

PERFORMANCE OF NEW POTATO VARIETIES AND LINES IN COLUMBIA BASIN ^{1/}

by
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New Varieties Needed

Because of productivity, disease, grade and internal quality problems with varieties currently being grown in the Columbia Basin, there is a critical need for new varieties. With the present costs of growing, processing, packing and marketing a crop of potatoes there is very little profit margin to absorb the increased costs caused by these problems. Changes in the weather which increase the expression of some of the problems, such as we have witnessed the past couple of years with internal brown spot, can place the whole potato industry in serious jeopardy. More gradually changes, such as the decreasing yields, solids and grade that are occurring Columbia Basin farms that are cropped repeatedly to potatoes, and build up soil-borne diseases, can eventually drive these farms out of potato production and decrease the profitability of many support industries that serve these farms.

Resistance to the diseases, pests and stresses which cause most of these problems are readily available in breeding lines. Many promising new lines are being developed containing various combinations of these resistances but it is extremely difficult to get them all together in one bundle with all the appearance, yield, quality, handling and storability characteristics needed in a commercial variety. Several near misses have been released as varieties in the past few years. They have been tried by the industry on a limited scale and then, in spite of their great advantages over current varieties, they have been rejected because of one, or a few major weaknesses.

Usually new varieties or potential varieties have been tested using the same planting, growing, harvesting, storing and processing methods used for Russet Burbank. In many cases such conditions are not optimum for the new variety or line and it expresses weaknesses that result in its rejection from further testing. Also most new lines are judged for potential use as an all-purpose, 12-month-a-year variety like Russet Burbank. If they don't measure up in every regard they are discarded, without making much effort to determine if they might be very useful for certain growing areas, markets or seasons of the year. Many problems in the Columbia Basin potato industry could probably be alleviated with well-planned use of varieties already available, if growers, processors, packers and marketing people would recognize the potential value of these lines to them and would take the trouble to work out optimum conditions for new varieties.

Over the past six years we have widely evaluated many hundreds of new lines coming out of U.S. and Canadian breeding programs and taken a thorough look at new variety releases. Most show very little potential for use in the Columbia Basin. However, there are several that deserve more thorough evaluation by the potato industry, to determine whether they may fill an important "slot" in the needs of this area. Following are "performance profiles" of some of the more promising, and some not-so-promising cultivars which industry people have heard about and wonder if they should be testing.

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Performance Profiles

Russet Burbank (Many Trials). Will be hard to replace but has many problems - low grade, net and internal necrosis, brown center and hollow heart, blackspot bruising and susceptibility to almost every potato disease. Its good yields, good storing and cooking qualities and wide adaptability have built for it a reputation for quality and have made "oblong russet" the prime selection criteria in most U. S. breeding programs. Still the one to beat!

Lemhi (73 Trials). Very nice oblong russet with good yield and high percent No. 1's. Can be harvested quite early in the fall. Few external or internal problems except for its serious blackspot susceptibility. It seldom shows brown center or has as much hollow heart as Russet Burbank in Washington trials, except under excessive irrigation. It has good solids, low sugars and fries well, but often has limp fries. It does not store as well as Russet Burbank, sprouts sooner and has some storage rot problems. It has good resistance to scab and is not quite as susceptible to some early dying diseases as Russet Burbank. It is not as resistant to Sencor damage as Russet Burbank. Bruise susceptibility limits its use, but works well for processing when taken directly from field to factory during a 3-month period in the fall. The spectre of blackspot bruising will probably prevent its use for fresh market.

Nooksack (81 Trials). An unusual processing and fresh market variety that has been released for 8 years now and is finally gaining acceptance. It has an upright, bushy plant that produces blocky, medium-russet, smooth tubers that are often flattened and sometimes pear-shaped. Because of extreme dormancy, seed needs to be warmed extra long before planting, which sometimes causes seed piece rot and poor stands. It has few eyes, so large seed pieces are needed. It usually produces low numbers of stems and tubers, so the tubers are generally large in size. It requires less irrigation and fertilization than most cultivars, especially Russet Burbank. It usually produces less total yield than Russet Burbank but has few culls so often produces more total yield of No. 1's. Seldom has external or internal blemishes but will growth crack if irrigation rates are high. Has very high solids, low sugars and outstanding cooking qualities. Can not be harvested as an early cultivar, must be allowed to mature and suberize properly. It shows very little bruising and stores well, usually requiring no sprout inhibitor, but has some weakness to storage rots. Very resistant to scab and Sencor damage and has some resistance to Colorado potato beetle, but is susceptible to early dying diseases, although less so than Russet Burbank. Because the serious internal bruising and storage problems being experienced in Russet Burbank and other cultivars are seldom found in Nooksack and because more growers are learning how to get a good stand of Nooksack with resulting good yields, this cultivar is continuing to grow in importance. It should be a valuable long term, storage variety.

