Table 1 *Frequency distribution of the wheat plants tolerant and susceptible to the application of 2,4-D in different generations*

| Cross generation | No. of plants progenies: Tolerant (T) | Segregating (Seg) | Susceptible (S) | Genetic ratio (T:S) | $\chi^2$ value | *P* value |
|---|---|---|---|---|---|---|
| *HD 2009 × CPAN 1874* | | | | | | |
| HD 2009 | 0 | | 99 | S | | |
| CPAN 1874 | 106 | | 0 | T | | |
| $F_1$ | 40 | | 0 | T | | |
| $F_2$ | 455 | | 152 | 3T:1S | 0.005 | 0.50–0.95 |
| *PBW 94 × CPAN 1922* | | | | | | |
| PBW 94 | 0 | | 93 | S | | |
| CPAN 1922 | 96 | | 0 | T | | |
| $F_1$ | 38 | | 0 | T | | |
| $F_2$ | 480 | | 147 | 3T:1S | 0.80 | 0.20–0.50 |
| *WL 711 × HD 2009* | | | | | | |
| WL 711 | 116 | | 0 | T | | |
| $F_3$ progenies | 9 | 7 | 8 | 3T:2Seg:3S | 0.28 | 0.50–0.95 |

1922 which were grown in a randomized complete block design with three replications in *rabi* 1984–85. Four rows of each of the parents, two of the $F_1$, 12 of the $F_2$ and one of each $F_3$ plant progeny, were grown in each replication. Rows were 2.25 m long spaced 25 cm apart. Plant to plant distance was 15 cm. After 45 days of sowing the crop was sprayed with 800 ppm of 2,4-D (600 g of 98% pure 2,4-D in 750 l of water/ha). Data were recorded on all the plants either as susceptible or tolerant. Plants having condensed and branched spikes were categorized as susceptible. Probable segregation ratios were worked out and $\chi^2$ test was applied to confirm the goodness of fit.

Application of 2,4-D perfectly controlled broad-leaf weeds. There was no symptom of phytotoxicity on wheat until heading. HD 2009 and PBW 94 (sensitive varieties) had serious spike deformities, delayed emergence, condensed and branched spikes. Singh and Sharma[2] also observed phytotoxic effects of 2,4-D on HD 2009. WL 711, CPAN 1874 and CPAN 1922 had no visual symptoms of phytotoxicity. The $F_1$ generation of both the crosses (HD 2009 × CPAN 1874 and PBW 94 × CPAN 1922) behaved like the tolerant parents indicating thereby the dominance of tolerance to 2,4-D over susceptibility. In the $F_2$ generation a segregation ratio of 3 tolerant: 1 susceptible plants was recorded (table 1). A good fitness of the $\chi^2$ values revealed that tolerance of wheat varieties CPAN 1874 and CPAN 1922 to 2,4-D appeared to be under the control of a single dominant gene. In the $F_3$ plant progenies of the cross WL 711 × HD 2009, a segregation ratio of 3:2:3 for tolerant: segregating: susceptible progenies was recorded which further confirmed the monogenic inheritance of tolerance to 2,4-D.

7 October 1986

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## ASSOCIATION OF GREEN ISLANDS WITH RICE BLAST LESIONS AND ITS UTILITY IN VARIETAL SCREENING

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THE rice blast pathogen induces lesions of various sizes[1] and colours[2] on the host leaves. The colour is not described as shade numbers and proper weightage to these visual symptoms is not given in the existing disease quantification methods[3,4]. This made it difficult to differentiate the varietal reaction on the basis of these symptoms. The green island formation is observed in the rust pustules[5]. The present communication reports the association of green islands

Table 1 *The green island producing ability of blast lesions of different rice varieties*

| Variety | Lesion samples | | Green island producing ability |
|---|---|---|---|
| | Size* | Colour** | |
| Rambhog | 2 mm lines | Chocolate 7 | – |
| Zapaka | 1–2 mm lines | Chocolate 7 | – |
| Taichung | long lines | Brown | – |
| Phudunge-I | Specks | Chocolate 7 | – |
| Krishna bhog-I | 7 $mm^2$ | 44 Liliac, Chocolate 7, 21 rust | + |
| Krishna bhog-II | 15 $mm^2$ | 44 Liliac, 35 Garnet lake | + |
| Sano Khamti | 25 $mm^2$ | 69 Bottle green, 28 Cardinal red | + |
| Sano Atte-I | 10 $mm^2$ | 45 Mauve' | + |
| Sano Atte-II | 3.5 $mm^2$ | 45 Mauve | + |
| Phudunge-II | 3 $mm^2$ | 44 Liliac, 42 Maroon | + |
| Jaspatay | 1.5 $mm^2$ | 46 Amethyst | + |
| Tapre | 10 $mm^2$ | 51 Winster blue, 3 Carnary | + |
| Timburay | 2.5 $mm^2$ | 50 Orchid | + |
| Seto Yangsiry | 3.5 $mm^2$ | 50 Orchid, 28 Cardinal red | + |
| HR-12 | 4 $mm^2$ | 43 Lavender, 42 Maroon | + |

*Average size of more than 50% of lesion population of the variety.
**Colour from the centre towards margin; + Present; – Absent.

with certain blast lesions on excised leaves and also the chlorophyll retention ability of various blast lesions collected from different rice cultivars. This information may be useful for evaluating the disease reaction of rice varieties.

The rice varieties popular in the state of Sikkim in India and HR-12 a blast susceptible variety were raised under conditions congenial for the blast disease of rice[6]. The infected leaves were collected, the lesion colour was recorded after comparing them with the horticultural colour guide (determinations approximate Maerz and Paul, colour dictionary), the area was measured, the lesions were incubated at high relative humidity in petridishes and the leaf senescence was recorded.

The brown and chocolate lesions produced on the varieties Rambhog, Zapaka, Taichung and Phudunge-I (collected from village Dikling) could not retain the chlorophyll whereas the purple (i.e. 43 Lavender to 46 Amethyst, 50 Orchid and 51 Winster blue) and the green (i.e. 69 bottle green with little purple tinge) lesions of 1.5–25 $mm^2$ area with or without yellow and brown margins could retain the chlorophyll until the healthy areas of leaf completely senescenced (table 1).

The varieties can be classified as resistant and susceptible on the basis of their green island producing ability. The specks, lines or spindles produced on resistant var could not retain the chlorophyll. The green island producing varieties were susceptible to the pathogen and the degree of susceptibility expressed as the size and colour of the lesion was different in different cultivars. This will help in proper disease quantification for varietal screening for reaction to blast disease of rice.

The author thanks the Head, Division of Genetic Resources for seeds of rice varieties and Dr S. B. Lodh for colour guide.

19 September 1986; Revised 3 November 1986

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