	21.5	32.9	59–89
January 1986	20.0	32.8	53–85
April '86	25.1	34.0	62–83
May '86	25.8	34.0	61–79
July '86	23.5	30.1	78–92
September '86	22.9	30.0	75–93
November '86	21.9	31.9	64 88
January 1987	20 0	32.9	47–82
April '87	24.9	33.9	59–80
July '87	24.3	31.2	74–87
December '87	21.2	33.7	52–80

13 June 1988; Revised 18 July 1988

1. Menon, K. P. V. and Pandalai, K. M., *The coconut palm—A Monograph*, Indian Coconut Committee, Ernakulam, 1958, p. 384.
2. Ohler, J. G., *Coconut, Tree of Life*, FAO, Rome, 1964, p. 446.
3. Nambiar, K. K. N., Joshi, Y., Venugopal, M. N. and Mohan, R. C., *J. Plant. Crops*, 1986, **14**, 130.

EFFECT OF 2,4-D ANALOGUES ON CALLUS CULTURES IN MAIZE

P. SUPRASANNA, K. V. RAO and G. M. REDDY
Department of Genetics, Osmania University Hyderabad 500 007, India.

IN VITRO culture of higher plant cells and tissues has gained tremendous importance in view of the pros-