

**M-211 RICE:
DESCRIPTION
AND
MANAGEMENT
GUIDELINES**



2022

**CCRRF &
University of California
Cooperative Extension
University of California, Davis
Department of Plant Sciences**

M-211

Introduction:

M-211 is a high yielding, early maturing, semi-dwarf, smooth-hulled, premium Calrose medium grain rice cultivar. It was developed by the California Cooperative Rice Research Foundation, Inc. (CCRRF) at the Rice Experiment Station (RES), Biggs, CA and released to growers in April 2020. M-211 is protected under the US Plant Protection Act, Title 5 (to only be sold as a class of certified seed) as well as a US Plant Utility Patent. M-211 is available exclusively to California rice growers, export of seed is prohibited, and use in genetic or breeding research requires a Material Transfer Agreement.

Pedigree and Breeding:

Its pedigree is M-206/4/M-203/K397//M-205/3/87P1309//M-401/M-203. M-206 is a high yielding, glabrous, early maturing Calrose variety released by RES in 2003 and widely adapted in rice growing areas in California. K397 or Kirara 397 is a premium quality, short grain, semi-dwarf rice variety developed in Hokkaido in 1980. It is cold tolerant during booting stage and has good tolerance to leaf and panicle blast. M-205 is a glabrous high yielding, early maturing Calrose-type medium grain variety released by RES in 2005 and adapted in warmer areas. M-401, which is a mutant of Terso, is a late maturing medium grain with premium quality released in 1981. M-203 is photoperiod insensitive and an early maturing semi-dwarf medium grain mutant of M-401 developed and released by RES in 1988. M-206, M-205, and M-401 are still being grown in commercial production in California. M-211 was tested in the University of California Cooperative Extension (UCCE)

statewide tests under the experimental designation 12Y2175.

Table 1. Agronomic performance in UCCE Statewide Yield Tests 2017-2021.

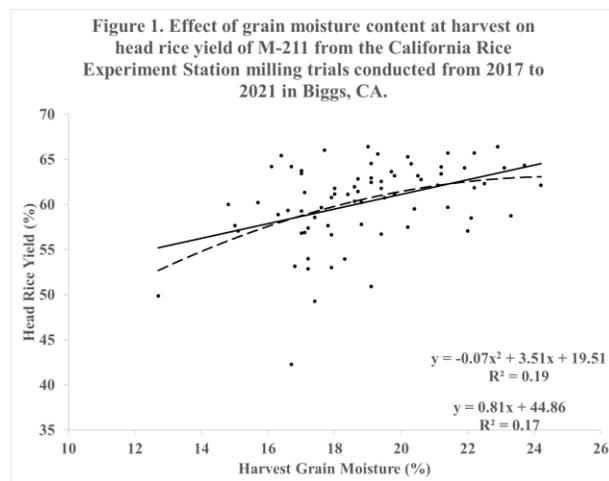
| Variety | Grain Yield (lb/a) | Seedling Vigor (1-5) | Days to 50% Heading | Plant Height (cm) | Lodging (%) |
|-------------|--------------------|----------------------|---------------------|-------------------|-------------|
| Zone 1 (NW) | | | | | |
| M-105 | 9121 | 4.7 | 86 | 101 | 63 |
| M-206 | 8929 | 4.8 | 87 | 101 | 59 |
| M-209 | 9089 | 4.7 | 94 | 101 | 43 |
| M-210 | 9067 | 4.7 | 87 | 99 | 39 |
| M-211 | 9349 | 4.7 | 94 | 103 | 57 |
| Zone 2 (NE) | | | | | |
| M-105 | 9139 | 4.8 | 79 | 96 | 33 |
| M-206 | 9199 | 4.8 | 80 | 99 | 39 |
| M-209 | 9598 | 4.8 | 86 | 99 | 23 |
| M-210 | 9215 | 4.8 | 80 | 99 | 37 |
| M-211 | 10087 | 4.8 | 87 | 101 | 27 |
| Zone 3 (S) | | | | | |
| M-105 | 9013 | 4.7 | 87 | 94 | 32 |
| M-206 | 8868 | 4.8 | 89 | 96 | 29 |
| M-209 | 8590 | 4.7 | 94 | 93 | 24 |
| M-210 | 8806 | 4.8 | 88 | 95 | 26 |
| M-211 | 8874 | 4.8 | 95 | 96 | 25 |
| Overall | | | | | |
| M-105 | 9091 | 4.8 | 84 | 97 | 43 |
| M-206 | 8999 | 4.8 | 85 | 99 | 42 |
| M-209 | 9092 | 4.8 | 91 | 97 | 30 |
| M-210 | 9030 | 4.8 | 85 | 98 | 34 |
| M-211 | 9437 | 4.8 | 92 | 100 | 36 |

