ARS 52-26
JANUARY 1968

AFLATOXIN DEVELOPMENT AND GRADE OF UNDRIED ROUGH RICE FOLLOWING PROLONGED STORAGE IN AERATED BINS

Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE

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UNITED STATES DEPARTMENT OF AGRICULTURE

in cooperation with

TEXAS AGRICULTURAL EXPERIMENT STATION

AFLATOXIN DEVELOPMENT AND GRADE OF UNDRIED ROUGH RICE FOLLOWING PROLONGED STORAGE IN AERATED BINS

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SUMMARY

Undried rice was stored in aerated bins for periods of 19 to 21 days to determine how long rice could be retained under these conditions without aflatoxin contamination or change in grade, and the relation, if any, of aflatoxin contamination to changes in grade. The airflow rate, the moisture content of the rice, and the ambient air temperature were varied in the tests. The rice was stored in bins of approximately 1-barrel capacity.

When rice with a high moisture content (24 to 26 percent) was stored, the market grade of the rice was lowered and a high percentage of kernels were infected by Aspergillus flavus before the 21st day. Grade changes and contamination occurred regardless of the ambient air temperature or airflow rate used. Relatively large amounts of aflatoxins developed when high-moisture-content rice was stored during warm weather (August and September), but only small amounts developed during cool weather (October). A rapid drop in rice grade and an increase in aflatoxin development were associated both with storing rice with a 24- to 26-percent moisture content during warm weather and with the use of a low airflow rate (0.5 c.f.m. per barrel) during aeration.

Rice with a 20-percent moisture content or less was stored under aeration at 1 and 2 c.f.m. per barrel for 21 days in August and September without a measurable increase in aflatoxin contamination or loss in market grade.

It is recommended that green rice be dried to a moisture content of 20 percent or less within a maximum of 48 hours, particularly in the southern rice-growing area in August and September, when the ambient temperature is usually high.

INTRODUCTION

Within a 3-week period, commercial dryers may receive more than half of the entire amount of green rice taken in during one harvest season. 1/ This situation has been brought about by widespread planting of early-maturing rice varieties that tend to be ready for harvest during a shorter season than later maturing varieties.

Adequate drying is essential for successful long-term storage of rough rice, but it is often advantageous for commercial dryers to delay drying

1/ Louvier, F. J., Jr. Handling studies at commercial rice dryers. Unpublished progress report. Transportation and Facilities Research Division. 1964.

temporarily so that more rice can be received. The alternatives to immediate drying are to turn down prospective customers or to store green or partially dry rice for several days.

Undried rice in bulk storage is subject to heating. The heat is generated by the respiratory activity of rice and micro-organisms (6, pp. 152-220). 2/ Respiratory activity increases with rises in both moisture content and temperature. Heating, once started, tends to continue and increase in intensity. Damage resulting in discolored kernels is accelerated under conditions accompanying heating. When the movement of air dissipates the heat as rapidly as the heat is generated, rice remains at nearly the same temperature as the ambient air. The processes causing heat-damaged kernels are slowed, but not stopped, when spontaneous heating is avoided by air movement.

Considerable research has been documented on the use of aeration to improve bulk storage conditions for undried rice. Reviews of some of these reports may be found in ARS 20-7, "Research on Conditioning and Storage of Rough and Milled Rice" (5). More recent tests are reported in transactions of the American Society of Agricultural Engineers, 1966 (3). These tests provided data based on moisture content of the rice, airflow rate, and average ambient air temperature for use in predicting the length of time aerated rice may be stored without change in market grade.

Since these tests were made, other research has suggested the need to investigate aflatoxin contamination in undried, aerated rice.

Allcroft and others (1) reported the isolation of a toxic principle in Brazilian peanut meal in 1961. The toxin was found to consist of at least four compounds produced by the growth of certain strains and species of fungi, principally by *Aspergillus flavus* and closely related species. Subsequent investigations established that these metabolites, given the name "aflatoxins," were hepatotoxic and hepatocarcinogenic to many laboratory and domestic animals. The proceedings of a symposium held at the Massachusetts Institute of Technology in 1964 (11) summarized the results of research on aflatoxins to that date. Since *A. flavus* and closely related *Aspergillus* spp. are often a predominant part of the microflora of rice (8) and other cereals, an investigation of the possibility of aflatoxin contamination of rice was carried out and reported (2). Further, Schroeder reported in 1965 that rice was an excellent substrate for the production of aflatoxins in vitro. 3/ Shotwell and others (10) also obtained optimal yields (more than 1 milligram of aflatoxin B_1 per gram of starting material) on the solid substrate rice.

The present study was made to determine the conditions under which aflatoxin contamination would occur in undried, aerated rice in bulk storage; the general conditions limiting the period of time the rice could be retained in storage; and the relation, if any, of aflatoxin contamination to other quality changes.

2/ Underscored numbers in parentheses refer to Literature Cited, p. 14.

3/ Schroeder, H. W. Factors affecting aflatoxin production in vitro by *Aspergillus flavus-oryzae* spp. Unpublished paper presented to the Annual Meeting of the Peanut Improvement Working Group, Washington, D. C., April 1965.

MATERIALS AND METHODS

The tests were conducted at the Rice-Pasture Research and Extension Center, Beaumont, Tex., in 1965 and 1966. Green rice was placed in nine bins, each 5 feet high and with a diameter of 14 inches. The nominal capacity of each bin was one barrel. The bins were arranged in a row, and an enclosure was built around the row (fig. 1). A 4-inch thickness of rock wool insulation was placed between the bins and the enclosure to inhibit temperature changes by conduction. The bins had perforated floors and a plenum chamber under the floors. Air was supplied to the plenum chambers through supply pipes connected to a central duct (fig. 2). Calibrated, perforated metal sheet was installed in the supply pipe to each bin for metering airflow (9).

During a previous year, two lots of rice with a high moisture content (23.5 and 22 percent, respectively) were stored in bins with the air supply entirely shut off. Figure 3 shows the temperature of the rice in the non-aerated bins and also in bins aerated at the rate of 0.5 c.f.m. per barrel, and the average daily air temperature. Apparently, the volume of rice stored in these bins was enough to simulate spontaneous heating in larger bins.

Rice was stored in the bins for 21 days three times each year--during August, September, and October.

During the 1965 tests, rice of a similar moisture content was stored in each bin, and the airflow rate was varied. Three bins were aerated at the rate of 0.5 c.f.m. per barrel, three at 1 c.f.m. per barrel, and three at 2 c.f.m. per barrel.

