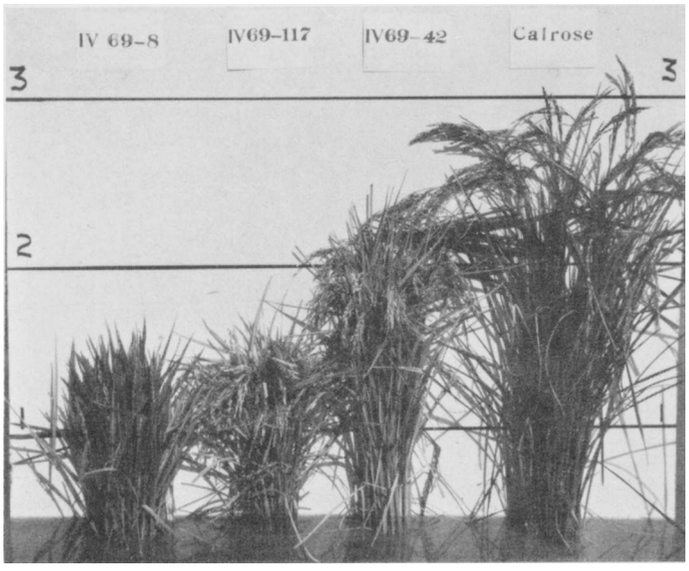

Selected rice plants from the introduction nursery, grown near El Centro, California, showing Calrose and introduced plants with short and intermediate heights.

RICE IN

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CALIFORNIA RICE GROWERS adopted an accelerated research program in 1969, based on recommendations of a rice industry committee. The basic objectives of the industry-sponsored program are to provide improved varieties, new production technology, and marketing information which will enable rice growers to remain competitive in domestic and world markets. The research program involves utilization of the expanded research facilities at the industry-owned and operated Rice Experiment Station at Biggs, plus the recently developed supplementary rice research resources of the University of California at Davis, and at the Imperial Valley Field Station, El Centro. Research is already underway toward the development of better California varieties with fewer crop residue management problems.

Crash program

Crash programs to breed improved rice varieties to meet local needs at several locations throughout the world are also providing sources of germplasm to speed the California variety development work. Strict Federal and State laws on importation of rice seed offer assurance against accidentally introducing new diseases and insect pests of rice. Rice seed imported into the United States is under permit from the Plant Quarantine Division of the U. S. Department of Agriculture. The seed is fumigated with methyl bromide and treated in hot water with a fungicide and then planted in a greenhouse at the Plant Industry Station, Beltsville, Maryland. This system takes about 12 months from the time the seed is imported until it can be sown at a rice experiment station. However, special authorization has been obtained from Federal and State quarantine officials to plant seed imported from foreign countries at the Imperial Valley Field Station near El Centro.

This cooperative arrangement between U.S.D.A. and the University of California has allowed importation and use of overseas rice germplasm in a significantly shorter time. The subtropical environmental conditions of the Imperial Valley also allow a long growing season. The isolation (about 400 miles from the nearest commercial rice field) also is an advantage. Under the new plan, the rice lines are received and fumigated at the Washington, D.C., Plant Quarantine Station, transferred to Beltsville where they are treated in hot water and with a fungicide, then promptly shipped to the Imperial Valley Field Station and grown under quarantined field conditions. This procedure has safely increased the supply of seed available in quantity for California's genetic and plant breeding efforts.

During the 1969 introduction program the key objectives were to obtain rice varieties and selections with short stature and lodging resistance. Large populations of material of this type were being grown at the International Rice Research Institute (IRRI), Los Banos, Philippines. IRRI is an international agricultural research station working on rice, funded and staffed by the Rockefeller and Ford Foundations. Rice germplasm for use in the California rice breeding programs, was selected which included lines with japonica background—short in stature, non-lodging, and early maturing. Good general appearance and panicle characteristics were also used as selection criteria.

Seed of the selected lines was airshipped to the U. S. Department of Agriculture, Agricultural Research Service, Plant Quarantine Division, Washington, D.C. The seed was treated in Washington and Beltsville and sent to El Centro, California, where it was planted in isolation during the summer of 1969. Periodic inspections of the growing plant material were made by the Bureau of Plant Quarantine, California State Department of Agriculture, for any signs of diseases or insects that might have survived the treatments given the seed before releasing it for planting elsewhere.

Test procedure

The rice seed was planted 6 inches apart in 3-row, 8-foot test plots on June 6, 1969, with every twenty-fifth row a check plot of a California commercial variety. The nursery was sprinkler-irrigated for 1 month before gradually flooding to a depth of about 6 inches. Two pesticide treatments were applied to kill flea beetles, and one herbicide treatment was made to control watergrass.

