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Effect of Date of Seeding on the
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In Cooperation with

DIVISION OF CEREAL CROPS AND DISEASES

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

Effect of Date of Seeding on the Length of the Growing Period of Rice¹

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INTRODUCTION

After growing a large number of rice varieties for several years at the Rice Experiment Station, Crowley, it became evident that information was needed relative to the effect of the time of seeding on the length of the growing period.

The importance of such information was emphasized when the time came to release to farmers rices that gave evidence of being valuable for commercial purposes. On the station the majority of the rice varieties were sown about the same date each year, and this date averaged somewhat later than that upon which the bulk of the commercial crop was sown.

Farmers had a general idea as to the growing periods of the two or three rice varieties they were growing, when seeded at extremely early or extremely late dates. Many farmers had the impression, however, that harvest time would occur about the same time each year even if there was a difference of as much as several weeks in the time of seeding. This impression, in former years, was due to the fact that seeding was done as soon as the seedbed could be prepared with the then prevailing equipment and this was usually about the same time each year. The same three varieties were grown for many years. Two of these varieties, Carolina Gold and Honduras, have a short growing period and the other, Wataribune, has a medium growing period with the characteristic of shortening its growing period when sown late in the season.

Some rice varieties released by the station have failed to produce normal crops when grown by farmers for the reason that they have long growing periods of practically fixed duration and if seeded too late will not mature fully before frost. Other varieties having a medium growing period when sown in sections of Louisiana in which early seeding is the common practice, in contrast to much later seeding on the station, were ready for harvest some time before this operation was anticipated.

OBJECT OF THIS EXPERIMENT

The necessity for knowing the length of the growing period of rices that were to be released to farmers was realized as far back as 1917, and at that time an experiment was started, first with one variety, primarily for the purpose of determining the best seeding date. Later, another variety was added.² In order to get additional information on the growing periods of several varieties a pot experiment was started in 1929.

¹ Cooperative investigations between the Division of Cereal Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture, and the Louisiana Agricultural Experiment Station.

² Some of the results of this experiment were published in U. S. D. A. Department Bulletin No. 1365, and in the Annual Report of the Agricultural Experiment Stations of Louisiana State University, 1926.

TABLE 1

NUMBER OF DAYS FROM EMERGENCE OF PLANTS TO EMERGENCE OF THE FIRST PANICLE, FOR 12 RICE VARIETIES SEEDED ON DIFFERENT DATES, IN POTS, FOR THE YEARS 1929-1933 INCLUSIVE, AND 5-YEAR AVERAGE; AT THE RICE EXPERIMENT STATION, CROWLEY, LOUISIANA

