

PERFORMANCE OF DIFFERENT BEAN CLASSES AND TYPES IN NORTH DAKOTA

A. A. SCHNEITER, J. R. LUKACH, R. NOWATZKI,
N. R. RIVELAND AND J. C. GARDNER

Several classes of dry edible beans appear to be adapted in North Dakota. Yields and maturity ranges of new potential classes have been comparable to the classes presently being grown and have potential for production in North Dakota.

Fifteen separate classes of dry edible beans are grown and marketed in the United States. National production of the more important classes from 1978-80 is given in Table 1 (1). The majority of the dry beans now grown in North Dakota are the pinto class although production of the navy bean has increased since 1975 (2). Other classes of dry edible beans are grown on a very limited acreage or not at all.

Several different classes of dry edible beans have been tested by the Agricultural Experiment Station, North Dakota State University, for several years to determine their adaptability in North Dakota. The advantage of growing different bean classes is that each class of beans commands a different price and market in the marketing system. The production of various classes can be important since this type of diversity allows the producer to take advantage of various market prices or production contracts.

A disadvantage of growing more than one class or type of beans on a farm is that the classes cannot be mixed, and separate storage areas and probable equipment cleanout between harvest operations are necessary. Markets have not yet been developed in North Dakota for most of the less commonly grown classes, so a grower should obtain a contract with a buyer before their production.

The bean classes black turtle, red Mexican or small red kidney, great northern, and light red or pink kidney are well adapted to production in North Dakota. Most of these classes have well developed markets outside North Dakota. Several other classes with very limited markets including cranberry, yelloweye, marrow, brown, and large red kidney have also been tested, but no varieties have been found that are well adapted in North Dakota, primarily because of late maturity.

Adapted bean classes are compared for yield and maturity at several locations and years to UI 114, a commonly grown pinto variety, in Table 2. Seeding dates of

all classes were identical for a given location each year. If more than one variety of a class was evaluated the variety with the highest yield was compared to UI 114. As indicated, most of the listed classes perform equal to or better than UI 114.

The period from seeding to physiological maturity of most of the listed classes is acceptable for production in North Dakota. The varieties evaluated in these experiments probably are typical of these different classes, but as in any agronomic crop, varieties within a class may vary in yield and maturity. If a producer is considering growing some of the bean classes, it is critical to know the specific variety.

Characteristics and performance of adapted bean classes follow:

Black Turtle: This class of dry edible beans, primarily the variety T-39, has performed very well in North Dakota, especially in the eastern dryland locations. Limited acreages are being grown in several areas of North Dakota. California and New York have traditionally been the largest producers of this class. The variety T-39 listed in Table 2 was developed in California. The potential export market for this type of bean would be in countries of the Caribbean and Central and South America where black turtle beans are very popular and are grown quite extensively. Black turtle is also used in the United States (in areas having people of Latin American descent). The variety T-39 is a bush type with purple blossoms having resistance to most of the rust strains prevalent in North Dakota in recent years. The black turtle types also appear to have some degree of tolerance to Sclerotinia, although some can occur if the disease infection is severe enough. The maturity of T-39 black turtle is of a range that is very acceptable for production in North Dakota. Other varieties presently under evaluation are Black Beauty, Ebony, and Midnight.

Red Mexican or Small Red Kidney: Washington and Idaho are the leading producers of this bean class. Two varieties of red Mexican beans, UI 36 and UI 37, which have been tested extensively are listed in Table 2, although other varieties including NW 59 and NW 63 also perform well. UI 37 is a very early-maturing bush variety with large seed suitable for late seeding or where early maturity is desired. This variety has performed well over most of North Dakota with yields similar to pinto UI 114. Under irrigation the early maturity of UI

Dr. Schneiter is Associate Professor, Department of Agronomy; Lukach is assistant agronomist, North Central Experiment Station, Minot; Nowatzki was formerly Superintendent, Langdon Experiment Station; Riveland is associate agronomist, Williston Experiment Station, and Gardner is assistant agronomist, Carrington Experiment Station.

37 has shown no advantage. The variety UI 36 has vining plant habit and maturity similar to the pinto types. Both UI 36 and UI 37 are susceptible to rust although UI 37 may escape infection because of its early maturity.

Great Northern: The variety Emerson, developed in Nebraska, has been the highest yielding and best adapted for maturity of several varieties tested. Its maturity is similar to UI 114. Yields have been consistent but slightly below UI 114 over all areas of North Dakota. Emerson has a prostrate growth with pods borne near the soil surface and as a result may be susceptible to staining, sprouting, and yield reduction under prolonged wet soil conditions. The disease response of Emerson is similar to UI 114. Nebraska and Idaho lead in the production of great northern beans. Small acreages have been grown in North Dakota but interest at the present time appears limited.

Light Red Kidney: The variety Pink Viva developed by the USDA at Prosser, Washington appears to be the best adapted of the light red kidney types tested in North Dakota. Yields have generally been similar to UI 114 at most locations. The variety has a distinctive dull green leaf color and is susceptible to rust and other diseases that attack UI 114. California and Idaho are the leading producers of this class of dry beans.