Emergence was good although there

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TRODUCTIONS

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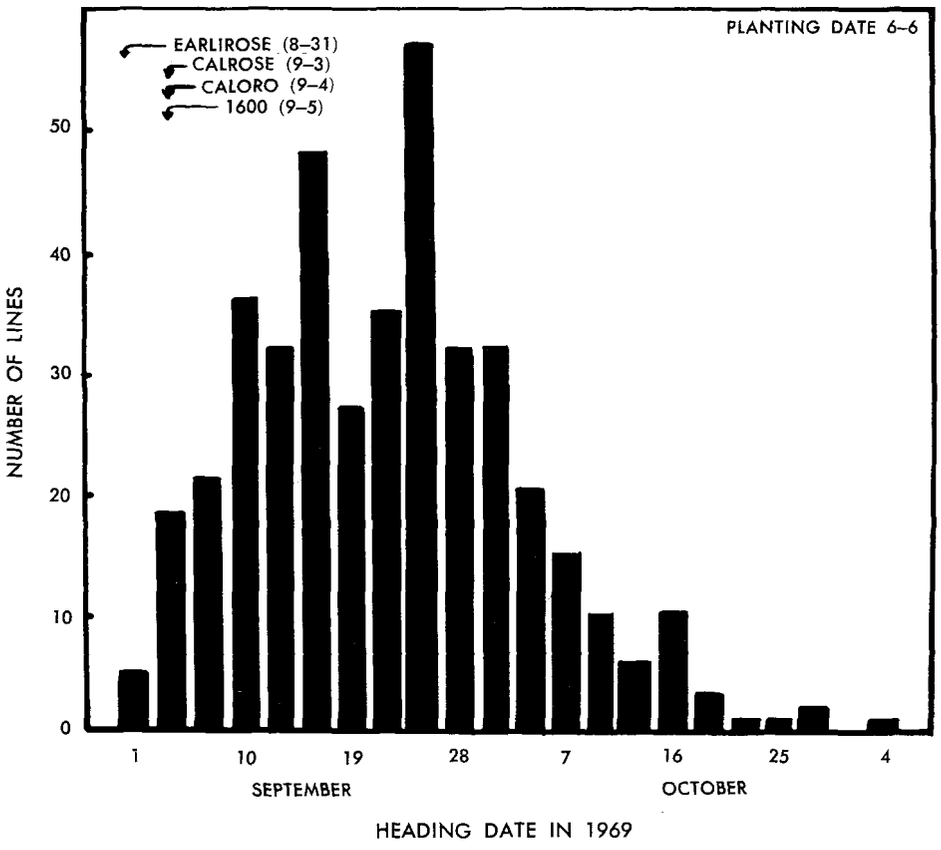
PEDIGREES, NUMBER OF LINES AND NUMBER OF SELECTIONS MADE IN RICE LINES OBTAINED FROM IRRI, PHILIPPINES AND GROWN AT EL CENTRO, CALIFORNIA DURING THE SUMMER OF 1969

Number lines in cross	Number plant selections made in cross	Average number selections per line	Cross
4	16	4.0	(IR8 × Palkweng) × Suwon 118
6	20	3.3	(Jinheung × IR262-43-8-11) × Calady 40
6	18	3.0	(Jinheung × IR262-43-8-11) × Senbon Asahi
6	24	4.0	Jinhung^2 × IR262-43-8-11
74	182	2.5	Jinhung × IR262-43-8-11^2
17	29	1.7	(Palkweng × IR8) × [IR8^2 × (Yukara × TNI)]
73	108	1.5	(Jinheung × IR62-43-8-11) × [IR8^3 × (Yukara × TNI)]
36	49	1.1	IR8 × (Yukara × TNI)
79	54	0.7	IR8^2 × (Yukara × TNI)
76	92	1.2	IR8^3 × (Yukara × TNI)
10	8	0.8	Yukara × TNI
27	36	1.3	Miscellaneous crosses
414	636	1.5	

No plants survived in 14 lines.

GRAPH 1. FREQUENCY DISTRIBUTION FOR HEADING DATE OF RICE LINES OBTAINED FROM IRRI, LOS BANOS, PHILIPPINES, AND GROWN NEAR EL CENTRO DURING SUMMER 1969