| Variety and Date Seeded | Days from Emergence to First Panicle | | | | | | 5-Year Average | Variety and Date Seeded | Days from Emergence to First Panicle | | | | | | 5-Year Average | |
|-------------------------|--------------------------------------|------|-------|------|------|------|----------------|-------------------------|--------------------------------------|------|-------|------|-------|------|----------------|--|
| | Years | | | | | | | | Years | | | | | | | |
| | 1929 | 1930 | 1931 | 1932 | 1933 | | | | 1929 | 1930 | 1931 | 1932 | 1933 | | | |
| | Days | Days | Days | Days | Days | Days | | Days | Days | Days | Days | Days | Days | Days | | |
| <i>Early Prolific</i> | | | | | | | | | | | | | | | | |
| March 1 | 83 | 88 | 91 | 94 | 84 | 88 | | <i>Vintula</i> | 99 | 100 | 99 | 97 | 91 | 97 | | |
| March 15 | 83 | 90 | 94 | 101 | 89 | 91 | | March 15 | 94 | 95 | 97 | 102 | 94 | 96 | | |
| April 1 | 89 | 94 | 83 | 87 | 91 | 89 | | April 1 | 89 | 97 | 91 | 90 | 92 | 92 | | |
| April 15 | 86 | 90 | 80 | 86 | 86 | 86 | | April 15 | 83 | 89 | 87 | 91 | 90 | 88 | | |
| May 1 | 77 | 80 | 79 | 73 | 83 | 78 | | May 1 | 74 | 85 | 83 | 76 | 85 | 81 | | |
| May 15 | 79 | 80 | 76 | 86 | 76 | 79 | | May 15 | 79 | 80 | 74 | 80 | 77 | 78 | | |
| June 1 | 74 | 72 | 77 | 72 | 77 | 74 | | June 1 | 72 | 77 | 77 | 77 | 78 | 76 | | |
| June 15 | 73 | 70 | 68 | 54 | 72 | 67 | | June 15 | 73 | 68 | 71 | 56 | 80 | 70 | | |
| Average | 81 | 83 | 81 | 82 | 82 | 82 | | Average | 83 | 86 | 85 | 84 | 86 | 85 | | |
| <i>Caloro</i> | | | | | | | | <i>Honduras</i> | | | | | | | | |
| March 1 | | | | | 82 | 73 | 78* | March 1 | 102 | 94 | 104 | 101 | | 100 | | |
| March 15 | | | | | 94 | 74 | 84* | March 15 | 95 | 100 | 102 | 94 | 96 | 97 | | |
| April 1 | | | | | 90 | 108 | 99 | April 1 | 91 | 100 | | 88 | 98 | 94 | | |
| April 15 | | | | | 96 | 88 | 92 | April 15 | 85 | 96 | 84 | 91 | 95 | 90 | | |
| May 1 | | | | | 79 | 83 | 81 | May 1 | 77 | 85 | 83 | 77 | 85 | 81 | | |
| May 15 | | | | | 77 | 80 | 79 | May 15 | 81 | 82 | 76 | 82 | 81 | 80 | | |
| June 1 | | | | | 74 | 75 | 75 | June 1 | 79 | 77 | 77 | 77 | 81 | 78 | | |
| June 15 | | | | | 47 | 65 | 56 | June 15 | 78 | 74 | 74 | 51 | 72 | 70 | | |
| Average | | | | | 80 | 81 | 81 | Average | 86 | 89 | 86 | 83 | 87 | 86 | | |
| <i>Delitus</i> | | | | | | | | <i>Shoemed</i> | | | | | | | | |
| March 1 | 102 | 113 | 102 | 105 | 99 | 104 | | March 1 | | | | 102 | 101 | 102* | | |
| March 15 | 99 | 109 | 107 | 103 | 103 | 104 | | March 15 | | | | 110 | 105 | 108 | | |
| April 1 | 97 | 101 | 96 | 95 | 101 | 98 | | April 1 | | | | 97 | 98 | 98 | | |
| April 15 | 92 | 96 | 92 | 94 | 95 | 94 | | April 15 | | | | 94 | 99 | 97 | | |
| May 1 | 86 | 87 | 91 | 84 | 91 | 88 | | May 1 | | | | 86 | 85 | 86 | | |
| May 15 | 81 | 87 | 83 | 85 | 89 | 85 | | May 15 | | | | 85 | 84 | 85 | | |
| June 1 | 86 | 83 | 83 | 83 | 86 | 84 | | June 1 | | | | 81 | 81 | 81 | | |
| June 15 | 83 | 77 | 81 | 65 | 80 | 77 | | June 15 | | | | 65 | 74 | 70 | | |
| Average | 91 | 94 | 92 | 89 | 93 | 92 | | Average | | | | 90 | 91 | 91 | | |
| <i>Wataribune</i> | | | | | | | | <i>Acadia</i> | | | | | | | | |
| March 1 | 120 | 115 | 99 | 103 | 103 | 108 | | March 1 | 105 | 96 | 99 | | | 100† | | |
| March 15 | 116 | 101 | 107 | 113 | 101 | 108 | | March 15 | 121 | 105 | 105 | | | 110 | | |
| April 1 | 99 | 97 | | 106 | 108 | 103 | | April 1 | 101 | 108 | 105 | | | 105 | | |
| April 15 | 96 | 101 | 97 | 106 | 101 | 100 | | April 15 | 97 | 103 | 99 | | | 100 | | |
| May 1 | 88 | 92 | 97 | 90 | 96 | 93 | | May 1 | 88 | 93 | 97 | | | 93 | | |
| May 15 | 85 | 87 | 90 | 88 | 88 | 88 | | May 15 | 85 | 85 | 90 | | | 87 | | |
| June 1 | 79 | 77 | 77 | 83 | 78 | 79 | | June 1 | 79 | 78 | 80 | | | 79 | | |
| June 15 | 70 | 67 | 71 | 54 | 72 | 67 | | June 15 | 73 | 68 | 71 | | | 71 | | |
| Average | 94 | 92 | 91 | 93 | 93 | 93 | | Average | 93 | 92 | 93 | | | 93 | | |
| <i>Fortuna</i> | | | | | | | | <i>Blue Rose</i> | | | | | | | | |
| March 1 | 110 | 117 | 118 | 114 | 111 | 114 | | March 1 | 132 | 113 | 130 | 131 | 136 | 128 | | |
| March 15 | 106 | 116 | 119 | 111 | 114 | 113 | | March 15 | 127 | 125 | 132 | 131 | 127 | 128 | | |
| April 1 | 102 | 111 | 106 | 103 | 112 | 107 | | April 1 | 111 | 121 | 129 | 121 | 123 | 121 | | |
| April 15 | 104 | 106 | 111 | 100 | 99 | 104 | | April 15 | 106 | 109 | 113 | 119 | 114 | 112 | | |
| May 1 | 97 | 101 | 99 | 100 | 104 | 100 | | May 1 | 92 | 96 | 109 | 100 | 106 | 101 | | |
| May 15 | 98 | 93 | 92 | 98 | 99 | 96 | | May 15 | 91 | 90 | 92 | 99 | 93 | 93 | | |
| June 1 | 93 | 92 | 93 | 99 | 94 | 94 | | June 1 | 83 | 83 | 86 | 91 | 90 | 87 | | |
| June 15 | 88 | 84 | 88 | 84 | 90 | 87 | | June 15 | 78 | 77 | 78 | 65 | 83 | 76 | | |
| Average | 100 | 103 | 103 | 101 | 103 | 102 | | Average | 103 | 102 | 108 | 107 | 109 | 106 | | |
| <i>Iola</i> | | | | | | | | <i>Rexoro</i> | | | | | | | | |
| March 1 | 132 | 126 | 134 | 126 | 129 | 129 | | March 1 | 129 | 133 | 148 | 138 | 133 | 136 | | |
| March 15 | 127 | 122 | 140 | 129 | 125 | 129 | | March 15 | 139 | 133 | 140 | 138 | 138 | 138 | | |
| April 1 | 122 | 124 | 129 | 120 | 123 | 124 | | April 1 | 130 | 140 | 138 | 130 | 133 | 134 | | |
| April 15 | 117 | 118 | 125 | 115 | 118 | 119 | | April 15 | 128 | 129 | 148 | 124 | 126 | 131 | | |
| May 1 | 113 | 107 | 121 | 106 | 112 | 112 | | May 1 | 112 | 120 | 121 | 112 | 122 | 117 | | |
| May 15 | 110 | 109 | 108 | 107 | 121 | 111 | | May 15 | 114 | 115 | 111 | 115 | 117 | 114 | | |
| June 1 | 101 | 106 | 108 | 106 | 105 | 105 | | June 1 | 103 | 111 | 112 | 113 | 105 | 109 | | |
| June 15 | 105 | 104 | 106 | 88 | 100 | 101 | | June 15 | 103 | 104 | 104 | 100 | 106 | 103 | | |
| Average | 116 | 115 | 121 | 112 | 117 | 116 | | Average | 120 | 123 | 128 | 121 | 123 | 123 | | |