In the 1966 tests, the airflow rate for all bins was 1 c.f.m. per barrel, and rice of three ranges of moisture content was used for each storage period. To achieve this moisture range, rice with a 23- to 26-percent moisture content was used. Part of the rice was loaded into three of the nine bins without further drying. Another portion was dried to a moisture level about 2 to 3 percent below the initial moisture content and placed in three of the remaining bins. The rest was dried to a moisture level about 4 to 6 percent below the initial moisture content and placed in the last three bins.

The bins were sampled by removing rice near floor level. Since the airflow direction was downward, rice at floor level was the last to be affected by aeration and therefore received the most severe storage treatment. Each bin was sampled at 3-day intervals, so that rice exposed to each of the three airflow rates was sampled every day throughout the test periods in 1965, and rice from each of the three initial moisture levels was sampled every day throughout the test periods in 1966.

The samples were subdivided immediately after removal from the bins. About 150 grams of each sample was dried rapidly in an oven at 140° F. for aflatoxin assays. The rest of the sample was dried slowly to a 12-percent moisture level in a special dryer using air heated to 85° F. Approximately 15 grams of this part was used for mold counts and the remainder was graded by inspectors of the U.S. Department of Agriculture, Consumer and Marketing Service, Grain Division, at Beaumont, Tex.

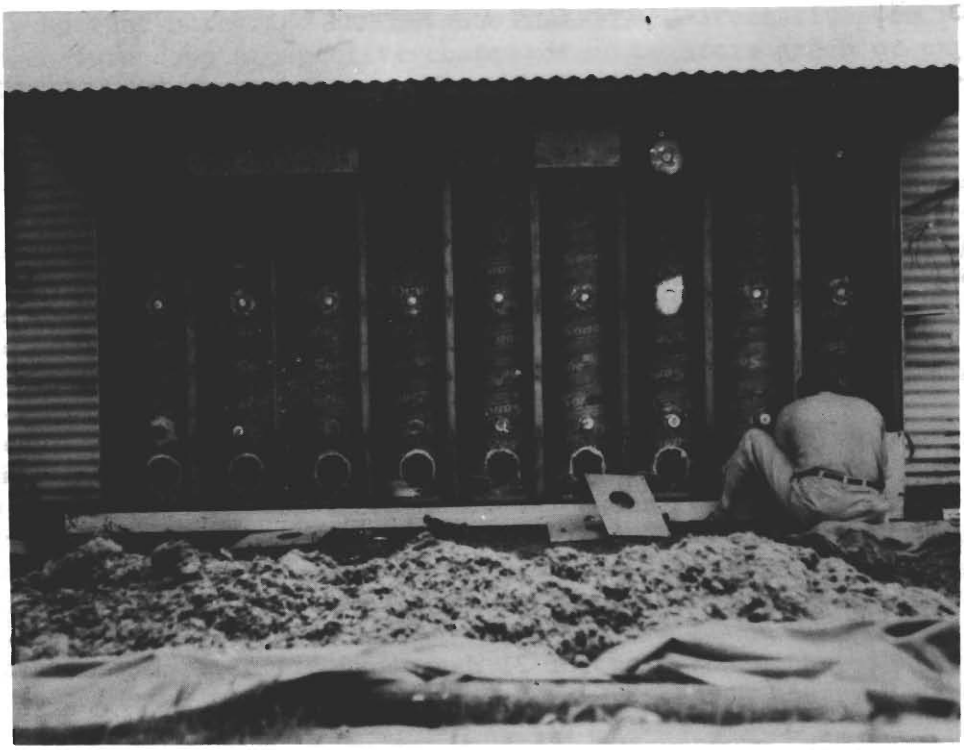

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Figure 1.--Bins and partially completed enclosure. The rock wool insulation in the foreground was used to fill the spaces between the bins and the walls of the enclosure.

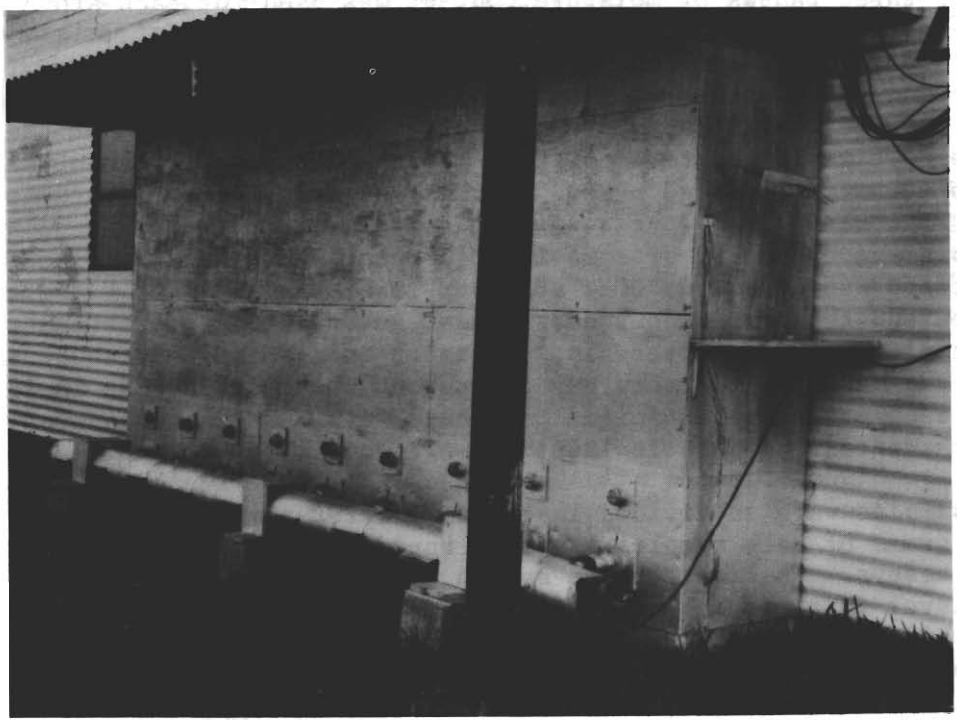

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Figure 2.--The bin enclosure with a multiple aeration system. Sampling ports are located immediately above the air supply pipes.