Agronomic Characteristics:

Table 1 contains a summary of the agronomic data collected in the UCCE Statewide Yield Tests from 2017 to 2021. Seedling vigor scores were identical to M-105, M-206, M-209 and M-210. M-211 reaches 50% heading 8-days later than M-105, 7-days later than M-210 and M-206, 1-day later than M-209. Although M-211 is 1- to 3-cm taller than M-206 and M-105 on average, it tends to have a much thicker stalk and is more resistant to lodging. M-211 has

shown a consistent yield advantage of approximately 4% over M-105, M-206, M-209, and M-210.

Approximately 2% cold-induced blanking was observed from M-211 at the San Joaquin research location over a three-year evaluation. M-211 is moderately susceptible to both stem rot and blast diseases. In comparison to M-209 and M-206, M-211 is less susceptible to stem rot. Growers are recommended to bleach-treat seed for *Bakanae*. No marked difference in sensitivity to standard rice herbicides from the parent varieties has been observed, however commercial experience is limited.



Milling and Quality:

Milled M-211 rice grains are heavier (1000-grain weight=23.64 g) and slightly longer (length=5.98 mm) compared to M-206 (5.84 mm), but slightly shorter than M-209 (6.07 mm). The grain width of M-211 (2.92 mm) is slightly wider than both M-209 (2.73 mm) and M-206 (2.79 mm). However, the length/width ratio of M-211 is 2.05 compared to 2.22 of M-209, and 2.10 L/W ratio of M-206. While

slightly bigger sized-kernels are generally considered a plus as opposed to smaller grains, the M-211 has grains that perfectly fit for mixing or co-mingling of Calrose-type rice.

Head rice yield of M-211 when harvested at 18-22% was 61/67 (head/total) compared to 62/68 of M-209 and 64/69 of M-206 across variety trial evaluations. The effect of grain moisture content on head rice yield of M-211 over a 5-year harvest moisture trial at the RES is presented in Figure 1. Unlike other RES Calrose varieties which are stable across optimum harvest moisture contents between 22 to 18%, M-211 tends to be less stable.

Area of Adaptation:

M-211 is better suited in favorable, high-yielding environments with a high-input production system and adapted to areas where M-209 or M-205 were grown. Results from the San Joaquin location and cold greenhouse tests indicate that M-211 may suffer more from cold-induced blanking if grown in cooler rice areas.

Management Guidelines:

The following guidelines are based on research, observation and experience gained in developing M-211. These suggested cultural practices are intended to assist in the production of optimum yields and quality.

- Optimum harvest moisture of M-211 is between 22 and 20%. Because head rice yields can decrease quickly at lower harvest moisture contents. If choosing to harvest M-211 or other Calrose variety fields, M-211 should always be harvested first since other varieties have more stable milling yields at lower harvest

moistures. Later draining of M-211 fields may be beneficial.

- Fertilizer rates and other management practices should be similar to those for other medium grain varieties in your production area. Excessive N will increase lodging, blanking, and disease. It should be noted that M-211 is a later maturing variety and excessive N rates can further delay maturity.
- Preferred seeding dates are the same as for other California varieties and M-211 is not recommended for late plantings because of the risk of cool temperature induced sterility (blanking). Standard seeding rates of 130 to 150 lb/acre are recommended, although good yields at lower seeding rates were reported when good stands were achieved. Excessive seeding rates reduce yield potential and increase susceptibility to disease.
- Water depth should be increased to about 8 inches after panicle initiation (50 to 55 days after planting) to protect developing panicles from low temperature exposure during occasional cool nights.

Cover graphic art by Linda Seaman.

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