EXTENT OF NATURAL CROSSING IN RICE

H. M. Beachell, C. Roy Adair, N. E. Jodon, L. L. Davis, and Jenkin W. Jones

The inflorescence of rice is a terminal panicle of perfect flowers. Each floret or spikelet has a branched stigma, six stamens, and two well-developed lodicules. In blooming, the flowers open rapidly and usually the anthers dehisce just before or at the time the flower opens. The flowers may remain open from 1 to 3 hours. Cultivated rice normally is self-pollinated but some natural crossing occurs. A knowledge of the extent of natural crossing in rice is of importance to the breeder, enabling him to grow material in such a manner as to eliminate crossing as much as possible and also in planning effective roguing. Available evidence indicates that natural crossing has been, and probably still is, an important factor in the origin of rice varieties. This paper presents data on the extent of natural crossing in rice varieties grown under various climatic conditions.

REVIEW OF LITERATURE

In India, Hector (2) estimated 4% of natural crossing in rice in Lower Bengal; McKerral (7) 1.1% in Burma; Roy (12) from 0.1 to 2.9% in cultivated rice and 7.9% in wild rice in the Central Provinces; Parnell, et al. (8) from 2 to 4% in Madras. Ramiah (10) stated that, "in hybrid progenies of wild rice, the amount of natural crossing may go up to even 15 to 20% at Coimbatore, Madras"; and Kadam and Patil (5) reported from none to 4.31% with an average of 0.52% crossing in Bombay.

In Japan (Hokkaido), Akemine and Nakamura (1) found an average of 0.9% of natural crossing in 19 varieties grown close together during a 5-year period. The average maximum was 2.32% and the average minimum 0.21%. They also reported that Shimoyama (13) in Japan found 0.084% of natural crossing, and Suzuta and Tomura (14) in Formosa from 0.9 to 1.45%.

Ikeno (4) found no crossing between alternate rows of common and glutinous rice, but he reported that van der Stok in Java found from 1.3 to 4% of natural crossing, and as much as 23% in some cases. Heide (3) in Java placed varieties with respect to pollination in three groups, viz., Open, variable, and closed.

Rodrigo (11) in the Philippine Islands estimated 2.4% of natural crossing in panicles bagged together. In Ceylon, Lord (6) found from 0.34 to 0.67%, and Poggendorff (9) in Australia reported an average of 0.44% of natural crossing.

This brief review indicates that the extent of natural crossing in rice probably depends both on the varieties observed and the climatic conditions under which they were grown.

Cooperative investigations conducted by the Division of Cereal Crops and Diseases, Bureau of Plant Industry, U. S. Dept. of Agriculture, and the Arkansas, Louisiana, Texas, and California agricultural experiment stations. Received for publication May 17, 1938.

2Assistant agronomists and senior agronomist, respectively.

3Number in parentheses refers to "Literature Cited," p. 752.

4743 Published September, 1938