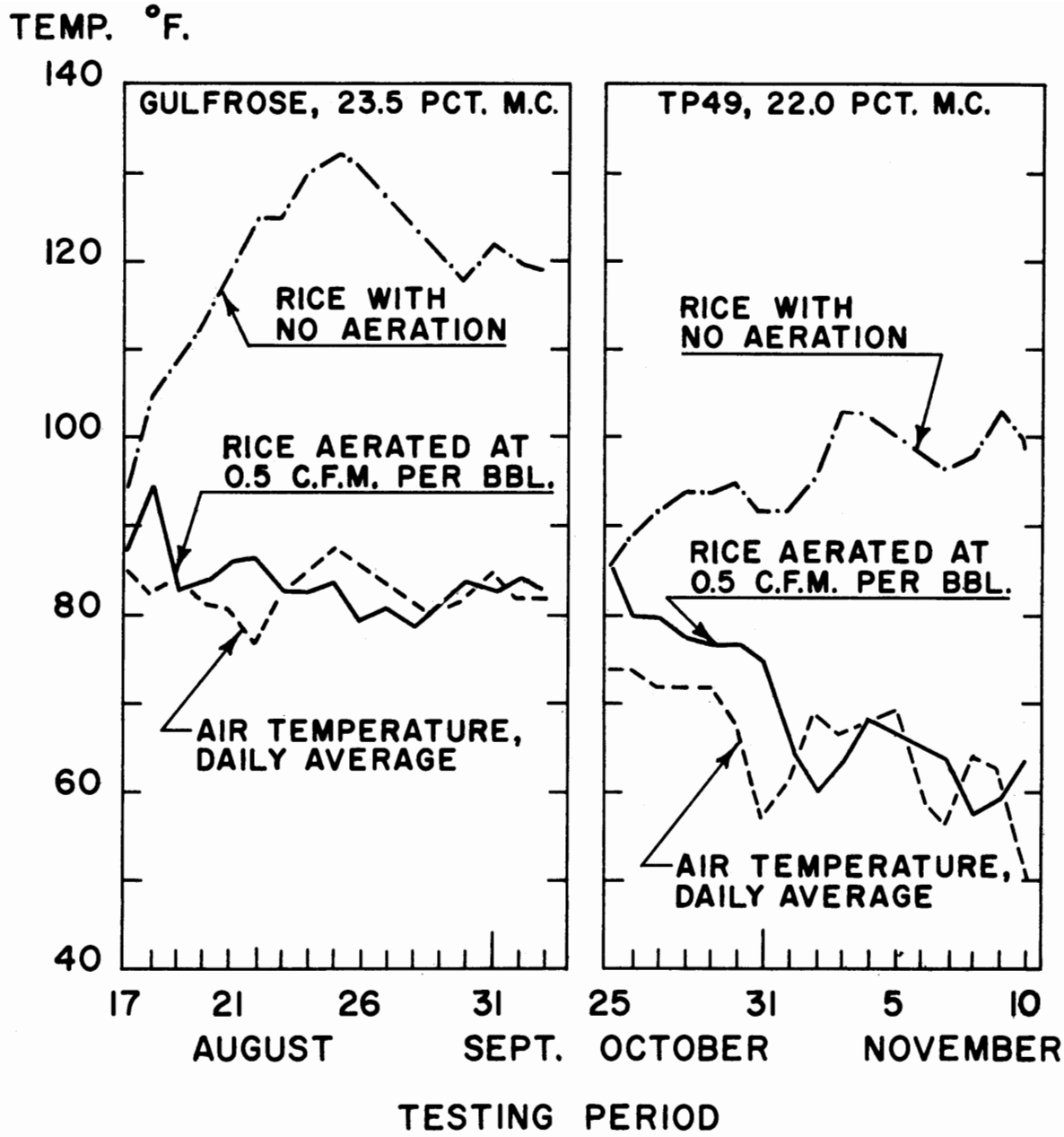

Figure 3.--Temperatures of rice with a high moisture content (M.C.) stored in test bins 14 inches in diameter and 5 feet high indicate that spontaneous heating occurred when rice was not aerated.

The prevalence of fungi was determined by plating 100 kernels of rough rice from each sample on malt-sugar agar in petri dishes as described by Christenson (4). The surface of the rice was disinfected by immersion in a 1-percent sodium hypochlorite solution for 1 minute, followed by a rinse in sterile, distilled water before being placed on the agar surface. The petri dishes were incubated at 77° F. for 2 to 10 days before the percentage of seed infected by fungi was determined.

Aflatoxin concentrations were determined for 50 grams of each sample after the rough rice was ground in a laboratory mill to pass a 20-mesh screen. The ground sample was extracted in aqueous acetone after the method developed by Pons and Goldblatt (7) and the aflatoxin was assayed by thin-layer chromatography and comparison with a known standard.

RESULTS

Storage data for particular bins of rice were used to compare the effects of airflow rates, rice moisture content, and ambient temperatures on factors influencing quality. The data collected on all 54 bins of rice are given in the appendix.

The data in table 1 show the effect of airflow rate on the quality of rice with a high moisture content stored during the hottest part of the 1965 harvest season. Rice aerated at 0.5 c.f.m. per barrel tended to be warmer than the average ambient temperature, whereas rice aerated at 1 or 2 c.f.m. per barrel tended to be cooler than the average ambient temperature. The percentage of kernels infected by *Aspergillus flavus* was moderate during 5 days of storage with an airflow rate of 0.5 c.f.m. per barrel, but increased abruptly thereafter. With an airflow rate of 1 c.f.m. per barrel, the infection did not increase sharply until the 15th day, and at 2 c.f.m. the increase did not occur until the 20th day.

Rice aerated at 0.5 c.f.m. per barrel remained at grade U.S. No. 1 through the 5th day of storage. With the airflow increased to 1 c.f.m. per barrel, rice samples graded U.S. No. 1 through the 9th day of storage, and at 2 c.f.m. per barrel maintained this grade through the 17th day. Rice graded U.S. No. 1 generally contained no more than a trace of aflatoxin.

Table 2 shows the effect of moisture content of the rice on infection by fungi, amount of aflatoxins present, and length of time during which rice samples graded U.S. No. 1. All rice was aerated at a rate of 1 c.f.m. per barrel. Sixty-one percent of the kernels of rice samples with a 26.2 percent moisture content were infected with *A. flavus* within 6 days after storage. At the same time, aflatoxin assays indicated more than 100 p.p.b., and the grade dropped from U.S. No. 1 to U.S. No. 2. Less than 60 percent of the kernels of rice with a moisture content of 22.6 percent were infected by *A. flavus* until the 18th day in storage, and the aflatoxin assay at this moisture level never exceeded 100 p.p.b. However, rice sampled during the 6th day of storage graded U.S. No. 2 instead of grade U.S. No. 1. Rice going into storage with a moisture content of 19.8 percent had a maximum infection by *A. flavus* of 32 percent and showed no detectable amounts of aflatoxins during the 21-day storage period. This rice graded U.S. No. 1 through the 15th day.

