PROMISING NEW MULTIPLE INSECT RESISTANT RICE VARIETIES

THE gall midge, the stem borers and the vectors of rice virus disease, *i.e.*, leaf hoppers and the planthoppers constitute the major in insect pests of rice that cause considerable yield losses annually in the different parts of the country. Effective and economic chemical control of these is rather difficult to achieve, as it is dependent on factors like timing, dosage, method and frequency of application of insecticides. Thus evolving high yielding rice varieties combining field resistance/tolerance to the major pests would provide an effective alternative.

With the objective of developing lines possessing resistance/tolerance to pests, varieties in the genetic stock collection being maintained at the Central Rice Research Institute, Cuttack, are regularly screened for their reaction to pests to provide donors for utilization in breeding programmes. This had resulted in the identification of a number of resistant donors for the different insects some of which are listed below.

Donors	Varieties
Gall midge ..	Ptb 10, Ptb 18, Ptb 21, Leaung 152, ARC 6158, ARC 5984, ARC 6221, JBS 446, JBS 673, MNP 30, MNP 471.
Stem borer ..	TKM 6, Ptb 18, Ptb 21, Leaung 152, CB I, CB II, Topa I, W 1263, GEB 24.
Leaf hopper ..	Ptb 18, Ptb 21, TKM 6, W 1263, Ptb 2, Ptb 7
Planthopper ..	TKM 6, ARC 6238, AC 255, Ptb 21, Ptb 33

The degree of resistance of these donors is later confirmed under artificial conditions. The varieties exhibiting a desired level of tolerance/resistance to one or more major insects are crossed to selected high yielding types to develop high yielding strains combining good yield potential and desired level of resistance.

Forty cultures combining good yield potential and a desired level of resistance to more than one insect pests, were subsequently identified from seven crosses involving four donors. From these cultures, based on data collected from different sources, four were finally retained. The information on these cultures along with that of Jaya is presented in Table I. These cultures mark a significant improvement over the existing varieties. In addition to the data provided in Table I, it may be said that CR 94-MR-1550 is suitable for late planting in *kharif* (*e.g.*, after the harvest of jute) and can tolerate transplanting of aged seedlings (upto 60 days age) without any appreciable reduction in yield. Even under 0 nitrogen level, this had yielded better than several released high yielding varieties.

CR 139–1047 has been reported to possess a high degree of resistance to bacterial leaf blight in international baterial blight nursery trials conducted at many test locations in India, Ceylon, Thailand, Indonesia, Philippines, etc.

The new dwarf rices released thus far in India possess low level of field resistance to common rice pests and as a result, the varieties have already become susceptible to major pests in several parts of the country. In fact, in parts of Kerala, the incidence of planthoppers has been reported to have

TABLE I

Insect and disease reaction and yield of promising multiple insect resistant cultures

Culture	Cross	Reaction to							Duration (days)	Yield (t/ha) without prot.	Grain character
		Gall midge	Stem borer	Leaf hopper	Plant-hopper	RTV	BLB	Blast		*Kharif*	
CR 94-MR-1550	(Ptb 21 × Ptb 18) IR 8	R	MR	R	MR	R	MR	S	130	3·5	Medium bold red rice
CR 57-MR-1523	IR 8 × Ptb 21	R	MR	R	R	R	S	MR	124	3·2	Medium bold white rice
CR 138–928	Jaya × TKM 6	S	R	R	MR	MR	MR	MS	137	3·0	Long slender white rice
CR 139–1047	(TKM 6 × IR 8) TKM 6	S	R	MR	MS	MS	R	R	135	3·0	Long slender white rice
Jaya (susceptible check)	T (N) I × T 141	S	S	S	S	S	S	MS	140	1·5	Long bold white rice

reached an alarming situation. The large scale introduction of the multiple resistant varieties in the different insect problem areas would reduce the losses in yield and directly contribute to increased production. Minimum plant protection especially in the seedling stage might be taken as an additional precaution in pest endemic areas.

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All India Coordinated Rice Improvement Project, Hyderabad 500 030, — M. V. S. Sastry.
and
Central Rice Research Institute, Cuttack 6, *October* 1, 1975. — P. S. Prakasa Rao.

FIRM SEEDS IN THE FINGER MILLET (*ELEUCINE CORACANA*, G.)

There is very little published data concerning dormancy in finger millet (ragi). The present work deals with the dormancy in ragi and the methods of overcoming the same.

A sample of 'Purna ragi' was subjected to standard germination test as per *Seed Testing Manual* (1969). Due to the presence of large number of fresh ungerminated seeds, dormancy was suspected to prevail in the seeds. The fresh ungerminated seeds were kept in the germination paper with regular supply of adequate moisture upto 45 days and tested for viability by pricking the seeds with a fine needle at an interval of one week as tried by Delouche (1964) on rice. Suspecting the prevalence of dormancy in the seeds, fresh samples were drawn from the original lot and tested for germination after giving the treatments as in Table I.

Results and Discussion

The germination percentages obtained after the end of test are as given in Table I.

The statistical analysis showed that the results are highly significant. From the data (Table. I) it is evident that germination of ragi seeds was omproved by various seed treatments. Methods like treatment with 0·20% solution of potassium nitrate and soaking were found more effective than scarification. It is probable that efficient scarification may bring up the level of germination to that of other methods. Delouche (1966) while working with graminae seeds reported that impermeability of the pericarp-seed coat complex to oxygen (but not to water) was the main cause for the dormancy which could be overcome by rupturing the pericarp-seed coat complex mechanically. In the present investigation the treatments have helped in softening or by mechanical breaking the seed coat complex, which, probably acted as a physical barrier for the entry of oxygen into the seeds. The ungerminated seeds when pricked with fine needle germinated well. Such results were also obtained by Delouche *et al.* (1964) on rice, Bass (1955) on wheatgrass seeds, Laude (1949) on oatgrass and Wayne *et al.* (1962) on sorghum. Among the methods used for breaking the dormancy, scarification appears to be fairly simple. The other methods are also quite efficient.

Table I

Showing germination percentages

Treatments	RI	RII	RIII	RIV	Total	Mean
1. 0·2% KNO_3	95	95	97	94	381	95
2. Soaking overnight	86	88	90	89	353	88
3. Soaking for 3 days	92	89	92	90	363	91
4. Scarification	85	82	80	84	331	83
5. Sand as substrata	38	40	40	35	153	30
6. Control (paper)	25	28	29	26	108	27

C.D. = at 1% level 3·9157. S. Em. = 1·879.

Agricultural Department (Seed Testing), Hebbal, Bangalore, *October* 6, 1975. — G. N. Kulkarni. V. Basavaraju.