* Two year average.

† Three year average.

METHOD OF EXPERIMENTATION

The varieties were sown in soil in galvanized iron cans 15 inches square. Twelve varieties were seeded every two weeks beginning March 1 and ending June 15 during a period of five years. Records were kept of the date of germination; percentage of stand, based on 100 seeds planted in each can; date of application of irrigation water; and date of emergence of the first panicle.

This paper deals especially with the length of the growing period from the emergence of the plants to the emergence of the first panicle of 12 varieties seeded on different dates. No attempt was made to obtain yields.

RICE VARIETIES USED

The varieties used included old and new commercial rices, varieties recently released by the station, and rices giving promise of becoming of value for commercial purposes. The first group included Honduras and Wataribune; the second group, Blue Rose, Early Prolific and Caloro; the third group, Fortuna and Delitus; and the fourth group, Vintula, Rexoro, Acadia, Iola and Shoemed. Caloro and Shoemed were grown only in 1932 and 1933. Acadia was grown only in 1929, 1930, and 1931. The rices used included varieties of short, medium and long growing periods; and of long, medium and short grain types.

TABLE 2

AVERAGE NUMBER OF DAYS FROM EMERGENCE OF PLANTS TO EMERGENCE OF THE FIRST PANICLE FOR 12 RICE VARIETIES, SEEDED ON DIFFERENT DATES, IN POTS, FOR THE FIVE YEARS 1929 TO 1933 INCLUSIVE. DIFFERENCE IN DAYS AND IN PERCENT BETWEEN LONGEST AND SHORTEST GROWING PERIOD. RICE EXPERIMENT STATION, CROWLEY, LOUISIANA