TABLE 1.--Effect of aeration rate and time in storage on fungus infection, aflatoxin contamination, and U.S. grade: Belle Patna rice with 22-percent moisture content, August 1965

Airflow rate per barrel and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus* 1/	Aflatoxin assay 1/	U.S. grade
0.5 c.f.m.	Percent	°F.	°F.	Percent	P.p.b.	No.
0 2/	22.2	95	82	8	--	1
2 days	21.5	95	84	4	38	1
5 days	21.1	85	83	0	10	1
8 days	20.4	84	84	28	133	2
11 days	19.8	87	80	29	233	(3/)
14 days	18.5	82	78	43	342	(3/)
17 days	18.7	85	83	25	629	(3/)
20 days	18.3	86	84	32	857	(3/)
1 c.f.m.						
0 2/	22.2	94	82	8	--	1
3 days	21.0	78	84	1	--	1
6 days	20.9	80	80	9	10	1
9 days	20.1	80	84	2	4	1
12 days	19.7	78	80	5	17	5
15 days	19.1	76	82	45	58	(3/)
18 days	18.6	82	82	41	15	(3/)
21 days	18.6	79	85	26	23	(3/)
2 c.f.m.						
0 2/	22.0	95	82	--	--	1
2 days	20.9	81	84	5	(4/)	1
5 days	20.9	76	83	10	(4/)	1
8 days	20.4	76	83	1	(4/)	1
11 days	20.1	76	84	4	(4/)	1
14 days	19.4	74	80	13	(4/)	1
17 days	19.2	79	84	6	6	1
20 days	18.9	79	82	35	30	2

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.
4/ Trace only.

TABLE 2.--Effect of moisture content of rice and time in storage on fungus infection, aflatoxin contamination, and U.S. grade: Bluebelle rice aerated at 1 c.f.m. per barrel, August 1966

Initial rice moisture content and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus* 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
High:						
0 2/	26.2	85	82	--	--	1
3 days	23.7	88	80	22	8	1
6 days	23.0	87	77	61	104	2
9 days	20.6	92	82	83	534	(3/)
12 days	21.5	90	86	70	629	(3/)
15 days	19.9	83	76	41	434	(3/)
18 days	19.5	84	83	98	743	(3/)
21 days	18.6	71	71	37	265	(3/)
Medium:						
0 2/	22.6	85	82	--	--	1
3 days	20.8	83	80	16	--	1
6 days	20.4	82	77	32	8	2
9 days	20.4	87	82	28	94	(3/)
12 days	19.3	88	86	35	9	(3/)
15 days	19.3	82	76	27	26	(3/)
18 days	18.7	84	83	60	11	(3/)
21 days	18.2	71	71	62	28	(3/)
Low:						
0 2/	19.8	86	82	--	--	1
3 days	18.6	81	80	1	--	1
6 days	19.0	78	77	11	--	1
9 days	18.8	83	82	11	--	1
12 days	18.2	82	86	16	--	1
15 days	18.0	80	76	32	--	1
18 days	17.6	82	83	26	--	2
21 days	17.6	70	71	29	--	1

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.

Table 3 shows the effect of the average ambient air temperature during the storage period on infection by A. flavus, amount of aflatoxins, and the grade of the rice. The airflow rate was 1 c.f.m. per barrel. The variations in ambient air temperature were obtained by storing rice during different months of the harvest season; however, this storage practice also introduced other unavoidable variations, such as different varieties of rice, and differences in the initial moisture content. The average ambient temperatures during the three 21-day storage periods were 81°, 75°, and 65° F., respectively, for August, September, and October. The percentage of kernels infected by A. flavus showed no significant correlation with the average ambient temperature. The largest amount of aflatoxins were found in samples from rice stored in August and the next largest amounts in samples stored in September. Only traces of aflatoxins were found in samples of rice stored in October, although this rice was stored at a very high moisture content and a high percentage of the kernels were infected by A. flavus after 6 days in storage.

DISCUSSION

Market quality of rice is based on milling yields and grade. One of the objectives of these tests was to determine the length of time undried rice remained at its initial grade. From the standpoint of market value this can be considered to be "safe storage time." There was no indication that milling yields were affected by prolonged storage before drying, but such storage caused grades to drop progressively from one classification to another. Each drop resulted in a lower market value.

The moisture content of the rice, the airflow rate, and the ambient air temperature each played a part in maintenance or deterioration of grade during long-term storage. Rice of low moisture content stored better than rice of a higher moisture content when the airflow rate and ambient temperature were the same. When two bins of rice of the same moisture content were aerated at different airflow rates, the rice receiving the largest volume of air remained at its initial grade longer. Rice harvested late in the season and stored while ambient temperatures were moderate remained at its initial grade longer than rice harvested early and stored while ambient temperatures were high, provided rice in both bins had the same moisture content and the same rate of airflow was used.

Rice with a high moisture content had a high percentage of kernels infected by Aspergillus flavus within the 21-day storage periods. The rate of buildup of infection progressed rapidly during seasons of high ambient temperature and more slowly during cooler weather, regardless of the airflow rate. The prevalence of A. flavus infection was not significantly related to the amount of aflatoxins present. Rice with a high moisture content had a high percentage of kernels infected by A. flavus after several days of storage during October, but only a trace of aflatoxin was detected in this rice at any time during the 21-day storage period.

Aflatoxins were not detected in most of the rice samples graded U.S. No. 1; however, more than a trace was found in 15 percent of these samples. The aflatoxin average for all samples grading U.S. No. 1 (see appendix tables 4 to 21) was less than 5 p.p.b. and the average for samples grading U.S. No. 2 was

TABLE 3.--Effect of ambient air temperature and time in storage on fungus infection, aflatoxin contamination, and U.S. grade: Rice with high moisture content aerated at 1 c.f.m. per barrel, August, September, and October 1966

Time of year and storage period	Rice moisture content (wet basis)	Temepratures: Rice	Temepratures: Ambient air (daily average)	Kernels infected by A. flavus 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Aug. 5 to 25						
0 2/	25.2	85	82	--	--	1
2 days	24.2	91	82	8	--	1
5 days	22.2	83	81	45	19	2
8 days	22.5	89	82	82	496	(3/)
11 days	20.1	90	83	74	343	(3/)
14 days	19.4	81	82	68	686	(3/)
17 days	19.8	92	82	87	743	(3/)
20 days	18.8	75	81	45	686	(3/)
Sept. 7 to 28						
0 2/	23.0	88	80	--	--	1
3 days	22.0	82	77	55	(4/)	1
6 days	21.0	84	76	95	28	1
9 days	20.6	87	76	38	123	2
12 days	20.4	83	76	41	211	(3/)
15 days	19.9	70	75	29	106	(3/)
18 days	19.8	76	75	18	106	(3/)
21 days	18.6	78	75	36	106	(3/)
Oct. 5 to 26						
0 2/	24.6	81	64	--	--	1
3 days	24.3	65	66	7	--	2
6 days	23.1	88	70	74	--	3
9 days	22.8	89	72	82	--	5
12 days	21.6	63	69	87	--	5
15 days	21.0	57	66	93	(4/)	(3/)
18 days	21.2	68	66	82	(4/)	(3/)
21 days	20.8	60	65	86	(4/)	(3/)

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.
4/ Trace only.

approximately 50 p.p.b. Further comparisons between grades and aflatoxins amounts could not be made with data from these tests because generally, when rice graded No. 2 or lower, additional samples were not submitted to the rice inspection service.

