EFFECT OF DEPTH OF SUBMERGENCE ON THE CONTROL
OF BARNYARD GRASS AND THE YIELD OF RICE GROWN
IN POTS

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From 1912 to 1920 the rice crop of California was sown in the same manner as any other small grain and then irrigated and drained every 10 days or 2 weeks. About 30 days after the rice seedlings had emerged the land was irrigated and kept submerged continuously until drained for harvest. This method of irrigation was favorable for the growth, reproduction, and spread of the several varieties of barnyard grass (Echinochloa crus-galli). Large areas of the most productive rice lands became so foul with barnyard grasses that it was difficult to produce satisfactory rice crops.

Observations and trials, at first by rice growers and later by others, indicated that seeds of the common barnyard grasses do not germinate under water so well as do rice seeds, nor do the grass seedlings emerge through from 4 to 8 inches of water as well as do rice seedlings. As a result of these observations and trials a continuous submergence method of irrigation was adopted by which, under field conditions, common barnyard grasses are largely controlled.

Instead of the former practice with its alternate irrigating and draining, rice is now sown broadcast in the water or on a well-prepared seedbed, which is immediately submerged. The water is then held at an average depth of about 6 inches until the crop is ready to be drained for harvest. The rice germinates in and the seedlings emerge through the water. When rice is sown on a rough seedbed and is then submerged some of the seed is covered with a layer of soil from slacked clods. Such seed seldom germinates normally and often fails to produce seedlings that emerge to the surface of the water. To avoid this, most of the rice land is now submerged and the clods are slacked before the rice is sown.

In using the continuous submergence method the depth of submergence must be considered, both in its effect on weed control and on the yield of rice.

Robertson (7), Adams (1), Jones (5, 6), and Dunshee (4), working in California, report that the highest average yields of rice were obtained by continuous submergence of the land to a depth of 6 inches. At the Biggs Rice Field Station, Biggs, Calif., during an 8-year period, the average yield of rice on plats that were submerged 2, 4, 6, and 8 inches deep was 3,769, 3,839, 3,925, and 3,834 pounds per acre, respectively.

In Louisiana, Chambliss and Jenkins (3) found that the highest average yield was obtained from plats continuously submerged 8