GERMINATION OF RICE SEED AS AFFECTED BY TEMPERATURE, FUNGICIDES, AND AGE

JENKIN W. JONES

INTRODUCTION

The most troublesome weed pest in the California rice fields is water grass (Echinochloa crus-galli) and its varieties, which are widely distributed throughout the rice-growing area. These grasses grow well in water and their seed will germinate under water. However, while the rice seedlings stretch to the surface of the water, the grass seedlings are suffocated to a large extent. Taking advantage of this fact, rice growers are now using water to control or check the growth of water grass. The rice is sown broadcast from April 15 to May 20, and the fields are then continuously submerged with water until drained for harvest. At seeding time the temperature of the atmosphere, the soil, and the water used for irrigation usually is too low for maximum germination and rapid growth. Later in the season the temperature of the water and atmosphere may be too high for best results, and some growers have reported that the rice seedlings were “scalded” when germinated under shallow water.

In a study of the effects of temperature and moisture upon the germination of rice seed, Akemine (1, 2) found (a) that the maximum, optimum, and minimum temperatures for the germination of rice are 104°, 86° to 95°, and 50° to 55.4° F., respectively; (b) that rice germinates equally well in water and in air, whether the grains are hulled or dehulled; (c) that the plumule appears sooner if the seed is placed in the air under favorable moisture conditions than if placed in water, and the radicle and crown roots also develop considerably sooner in the air than in water; (d) that after the plumule appears it grows much more rapidly in water than in air, the opposite being true of the radicle and crown roots; (e) that the frequent renewal of water had no sensible effect upon the development of the plumule, radicle, and roots, the same holding true for differences in

1Contribution from the Office of Cereal Investigations, Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C. Received for publication March 8, 1926. The author wishes to express his appreciation of the kindness of Prof. W. W. Mackie, University of California, Berkeley, Calif., in supplying equipment, and for suggestions.

2Associate Agronomist and Superintendent of the Biggs Rice Field Station, Biggs, Calif.

3Reference by number is to "Literature Cited," p. 591.

4Data given by Akemine in degrees Centigrade, but for comparison with other data given in this paper they are converted to Fahrenheit.