Although an exact determination of the parameters affecting the "safe storage time" would be of value, the many factors involved make such a study impractical. Several important factors that were not investigated in the present study are the effect of variation in the quantity of aflatoxin-producing fungi on the grain at the time it is stored and in the air used for aeration. Furthermore, there is no assurance that data obtained in small bin tests will predict (without adjustment by some unknown factor) the parallel developments in large commercial-type bins. However, these data clearly indicate a direct correlation between the rate of development of aflatoxin in stored undried rice, the moisture content of the rice, and the ambient temperature. Similarly, an inverse correlation with the rate of aeration (within the range of 0.5 to 2 c.f.m. per barrel) is indicated.

Since contamination with any amount of aflatoxin is objectionable, it is recommended that green rice be dried until its moisture content is 20 percent or less in a maximum period of 48 hours. This moisture level and time period is particularly important in the southern rice-growing area in August and September, when the ambient temperature is usually high. Rice having a moisture content lower than 20 percent can be held under aeration for 21 days if recommended airflow rates are used. However, rough rice must be dried to a moisture content of 12 percent or lower before it can be stored in bulk for a long period of time (3).

Continued research on this problem is needed to insure that the rice produced in the United States will retain its present reputation for wholesomeness and good quality.

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TABLE 4.--Fungus infection, aflatoxin contamination, and U.S. grade: Belle Patna rice with about 22-percent moisture content aerated at 2 c.f.m. per barrel, Beaumont, Tex., July 30 to August 20, 1965

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus* 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 1:						
0 2/	21.4	95	82	8	--	1
1 day	20.8	82	84	13	--	1
4 days	20.8	75	83	16	4	1
7 days	20.6	74	83	4	3	1
10 days	20.3	74	84	1	--	1
13 days	18.3	72	80	9	3	1
16 days	19.3	78	84	92	17	3
19 days	19.0	75	82	40	76	(3/)
Bin No. 4:						
0 2/	22.0	95	82	--	--	1
2 days	20.9	81	84	5	(4/)	1
5 days	20.9	76	83	10	(4/)	1
8 days	20.4	76	83	1	(4/)	1
11 days	20.1	76	84	4	(4/)	1
14 days	19.4	74	80	13	(4/)	1
17 days	19.2	79	84	6	6	1
20 days	18.9	79	82	35	30	2
Bin No. 7:						
0 2/	20.8	93	82	--	--	1
3 days	20.7	77	84	10	--	1
6 days	21.0	78	80	3	3	1
9 days	20.3	79	84	3	3	1
12 days	19.7	76	80	3	3	1
15 days	19.4	75	82	5	6	1
18 days	19.2	79	82	8	36	2
21 days	19.2	80	85	8	--	(3/)

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.
4/ Trace only.

TABLE 5.--Fungus infection, aflatoxin contamination, and U.S. grade: Belle Patna rice with about 22-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., July 30 to August 20, 1965

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus*	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 2:						
0 2/	23.0	95	82	8	--	1
1 day	21.6	102	84	7	--	1
4 days	20.8	79	83	8	(3/)	1
7 days	20.9	80	83	3	3	1
10 days	20.1	83	84	7	181	2
13 days	19.4	77	80	10	31	4
16 days	19.1	78	84	27	108	(4/)
19 days	19.0	80	82	57	63	(4/)
Bin No. 5:						
0 2/	23.0	95	82	8	--	1
2 days	21.1	85	84	5	(3/)	1
5 days	20.6	80	83	10	10	1
8 days	20.4	80	84	1	57	1
11 days	19.9	82	80	4	19	1
14 days	19.1	77	78	13	129	4
17 days	19.4	81	83	6	48	(4/)
20 days	18.9	80	84	35	172	(4/)
Bin No. 8:						
0 2/	22.2	94	82	8	--	1
3 days	21.0	78	84	1	--	1
6 days	20.9	80	80	9	10	1
9 days	20.1	80	84	2	4	1
12 days	19.7	78	80	5	17	5
15 days	19.1	76	82	45	58	(4/)
18 days	18.6	82	82	41	15	(4/)
21 days	18.6	79	85	26	23	(4/)

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Trace only.
4/ Samples not graded.

TABLE 6.--Fungus infection, aflatoxin contamination, and U.S. grade: Belle Patna rice with about 22-percent moisture content aerated at 0.5 c.f.m. per barrel, Beaumont, Tex., July 30 to August 20, 1965

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus*	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 3:						
0 2/	21.8	96	82	8	--	1
1 day	21.8	104	84	9	--	1
4 days	21.1	86	83	14	6	1
7 days	20.8	85	83	17	63	1
10 days	20.3	89	84	10	180	4
13 days	19.1	85	80	9	237	(3/)
16 days	19.4	82	84	21	228	(3/)
19 days	18.8	87	82	31	514	(3/)
Bin No. 6:						
0 2/	22.2	95	82	8	--	1
2 days	21.5	95	84	4	38	1
5 days	21.1	85	83	0	10	1
8 days	20.4	84	84	28	133	2
11 days	19.8	87	80	29	233	(3/)
14 days	18.5	82	78	43	342	(3/)
17 days	18.7	85	83	25	629	(3/)
20 days	18.3	86	84	32	857	(3/)
Bin No. 9:						
0 2/	22.6	96	82	8	--	1
3 days	20.7	102	84	3	--	1
6 days	20.6	101	80	15	13	2
9 days	19.3	90	84	27	48	(3/)
12 days	18.7	86	80	66	299	(3/)
15 days	18.6	81	82	72	943	(3/)
18 days	17.6	87	82	68	1428	(3/)
21 days	17.9	86	85	57	1772	(3/)

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.