| Dates Seeded | Varieties Arranged According to Length of Growing Period | | | | | | | | | | | |
|---|--|---------|---------|----------|---------|----------|------------|---------|---------|-----------|------|--------|
| | Early Prolific | Vintula | Caloro† | Honduras | Delitus | Shoemed† | Wataribune | Acadia* | Fortuna | Blue Rose | Iola | Rexoro |
| | Days | Days | Days | Days | Days | Days | Days | Days | Days | Days | Days | Days |
| March 1 | 88 | 97 | 78 | 100 | 104 | 102 | 108 | 100 | 114 | 128 | 129 | 136 |
| March 15 | 91‡ | 96 | 84 | 97 | 104 | 108 | 108 | 110 | 113 | 128 | 129 | 138 |
| April 1 | 89 | 92 | 99 | 94 | 98 | 98 | 103 | 105 | 107 | 121 | 124 | 134 |
| April 15 | 86 | 88 | 92 | 90 | 94 | 97 | 100 | 100 | 104 | 112 | 119 | 131 |
| May 1 | 78 | 81 | 81 | 81 | 88 | 86 | 93 | 93 | 100 | 101 | 112 | 117 |
| May 15 | 79 | 78 | 79 | 80 | 85 | 85 | 88 | 87 | 96 | 93 | 111 | 114 |
| June 1 | 74 | 76 | 75 | 78 | 84 | 81 | 79 | 79 | 94 | 87 | 105 | 109 |
| June 15 | 67 | 70 | 56 | 70 | 77 | 70 | 67 | 71 | 87 | 76 | 101 | 103 |
| Average | 82 | 85 | 81 | 86 | 92 | 91 | 93 | 93 | 102 | 106 | 116 | 123 |
| Difference between longest and shortest growing period. | | | | | | | | | | | | |
| In days | 24 | 27 | 43 | 30 | 27 | 38 | 41 | 39 | 27 | 52 | 28 | 35 |
| In percent | 26 | 28 | 43 | 30 | 26 | 35 | 38 | 35 | 24 | 41 | 22 | 25 |

* Three year average.

† Two year average.

‡ Longest growing period italicized for each variety.

EXPERIMENTAL RESULTS

The results are recorded in tables 1 and 2. The varieties are arranged in the tables, according to the maximum length of the growing period. In comparing the growing periods of the twelve varieties for the five years, when sown on different

dates, it is found that there is about the same variation from year to year in all varieties and that the variations are about the same for the various dates of seeding.

The longest average growing period for most of the varieties was for the March 1 seeding, however, for Early Prolific, Acadia and Rexoro it was for the March 15 seeding, and for Caloro the April 1 seeding. The longest average growing periods for Delitus, Wataribune, Blue Rose, and Iola were the same for the March 1 and the March 15 seedings.

It is interesting to note that the average growing periods of Caloro were as short or shorter for the March seedings than they were for the May seedings. This indicates that seasonal conditions in the spring had more effect on Caloro than on any of the other varieties.

The average growing period for all varieties decreased, after reaching the maximum, as the seasonal dates of seeding advanced. There was, however, a decided difference in the number of days of decrease in the growing periods of the several varieties. The varieties having the longest range in the average number of days between the maximum and minimum growing periods were Blue Rose, Caloro, Wataribune, Acadia and Shoemed, respectively, and those having the shortest range were Early Prolific, Vintula, Delitus, Fortuna, Iola, Honduras, and Rexoro, respectively.

The largest average percentage of decrease, below the maximum in the growing periods, when seeded on June 15, was 43 for Caloro, 41 for Blue Rose, 38 for Wataribune, 35 for Acadia and Shoemed, and 30 for Honduras; and the smallest average decrease was 22 for Iola, 24 for Fortuna, 25 for Rexoro, 26 for Early Prolific and Delitus, and 28 for Vintula.

DISCUSSION

In rice the maximum average length of time from emergence of the first panicle to full maturity is about 45 days. From the information contained in Table 3, a very accurate estimate can be made as to the time of full maturity of the twelve varieties discussed in this article, when seeded on different dates, with the exception of Caloro, the behavior of which is in some respects different from that of the other varieties.

The earliest date on which ice formed, in the 26 years that weather records have been kept at the Rice Experiment Station, was October 20. Ice seldom occurs before the middle of November.

With information regarding the length of the growing period, and a knowledge of the approximate date the first ice forms in his community, a farmer can determine very closely the time of maturity of a variety when seeded on a given date.

Rices having growing periods of approximately fixed lengths are desirable, if the growing periods are not too long, for one who wants to grow the same variety on a large acreage, or sow on different dates. Rices of this type will mature in the same order in which they are seeded, thus avoiding having the entire acreage mature at one time.