Navy or Pea Beans: The production of navy beans in North Dakota has increased from 61,000 cwt in 1975 to 404,000 cwt in 1980. North Dakota ranks third below Michigan and Minnesota, which produced an estimated 4,648,000 and 458,000 hundredweight respectively in 1980 (1). The variety Fleetwood, developed in Canada,

has consistently been the highest yielding navy variety with especially good yield in eastern North Dakota. It is also the latest in maturity of the varieties that have been evaluated. Earlier maturing varieties of navy beans are available and perform well in North Dakota but are inferior to Fleetwood for yield. Fleetwood has a bush plant type like most navy bean varieties. Only the bush type is recommended since staining could result with a vining plant type where the pods are borne near the soil surface.

Adzuki Beans: Adzuki beans are of a different genus and species than are dry edible beans. The University of Minnesota has conducted some research on adzuki beans and small acreages are grown in southern Minnesota. A new variety Minoka was released recently by the University of Minnesota. The yield of the variety Hoki listed in Table 2 has been equal to or greater than Minoka in North Dakota tests. Adzuki beans have a bush plant type, ripen very unevenly, and appear to shatter easily. The yield of adzuki beans has been lower than dry edible beans in North Dakota, with highest yields obtained with irrigation at Oakes, ND. Yields have progressively decreased as the test site was moved northward. Producers are advised to grow adzuki beans only with a contract for purchase.

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LITERATURE CITED

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2. North Dakota Agricultural Statistics, 1980. North Dakota Crop & Livestock Reporting Service, Fargo, ND 58108.

Table 1. Dry edible bean production of selected commercial classes in the United States from 1978-80.

| | Navy | Great Northern | Pinto | Red Kidney | Pink | Cran- verry | Small red Kidney | Black Turtle | Small white | Flat sm. white |
|------|----------------------|----------------|-------|------------|------|----------------|---------------------|-----------------|----------------|-------------------|
| | ----- X 100 cwt----- | | | | | | | | | |
| 1978 | 5604 | 1863 | 5638 | 1827 | 687 | 361 | 366 | 1140 | 192 | 11 |
| 1979 | 5858 | 1998 | 6051 | 1602 | 817 | 310 | 506 | 229 | 190 | 3 |
| 1980 | 5510 | 2077 | 9933 | 1839 | 1803 | 220 | 361 | 1369 | 193 | - |
| AVG. | 5657 | 1979 | 7207 | 1756 | 1102 | 297 | 411 | 913 | 191 | 5 |

Table 2. Yield comparisons of various bean classes and types as a percent of UI 114 when tested at comparable locations and conditions in North Dakota. Average days to maturity over all locations and conditions also is given.

| | | Yield as a percent of UI 114 | | | | | | | | | |
|----------------|-----------|------------------------------|-------------------|--------|----------------------|--------------------|----------|----------------------|------------------|-----------|--------------------|
| | | -----Eastern ND----- | | | -----Central ND----- | | | -----Western ND----- | | | |
| Class | Variety | Hatton | Dryland Barney | Fargo | Total Sta. yrs. | Dryland Langdon | Carring. | Total Sta. yrs. | Dryland Minot | Williston | Total Sta. yrs. |
| Pinto | UI 114 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Navy | Fleetwood | 108(3) ¹ | 128(2) | 108(3) | 113(8) | 93(1) | 87(2) | 89(3) | 81(2) | 88(2) | 84(4) |
| Black Turtle | T-39 | 110(4) | 112(3) | 88(4) | 102(1) | 100(2) | 93(3) | 96(5) | 92(3) | 100(2) | 95(6) |
| Gr. Northern | Emerson | 89(4) | 98(3) | 107(4) | 98(11) | 92(3) | 96(3) | 94(6) | 91(4) | 118(3) | 101(7) |
| Lt. Red Kidney | Pink Viva | 85(4) | 120(3) | 121(4) | 107(11) | 100(2) | 106(3) | 103(5) | 98(3) | 119(3) | 108(6) |
| Red Mexican | UI 36 | 96(4) | 108(3) | 105(4) | 102(11) | 73(3) | 99(3) | 86(6) | 109(4) | 112(3) | 110(7) |
| Red Mexican | UI 37 | 115(4) | 111(3) | 110(4) | 112(1) | 97(3) | 99(3) | 98(6) | 100(4) | 98(3) | 99(7) |
| Adzuki type | Hoki | 52(3) | 57(2) | 49(3) | 52(8) | 13(1) | 23(1) | 18(2) | - | - | - |

| | | Irrigated | | | Average days from seeding to maturity on Dryland & Irrig. | |
|----------------|-----------|------------|--------|--------------------|---|--|
| Class | Variety | Carrington | Oakes | Total Sta. yrs. | | |
| Pinto | UI 114 | 100 | 100 | 100 | 97 | |
| Navy | Fleetwood | 93(1) | 102(3) | 100(4) | 109 | |
| Black Turtle | T-39 | 95(2) | 100(4) | 98(6) | 100 | |
| Gr. Northern | Emerson | 92(2) | 94(4) | 93(6) | 97 | |
| Lt. Red Kidney | Pink Viva | 102(2) | 94(4) | 97(6) | 101 | |
| Red Mexican | UI 36 | 98(2) | 100(4) | 99(6) | 99 | |
| Red Mexican | UI 37 | 88(2) | 98(4) | 90(6) | 85 | |
| Adzuki type | Hoki | 49(1) | 62(3) | 55(4) | 115 | |

¹Number in () indicates the years that this variety was compared to UI 114.