TABLE 7.--Fungus infection, aflatoxin contamination, and U.S. grade: Nato rice with about 20-percent moisture content aerated at 2 c.f.m. per barrel, Beaumont, Tex., September 1 to 22, 1965

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus*	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 1:						
0 2/	20.8	92	84	82	--	1
3 days	18.8	76	82	59	--	1
6 days	18.2	77	82	39	--	1
9 days	18.0	70	84	27	(3/)	1
12 days	17.7	77	85	16	(3/)	1
15 days	17.8	73	83	23	(3/)	1
18 days	17.2	76	81	19	(3/)	1
21 days	17.0	77	77	9	(3/)	1
Bin No. 4:						
0 2/	19.8	89	84	82	--	1
2 days	19.2	78	82	23	--	1
5 days	18.8	79	84	15	--	1
8 days	18.7	73	82	27	--	1
11 days	18.4	76	85	6	--	1
14 days	18.5	74	83	9	--	1
17 days	18.2	76	82	11	(3/)	2
20 days	18.3	77	79	10	(3/)	1
Bin No. 9:						
0 2/	19.6	90	84	82	--	1
1 day	19.0	79	81	13	--	1
4 days	19.0	80	83	20	--	1
7 days	19.0	77	82	31	--	1
10 days	18.2	74	85	23	(3/)	2
13 days	18.5	77	85	32	(3/)	2
16 days	18.6	77	83	55	3	3
19 days	17.8	76	79	47	6	5

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Trace only.

TABLE 8.--Fungus infection, aflatoxin contamination, and U.S. grade: Nato rice with about 20-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., September 1 to 22, 1965

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus*	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 2:						
0 2/	19.6	90	84	82	--	1
3 days	19.4	79	82	33	--	1
6 days	19.0	79	82	16	9	1
9 days	18.4	73	84	21	15	1
12 days	18.8	78	85	16	5	1
15 days	18.4	75	83	31	12	2
18 days	18.3	78	81	30	6	(3/)
21 days	18.0	78	77	74	30	(3/)
Bin No. 5:						
0 2/	20.0	90	84	82	--	1
2 days	19.7	79	82	6	--	1
5 days	19.1	80	84	15	--	1
8 days	18.8	76	82	27	--	1
11 days	18.2	77	85	38	(4/)	2
14 days	18.4	78	83	39	4	3
17 days	18.5	77	82	44	3	3
20 days	18.2	77	79	40	(4/)	(3/)
Bin No. 8:						
0 2/	19.6	89	84	82	--	1
1 day	19.3	89	80	23	--	1
4 days	19.1	78	83	24	--	1
7 days	18.8	79	82	24	--	1
10 days	18.9	72	85	25	--	1
13 days	18.8	78	85	23	--	1
16 days	18.7	77	83	27	4	2
19 days	18.4	78	79	43	(4/)	(3/)

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.
4/ Trace only.

TABLE 9.--Fungus infection, aflatoxin contamination, and U.S. grade: Nato rice with about 20-percent moisture content aerated at 0.5 c.f.m. per barrel, Beaumont, Tex., September 1 to 22, 1965

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus*	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 3:						
0 2/	19.6	89	84	82	--	1
3 days	19.5	80	82	21	--	1
6 days	20.0	80	82	30	--	2
9 days	18.7	78	84	20	9	2
12 days	18.8	80	85	37	6	3
15 days	18.3	77	83	26	9	(3/)
18 days	18.1	80	81	49	30	(3/)
21 days	17.6	78	77	29	(4/)	(3/)
Bin No. 6:						
0 2/	20.2	90	84	82	--	1
2 days	19.8	85	82	35	--	1
5 days	18.9	81	84	31	--	1
8 days	19.2	80	82	36	--	1
11 days	18.7	78	85	37	6	2
14 days	18.7	81	83	37	6	2
17 days	17.7	80	82	31	12	(3/)
20 days	18.2	79	79	64	12	(3/)
Bin No. 7:						
0 2/	20.0	90	84	82	--	1
1 day	19.7	89	80	22	--	1
4 days	19.3	80	83	19	--	1
7 days	19.1	82	82	30	--	1
10 days	18.8	73	85	22	--	1
13 days	19.0	80	85	25	4	2
16 days	18.5	78	83	35	11	(3/)
19 days	18.3	77	79	45	34	(3/)

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.
4/ Trace only.

TABLE 10.--Fungus infection, aflatoxin contamination, and U.S. grade: TP 49 rice with about 20-percent moisture content aerated at 2 c.f.m. per barrel, Beaumont, Tex., October 8 to 29, 1965

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus*	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 1:						
0 2/	19.8	76	75	13	--	1
4 days	20.0	72	71	4	--	1
7 days	19.5	70	77	3	--	1
10 days	19.6	--	75	7	--	1
13 days	19.1	65	66	10	--	1
16 days	18.5	56	60	4	--	1
19 days	18.4	50	61	10	--	1
Bin No. 4:						
0 2/	20.8	73	75	13	--	1
4 days	20.1	74	71	--	--	1
5 days	19.5	69	72	2	--	1
8 days	19.0	72	76	1	--	1
11 days	18.6	71	76	3	--	1
17 days	18.5	52	52	4	--	1
20 days	18.0	55	60	5	--	1
Bin No. 9:						
0 2/	20.6	70	75	13	--	1
6 days	19.8	67	75	5	--	1
9 days	19.7	72	77	4	--	1
12 days	19.4	71	75	9	--	1
15 days	18.9	52	60	11	--	1
18 days	18.5	50	56	22	--	1
21 days	18.2	56	60	12	--	1

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.

TABLE 11--Fungus infection, aflatoxin contamination, and U.S. grade: TP 49 rice with about 20-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., October 8 to 29, 1965

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus*	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 2:						
0 2/	19.6	76	75	13	--	1
4 days	20.0	73	71	3	--	1
7 days	20.1	71	77	3	--	1
10 days	19.6	--	75	13	--	1
13 days	19.1	70	66	21	--	1
16 days	18.4	55	60	9	--	1
19 days	18.7	50	61	15	--	1
Bin No. 5:						
0 2/	20.0	73	75	13	--	1
5 days	19.4	71	72	25	--	1
8 days	19.4	73	76	9	--	1
11 days	19.6	71	76	16	--	1
14 days	19.1	60	59	17	--	1
17 days	18.6	54	52	20	--	1
20 days	18.3	55	60	26	--	1
Bin No. 8:						
0 2/	20.8	70	75	13	--	1
6 days	20.0	69	75	9	--	1
9 days	19.9	73	77	3	--	1
12 days	19.0	72	75	21	--	1
15 days	18.9	56	60	27	--	1
18 days	18.5	50	56	25	--	1
21 days	18.5	54	60	12	--	1

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.