Rices that materially shorten their growing periods are not so desirable for one who wants to grow the same variety on a large acreage, because, with this type of rice, the entire acreage will, regardless of the date sown, mature about the same time. Rices of this type are, however, very desirable for one who is forced to plant his crop late in the spring, for these rices, if not seeded too late, will sufficiently shorten their growing periods to produce a crop before frost.

TABLE 3

APPROXIMATE DATE 12 RICE VARIETIES MATURE WHEN SEEDED ON CERTAIN DATES. DETERMINED BY ADDING 45, THE AVERAGE MAXIMUM NUMBER OF DAYS FROM FIRST PANICLE EMERGENCE TO MATURITY, TO THE 5-YEAR AVERAGE NUMBER OF DAYS FROM EMERGENCE OF THE PLANTS TO EMERGENCE OF THE FIRST PANICLE, RICE EXPERIMENT STATION, CROWLEY, LOUISIANA

| Dates Seeded | Varieties Arranged According to Length of Growing Period | | | | | | | | | | | |
|--------------|--|----------|----------|----------|----------|----------|-------------|----------|----------|-----------|----------|----------|
| | Early Prolific | Vintula | Caloro | Honduras | Delitus | Shoemed | Watari-bune | Acadia | Fortuna | Blue Rose | Iola | Rexoro |
| March 1 | July 12 | July 21 | July 2 | July 24 | July 28 | July 26 | Aug. 1 | July 24 | Aug. 7 | Aug. 21 | Aug. 22 | Aug. 29 |
| March 15 | July 29 | Aug. 3 | July 22 | Aug. 4 | Aug. 11 | Aug. 15 | Aug. 15 | Aug. 17 | Aug. 20 | Sept. 4 | Sept. 5 | Sept. 14 |
| April 1 | Aug. 13 | Aug. 16 | Aug. 23 | Aug. 18 | Aug. 22 | Aug. 22 | Aug. 27 | Aug. 29 | Aug. 31 | Sept. 14 | Sept. 17 | Sept. 27 |
| April 15 | Aug. 24 | Aug. 26 | Aug. 30 | Aug. 28 | Sept. 1 | Sept. 4 | Sept. 7 | Sept. 7 | Sept. 11 | Sept. 19 | Sept. 26 | Oct. 8 |
| May 1 | Sept. 1 | Sept. 4 | Sept. 4 | Sept. 4 | Sept. 11 | Sept. 9 | Sept. 16 | Sept. 16 | Sept. 23 | Sept. 24 | Oct. 5 | Oct. 10 |
| May 15 | Sept. 16 | Sept. 15 | Sept. 16 | Sept. 17 | Sept. 22 | Sept. 22 | Sept. 25 | Sept. 24 | Oct. 3 | Sept. 30 | Oct. 18 | Oct. 21 |
| June 1 | Oct. 1 | Oct. 3 | Oct. 2 | Oct. 5 | Oct. 11 | Oct. 8 | Oct. 6 | Oct. 6 | Oct. 21 | Oct. 14 | Nov. 1 | Nov. 5 |
| June 15 | Oct. 5 | Oct. 8 | Sept. 24 | Oct. 8 | Oct. 15 | Oct. 8 | Oct. 5 | Oct. 9 | Oct. 25 | Oct. 14 | Nov. 8 | Nov. 10 |

SUMMARY

Twelve rice varieties were grown over a period of five years to determine the number of days from emergence of the plants to emergence of the first panicle, when seeded at intervals of two weeks, on eight dates beginning March 1 and ending June 15.

The length of the growing period of each variety shortened, after reaching the maximum, as the seasonal dates of seeding advanced. There was, however, a decided difference in the percentages of shortening. Some varieties tend to have a comparatively fixed growing period, while in others it appears that heading will not take place until a certain time in the fall after which their growing periods shorten very materially.

Varieties tending to have a relatively fixed length of growing period include Iola, Fortuna, Rexoro, Early Prolific, Delitus, and Vintula. Varieties that have a tendency not to head until a certain time in the fall and thereby greatly lengthen or shorten their growing periods include Caloro, Blue Rose, Wataribune, Acadia, Shoemed, and Honduras.

By knowing the length of the growing period, when seeded on different dates, any farmer growing a variety for the first time, can approximate very closely the time it will be fully mature if seeded on a given date. If he knows the approximate date when the first ice forms in the fall, he can also determine the latest safe seeding date for his locality.

Rices having growing periods of approximately fixed lengths are desirable for one who wants to grow the same variety on a large acreage.

Rices that materially shorten their growing periods are not desirable for one who wants to grow the same variety on a large acreage. They are very desirable, however, for one who is forced to sow his crop late in the spring.

