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# Physiologic Specialisation in *Pyricularia oryzae* Cav. in India during 1976-78

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One hundred and thirty one cultures of *Pyricularia oryzae* Cav. from rice (*Oryza sativa* L.) obtained from 15 states of India during 1976–78 were found to yield the pathogenicity-pattern of the physiologic race 0–17 (Veer)=IC. 17 (L & O). The cultures yielded only one pathogenicity-pattern on a new set of differentials designated as *Pyricularia oryzae* differentials, which has been proposed by the authors.

**Key Words:** **Physiologic specialization,** *Pyricularia oryzae*

## Introduction

Latterell et al. (1960) reported the existence of physiologic races of *Pyricularia oryzae* Cav. in India utilising United States blast differentials. Padmanabhan (1965) reported the existence of different physiologic races of the pathogen in different parts of India utilising the same set of differentials. Padmanabhan et al. (1970), Veeraraghavan and Premalatha Dath (1975, 1976), Venkata Rao and Appa Rao (1976) and Premalatha Dath and Veeraraghavan (1977) have reported the occurrence of physiologic races of *P. oryzae* utilising international blast differentials (Atkins et al. 1967). The present communication seeks to present the extent of specialisation in the pathogenicity of *Pyricularia oryzae* prevalent in India during 1976–78 utilising a new set of differential varieties along with the international blast differentials.

The cultures of *P. oryzae* which were screened in this study were isolated from blast specimens collected/received during 1976–'78 from Kerala, Tamilnadu, Karnataka, Andhra Pradesh, Orissa, West Bengal, Assam, Manipur Tripura, Uttar Pradesh, Sikkim, Himachal Pradesh, Jammu and Kashmir, Gujarat and Maharashtra. One hundred and thirty one isolates were tested for their pathogenicity on the plants of the international blast differentials viz., Raminad str. 3(P.I.231128), Zenith (C.I. 7787), N.P. 125 (P.I. 201902), Usen (P.I. 280683), Dular (P.I. 180061), Kanto-51 (P.I. 280678), Shia-tiao-tsao(S) (C.I. 8970-S) and Caloro (C.I. 1561-1) along with Te-tep, Tadukan, Carreon and Co. 13 so as to obtain another set of differentials viz., Te-tep, Tadukan, Zenith, Carreon, Dular, N.P. 125, C.I. 8970(S), Co. 13 herein referred to

as *Pyricularia oryzae* differentials, since the need for a new set of differentials was stressed by Padmanabhan et al. (1970). Veeraraghavan and Premalatha Dath (1975) had emphasized the necessity for replacement of the variety, Usen. Veeraraghavan (1975) described Caloro as a narrow-lesion variety. The score chart of Padmanabhan et al. (1967) is suitable for scoring broad lesion type varieties of rice. Raminad str. 3 being a late maturing variety does not set seed at different lattitudes and altitudes. The seeds of the international blast differentials were obtained from the United States Department of Agriculture, U.S.A. while the seeds of the rice varieties Te-tep (J.Ac.-150009), Tadukan (J. AC-140076) members of the Japanese blast differentials (Goto et al. 1964) were obtained from the National Institute of Agricultural Sciences, Japan. The seeds of Carreon (CRRI- AC. 3809) resistant to *P. oryzae* (Veeraraghavan 1967) and Co. 13 (CRRI- AC. 936) susceptible to *P. oryzae* (Padmanabhan et al. 1970) were obtained from the Genetic Stock of the Central Rice Research Institute, Cuttack. The method of identification of physiologic races of the pathogen was essentially the same as that of Padmanabhan et al. (1967). Four week old seedlings were raised in flats filled with soil enriched with phosphatic and nitrogenous fertilisers. The density of conidia in the conidial suspension was maintained at $2 \times 10^{-4}$ per ml. The inoculum was sprayed on the healthy seedlings of the international blast differentials and Te-tep, Tadukan, Carreon and Co. 13. Un-inoculated check plants were maintained to detect natural infection. Infection was scored ten days after inoculation of the plants. Absence of spots, gamma flecks, minute specks showing no differentiation into zones were taken as resistant reaction while circular lesions with ashy grey centre and dark-purplish brown margin, broadly spindle-shaped lesions and large distinct spindle-shaped lesions with central ashy zone and marginal zones were taken as susceptible reaction.

All the isolates of *P. oryzae* screened in this study exhibited one pathogenicity-pattern on the plants of the international blast differentials which is the same as that of the physiologic race IC. 17 (Ling & Ou 1969) =0.17 (Veeraraghavan 1975) table 1. The isolates of the pathogen yielded one pathogenicity-pattern on *P. oryzae* differentials as presented in table 2. The reaction of *P. oryzae* differentials to *P. oryzae*, race 0.17 (Veer) =IC. 17 (L & O) is presented in table 3.

**Table 1** *Reaction of International Blast differentials to the cultures of Pyricularia oryzae*

| P.I. 231128 | C.I. 7787 | P.I. 201902 | P.I. 280683 | P.I. 180061 | P.I. 280678 | C.I. 8970(S) | C.I. 1561-1 |
|---|---|---|---|---|---|---|---|
| R | R | S | R | S | S | S | S |

R=resistance S=susceptibility

**Table 2** *Reaction of Pyricularia oryzae differentials to the cultures of Pyricularia oryzae*

| Te-tep | Tadukan | Zenith | Carreon | Dular | N.P. 125 | C. 18970(S) | Co. 13 |
|---|---|---|---|---|---|---|---|
| R | R | R | R | S | S | S | S |

**Table 3** *Reaction of Pyricularia oryzae differentials to the culture of P. oryzae, race 0–17 (Veer) = IC. 17 (L & 0)*

| P.I. 280682 | P.I. 380001 | C.I. 7787 | P.I. 372279 | P.I. 180061 | P.I. 201902 | C.I. 8970(S) | P.I. 403392 |
|---|---|---|---|---|---|---|---|
| R | R | R | R | S | S | S | S |

PI/CI = code of U.S.D.A., USA

Since both the sets of differentials have yielded one pathogenicity-pattern only to the cultures of the pathogen on each of the two sets it is now open to other investigators to ascertain the suitability of the new set of differentials presented herein for the purpose of identification of physiologic races in cultures of *P. oryzae* available with them. The results reveal that the race I.C. 17 (L & O) = 0.17 (Veer) possesses a high degree of stability.

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