TABLE 12.--Fungus infection, aflatoxin contamination, and U.S. grade: TP 49 rice with about 20-percent moisture content aerated at 0.5 c.f.m. per barrel, Beaumont, Tex., October 8 to 29, 1965

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus*	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 3:						
0 2/	20.0	73	75	13	--	1
4 days	20.1	73	71	1	--	1
7 days	20.1	71	77	6	--	1
10 days	19.7	--	75	31	--	1
13 days	19.1	71	66	20	--	1
16 days	18.8	57	60	16	--	1
19 days	18.7	52	61	23	--	1
Bin No. 6:						
0 2/	20.0	72	75	13	--	1
5 days	20.2	71	72	8	--	1
8 days	20.0	74	76	6	--	1
11 days	19.3	75	76	37	--	1
14 days	18.7	54	59	41	--	1
17 days	18.7	57	52	38	--	1
20 days	18.9	54	60	24	--	1
Bin No. 7:						
0 2/	20.6	74	75	13	--	1
6 days	20.0	72	75	5	--	1
9 days	20.1	75	77	6	--	1
12 days	19.6	73	75	17	--	1
15 days	18.9	62	60	7	--	1
18 days	18.8	55	56	19	--	1
21 days	18.7	56	60	18	--	1

1/ Dashes indicate no detectable amount.
2/ Immediately after rice was stored.

TABLE 13.--Fungus infection, aflatoxin contamination, and U.S. grade: Bluebelle rice with about 26-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., August 5 to 26, 1966

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus* 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 1:						
0 2/	25.2	85	82	--	--	1
2 days	24.2	84	83	8	--	1
5 days	22.2	83	82	45	19	2
8 days	22.5	89	86	82	496	(3/)
11 days	20.1	90	85	74	343	(3/)
14 days	19.4	81	80	68	686	(3/)
17 days	19.8	92	84	87	743	(3/)
20 days	18.8	75	66	45	686	(3/)
Bin No. 4:						
0 2/	26.2	85	82	--	--	1
3 days	23.7	88	80	22	8	1
6 days	23.0	87	77	61	104	2
9 days	20.6	92	82	83	534	(3/)
12 days	21.5	90	86	70	629	(3/)
15 days	19.9	83	76	41	434	(3/)
18 days	19.5	84	83	98	743	(3/)
21 days	18.6	71	71	37	265	(3/)
Bin No. 7:						
0 2/	26.8	85	82	--	--	1
4 days	23.4	84	83	66	47	1
7 days	21.8	89	83	69	305	2
10 days	20.4	94	86	65	750	(3/)
13 days	20.1	90	84	71	534	(3/)
16 days	19.8	82	83	46	400	(3/)
19 days	19.2	82	76	80	360	(3/)

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.

TABLE 14.--Fungus infection, aflatoxin contamination, and U.S. grade: Bluebelle rice with about 22-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., August 5 to 26, 1966

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by A. flavus 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 2:						
0 2/	22.6	85	82	--	--	1
2 days	21.2	87	83	3	--	1
5 days	20.9	83	82	17	--	1
8 days	21.1	85	86	22	(3/)	2
11 days	20.2	87	85	20	53	(4/)
14 days	19.2	84	80	29	133	(4/)
17 days	19.0	84	84	64	41	(4/)
20 days	17.8	75	66	45	87	(4/)
Bin No. 5:						
0 2/	22.6	85	82	--	--	1
3 days	20.8	83	80	16	--	1
6 days	20.4	82	77	32	8	2
9 days	20.4	87	82	28	94	(4/)
12 days	19.3	88	86	35	9	(4/)
15 days	19.3	82	76	27	26	(4/)
18 days	18.7	84	83	60	11	(4/)
21 days	18.2	71	71	62	28	(4/)
Bin No. 8:						
0 2/	22.4	84	82	--	--	1
4 days	21.0	82	83	12	(3/)	1
7 days	20.4	82	83	21	28	2
10 days	19.8	85	86	44	19	(4/)
13 days	19.1	86	84	51	63	(4/)
16 days	19.0	82	83	70	19	(4/)
19 days	18.4	82	76	65	62	(4/)

1/ Dashes indicate no detectable amounts..
2/ Immediately after rice was stored.
3/ Trace only.
4/ Samples not graded.

TABLE 15.--Fungus infection, aflatoxin contamination, and U.S. grade: Bluebelle rice with about 20-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., August 5 to 26, 1966

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus* 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 3:						
0 2/	20.6	87	82	--	--	1
2 days	19.4	82	83	0	--	1
5 days	19.2	79	82	10	--	1
8 days	18.9	81	86	20	--	1
11 days	18.6	83	85	12	(3/)	1
14 days	18.2	83	80	13	11	1
17 days	17.9	81	84	6	--	1
20 days	17.6	75	66	7	--	2
Bin No. 6:						
0 2/	19.8	86	82	--	--	1
3 days	18.6	81	80	1	--	1
6 days	19.0	78	77	11	--	1
9 days	18.8	83	82	11	--	1
12 days	18.2	82	86	16	--	1
15 days	18.0	80	76	32	--	1
18 days	17.6	82	83	26	--	2
21 days	17.6	70	71	29	--	1
Bin No. 9:						
0 2/	20.2	85	82	--	--	1
4 days	19.2	80	83	3	--	1
7 days	19.0	79	83	20	8	1
10 days	18.4	83	86	17	--	1
13 days	17.6	83	84	11	--	1
16 days	17.9	79	83	17	11	1
19 days	17.4	80	76	19	--	1

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Trace only.

TABLE 16.--Fungus infection, aflatoxin contamination, and U.S. grade: Bluebonnet rice with about 23-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., September 7 to 28, 1966

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by A. flavus 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 4:						
0 2/	22.8	87	80	--	--	1
2 days	22.7	86	76	26	--	1
5 days	21.0	86	74	83	32	1
8 days	20.6	87	80	93	108	2
11 days	19.8	79	78	56	246	(3/)
14 days	18.9	71	70	99	246	(3/)
17 days	18.4	72	76	30	208	(3/)
20 days	18.7	78	77	41	246	(3/)
Bin No. 5:						
0 2/	23.0	88	80	--	--	1
3 days	22.0	82	75	55	(4/)	1
6 days	21.0	84	75	95	28	1
9 days	20.6	87	71	38	123	2
12 days	20.4	83	76	41	211	(3/)
15 days	19.9	70	70	29	106	(3/)
18 days	19.8	76	74	18	106	(3/)
21 days	18.6	78	76	36	106	(3/)
Bin No. 6:						
0 2/	23.8	86	80	--	--	1
4 days	21.4	84	75	59	--	1
7 days	20.6	84	78	90	47	1
10 days	20.0	80	72	51	100	1
13 days	19.4	78	70	100	108	(3/)
16 days	18.6	70	74	100	208	(3/)
19 days	19.1	75	78	100	133	(3/)

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.
4/ Trace only.