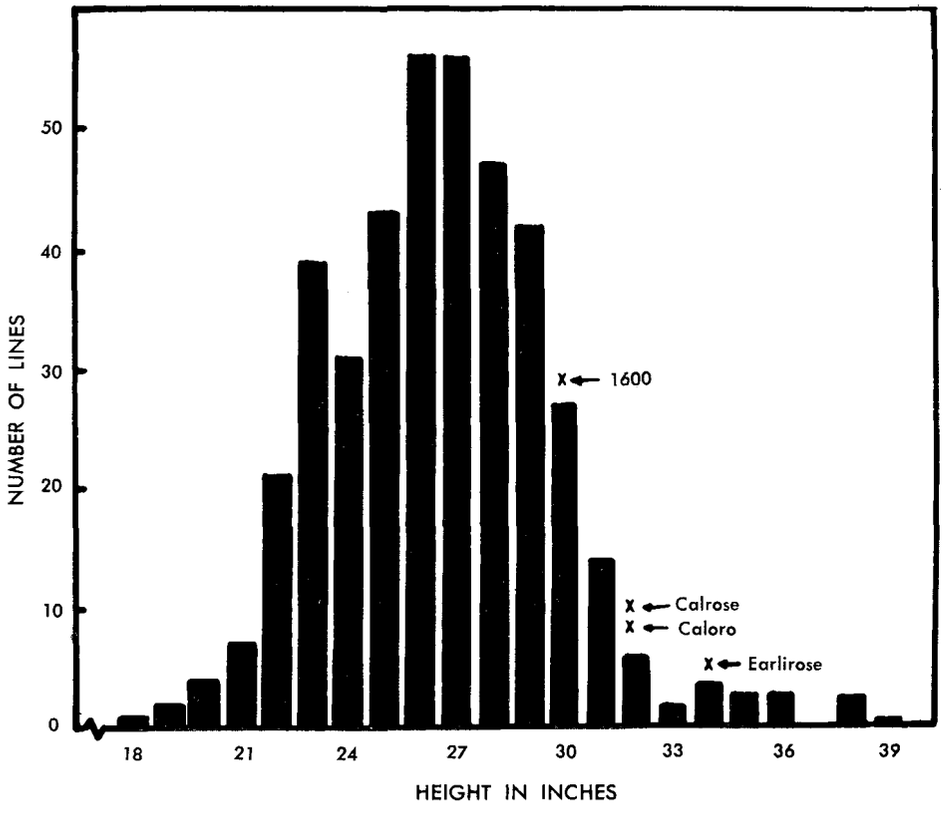
appeared to be dormant seeds in some lines. About 50 per cent or more of the planted seed produced mature plants. Of the 428 lines planted, only 14 lines were complete failures. A sufficient number of plants remained in all the other plots to obtain good notes and selections. The wide spacing allowed better observation of individual plant characteristics and seemed to make selection more reliable. On July 11, 205 rows were replanted to be certain of adequate observations and seed supply. Rows with poor survival in the first planting also had poor survival in the second planting. Survival seemed poorest in the late maturing lines.

Heading dates for the introduced lines were the same or up to 34 days later than the California check varieties (graph 1). Most of the lines seemed too late for use in California, however, improvements of about 5 days appeared possible by selecting within lines.

Height of the introductions was between 18 and 39 inches with an average of 26.6 inches (graph 2). Average height of the California varieties was 31.2 inches. Grain production was good on some of these short lines but poor on others. Most of the introductions were medium- to long-grain types with little within-line variability. Tillering was generally greater in the introductions.

Stem angle at flowering data resembled a normal curve with the check varieties about equal to the average of the experimental populations. It appeared that varieties with stem angles 5 to 10 degrees

GRAPH 2. FREQUENCY DISTRIBUTION OF PLANT HEIGHT FOR RICE LINES OBTAINED FROM IRRI, LOS BANOS, PHILIPPINES, AND GROWN NEAR EL CENTRO DURING SUMMER 1969



from vertical (22 per cent) may have lodging resistance but judging from subsequent behavior, many others also resisted lodging. A few appeared to have weak straw. More work is needed on the importance of this character under the conditions of the test.

Most introduced lines had longer panicles than the California varieties. However, the effect of environment on this character is unknown.

Seventy-four lines which were relatively homozygous and appeared to warrant testing on a replicated basis were selected and then all remaining plants within each line were harvested in bulk. Individual plant selections were also made within other lines resulting in 636 plant selections. Lines that were late or that had undesirable seed or plant characteristics, such as very small seeds or definite lodging potential, were discarded. Some lines (see table) appeared to have more potential than others.

Characteristics stressed in making plant selections were maturity, short stature, upright plant type, generally vigorous appearance, and grain size. Short stature, lodging resistance, and perhaps long-grain type appeared to be the most important characters obtained from this material. It seems unlikely that varieties acceptable to California growers could be selected from this group of introduced material. However, the greatest value will come from use as parents in crosses to short, weak-strawed but high-quality Japanese varieties or early, tall, weak-strawed but high-yielding California varieties having commercially acceptable grain quality. One cross may be sufficient. However, backcrossing to the present high-yielding California varieties may prove to be a rapid means of introducing this germplasm into an acceptable variety adapted to California.

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DEBRIS ACCUM in Pond Pine

JAMES K. AGEE
HAROLD H. BISWELL

These results indicate that thinning, with subsequent slash removal, will diminish the rate of debris accumulation for at least 20 years—facilitating maintenance of low fire hazards, and easing the problems of multiple-use forest management.

Prescribed burning has been a valuable technique to help maintain low wildfire hazard in California. In this technique, fire is used under specified conditions to obtain an initial burn of the desired intensity. After the first hazard reduction is completed, periodic prescribed fires maintain the fire hazard at a low level. The time interval necessary between these maintenance fires involves the rate of fuel increase, including growth of understory trees and shrubs, as well as debris. This report shows the rate of increase of forest debris in a ponderosa pine forest over an 18 year period.