TABLE 17.--Fungus infection, aflatoxin contamination, and U.S. grade: Bluebonnet rice with about 22-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., September 7 to 28, 1966

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by A. flavus 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 1:						
0 2/	22.2	92	80	13	--	1
2 days	21.4	82	76	8	--	1
5 days	20.5	81	74	64	19	1
8 days	19.5	85	80	69	32	1
11 days	19.0	80	78	91	67	1
14 days	19.0	69	70	99	37	1
17 days	18.2	70	76	93	42	1
20 days	18.1	77	77	98	37	1
Bin No. 2:						
0 2/	22.0	93	80	13	--	1
3 days	20.9	80	75	26	--	1
6 days	20.4	80	75	47	32	1
9 days	19.6	86	71	82	37	1
12 days	19.0	84	76	99	67	1
15 days	19.2	70	70	98	53	1
18 days	18.4	76	74	100	57	1
21 days	17.8	79	76	83	37	1
Bin No. 3:						
0 2/	21.6	92	80	13	--	1
4 days	20.9	80	75	42	--	1
7 days	20.6	80	78	78	19	1
10 days	19.0	82	72	90	53	1
13 days	18.8	80	70	52	40	1
16 days	18.3	71	74	41	53	2
19 days	18.6	75	78	47	32	2

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.

TABLE 18.--Fungus infection, aflatoxin contamination, and U.S. grade: Bluebonnet rice with about 19-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., September 7 to 28, 1966

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus*	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 7:						
0 2/	19.4	85	80	5	--	1
2 days	18.6	80	76	4	--	1
5 days	18.0	76	74	18	--	1
8 days	17.8	82	80	19	--	1
11 days	18.2	77	78	61	--	1
14 days	17.8	72	70	58	--	1
17 days	17.2	82	76	65	--	1
Bin No. 8:						
0 2/	19.5	88	80	5	--	1
3 days	18.8	78	75	2	--	1
6 days	18.6	75	75	17	--	1
9 days	18.2	79	71	40	--	1
12 days	18.0	77	76	42	--	1
15 days	17.4	68	70	68	--	1
18 days	17.4	79	74	57	--	1
21 days	16.9	76	76	68	--	1
Bin No. 9:						
0 2/	19.3	83	80	5	--	1
4 days	18.7	75	75	2	--	1
7 days	18.2	76	78	8	--	1
10 days	17.8	74	72	49	--	1
13 days	18.2	73	70	57	104	1
16 days	17.8	72	74	65	--	1
19 days	17.4	75	78	69	--	1

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.

TABLE 19.--Fungus infection, aflatoxin contamination, and U.S. grade: TP 49 rice with about 24-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., October 5 to 26, 1966

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by A. flavus 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 1:						
0 2/	24.6	81	64	--	--	1
2 days	24.7	68	63	11	--	1
5 days	24.4	87	80	70	--	1
8 days	22.2	79	79	69	--	3
11 days	21.6	75	59	94	60	(3/)
14 days	21.5	60	54	89	--	(3/)
17 days	21.2	60	67	74	37	(3/)
20 days	21.0	66	60	71	13	(3/)
Bin No. 2:						
0 2/	24.6	81	64	--	--	1
3 days	24.3	65	72	7	--	2
6 days	23.1	88	69	74	--	3
9 days	22.8	89	78	82	--	5
12 days	21.6	63	60	87	--	5
15 days	21.0	57	52	93	(4/)	(3/)
18 days	21.2	68	70	82	(4/)	(3/)
21 days	20.8	60	58	86	(4/)	(3/)
Bin No. 3:						
0 2/	24.3	80	64	--	--	1
4 days	24.6	82	77	23	--	1
7 days	22.8	78	70	92	--	3
10 days	22.2	87	59	95	13	(3/)
13 days	21.8	63	55	89	(4/)	(3/)
16 days	21.8	54	57	90	--	(3/)
19 days	22.2	72	61	88	--	(3/)

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Samples not graded.
4/ Trace only.

TABLE 20.--Fungus infection, aflatoxin contamination, and U.S. grade: TP 49 rice with about 21-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., October 5 to 26, 1966

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus* 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 4:						
0 2/	21.1	82	64	--	--	1
2 days	21.2	67	63	1	--	1
5 days	20.7	80	80	35	--	1
8 days	20.2	71	79	75	--	1
11 days	19.4	73	59	78	29	1
14 days	19.2	63	54	65	37	1
17 days	19.2	62	67	51	34	1
20 days	19.6	68	60	57	19	1
Bin No. 5:						
0 2/	21.1	82	64	--	--	1
3 days	20.8	65	72	2	--	1
6 days	20.5	78	69	41	--	1
9 days	20.2	81	78	59	(3/)	1
12 days	19.6	62	60	54	19	1
15 days	19.3	56	52	63	13	1
18 days	19.4	66	70	74	37	1
21 days	19.2	60	58	58	62	1
Bin No. 6:						
0 2/	21.2	81	64	--	--	1
4 days	20.2	73	77	17	--	1
7 days	20.2	74	70	60	(3/)	1
10 days	20.1	82	59	67	21	1
13 days	19.2	63	55	75	108	1
16 days	19.1	55	57	67	37	1
19 days	19.5	72	61	71	25	1

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Trace only.

TABLE 21.--Fungus infection, aflatoxin contamination, and U.S. grade: TP 49 rice with about 19-percent moisture content aerated at 1 c.f.m. per barrel, Beaumont, Tex., October 5 to 26, 1966

Bin No. and storage period	Rice moisture content (wet basis)	Temperatures: Rice	Temperatures: Ambient air (daily average)	Kernels infected by *A. flavus* 1/	Aflatoxin assay 1/	U.S. grade
	Percent	°F.	°F.	Percent	P.p.b.	No.
Bin No. 7:						
0 2/	18.5	83	64	--	--	1
2 days	18.6	66	63	3	--	1
5 days	18.4	79	80	1	--	1
8 days	18.0	70	79	26	--	1
11 days	17.6	69	59	33	--	1
14 days	17.6	61	54	40	--	1
17 days	18.1	56	67	63	--	1
20 days	17.6	67	60	49	--	1
Bin No. 8:						
0 2/	19.0	83	64	--	--	1
3 days	18.4	63	63	1	--	1
6 days	18.2	77	69	10	--	1
9 days	18.2	78	78	39	--	1
12 days	17.8	60	60	38	--	1
15 days	17.7	56	52	43	--	1
18 days	17.6	65	70	47	--	1
21 days	17.2	60	58	59	--	1
Bin No. 9:						
0 2/	19.0	83	64	--	--	1
4 days	18.4	73	77	3	(3/)	1
7 days	18.1	71	70	11	--	1
10 days	18.2	77	59	41	(3/)	1
13 days	17.6	61	55	38	6	1
16 days	17.2	53	57	51	--	1
19 days	18.4	69	61	35	--	1

1/ Dashes indicate no detectable amounts.
2/ Immediately after rice was stored.
3/ Trace only.