Butte (68 Trials). A late season variety with long, smooth, medium-russeted tubers that have few external or internal blemishes, so has high percent No. 1's. Unless fertilized and watered quite heavily and grown over a long season does not produce good yields and will produce pear-shaped tubers. Has good solids and cooking qualities but will develop high sugars and dark fries after cold storage. Sprouts early in storage and often has shatter bruise and storage rot problems. Has good scab resistance but is susceptible to early dying. Should be evaluated in the Columbia Basin as a fresh market and processing variety to be stored for only a few months at higher storage temperatures.

Wn521-12 (22 Trials). A blocky chipper or french-frying line with a light net skin, should be compared with Kennebec. Produces a good yield and high percent No. 1's. Sets low numbers of tubers which get very large so has a high percent over 12 oz. Normally has few external or internal blemishes except for an extreme tendency to shatter bruise. Has high solids early in the season. Tubers are very smooth and do not produce second growths. They occasionally have serious hollow heart. It has very good solids, low sugars and produces excellent fries. Stores fairly well but is very susceptible to bacterial soft rot. Susceptible to scab and the early dying diseases, but less so than Kennebec. Because of susceptibility to bruising, soft rot and scab may not be acceptable, but should be evaluated for early season processing.

WnC672-2 (17 Trials). A round, flat, medium-russeted chipping line that might have some use for french fries because of number of tubers over 12 oz. Good yields and high percent No. 1's. Tubers do not produce many second growths but are often rough in shape. Seldom much hollow heart but has serious weakness to internal necrosis and occasionally has serious shatter bruising. It has good solids, very low sugars and makes excellent fries, although many are too short. Stores fairly well but quite susceptible to bacterial soft rot and fusarium dry rot. Susceptible to scab and early blight, but has some resistance to other early dying diseases. It's somewhat sensitive to Sencor. Because of susceptibility to bruising, scab and internal problems and its short french fries it will probably have limited acceptance as a processing cultivar in the Northwest. It should be evaluated by Northwest chippers.

AD74135-1 (5 Trials). Long, medium-russeted tubers. Produces a very good yield with good percent No. 1's and moderate proportion over 12 oz. Has a nice external appearance but has a weakness to growth cracking and internal necrosis. Has a strong tendency toward pear shape. Has marginal solids and sugars and produces fries that are barely acceptable. Has short dormancy, some thumb nail cracking and blackspot bruising. Good scab resistance but is very susceptible to all early dying diseases. A high yielding, nice looking line but its marginal storability, processability and bruise susceptibility need to be further evaluated to see if they are in the range of acceptability.

A72685-2 (33 Trials). Oblong, medium-russeted tubers. Very good yields, good percent No. 1's, rather large proportion over 12 oz. Seldom produces knobs but tends to have rough shape. Occasionally has rather serious hollow heart and internal brown spot. Has good solids, rather low sugars, and produces fair fries but they are often limp, sometimes variable in color with sugar ends and develop some after-cooking darkening. Does not store well, has short dormancy and shrivels badly. Has some storage rot and blackspot bruising, about like Russet Burbank. Susceptible to scab, somewhat sensitive to Sencor, susceptible to early blight, but some resistance to Verticillium and Sclerotinia wilts. Because of poor storability, handling and frying characteristics and susceptibility to scab, will probably not be acceptable as a processing cultivar in the Columbia Basin. It might have some fresh market potential because of its high productivity.

Norgold Russet (Many Trials). Has become established as a line to beat for early fresh market because it has the desired oblong russet type, is very early, has few internal problems, and can be handled and shipped with few bruising or rot problems. It is not high yielding, has serious blackleg and early dying problems, has low solids and only marginal culinary quality but its scab resistance and attractive appearance will help it retain its popularity.

Norgold M (26 Trials). One of the better of a series of Norgold selections made in Nebraska which have larger plants that are not so susceptible to early dying diseases, and consequently, usually have large tubers and higher yields. Unfortunately, this more vigorous top growth seems to cause more roughness and hollow heart than is found in standard Norgold. In most of our trials though, Norgold M has been clearly superior to Norgold. This selection and some of its sister selections should be looked at more extensively by Norgold growers in the Columbia Basin.

LC-1 (10 Trials). An interesting new line picked up a few years ago as a rogue in a seed field. It has a small, compact plant which produces a medium yield of smooth, oblong, medium-russeted tubers that do not get very large and usually have a pear shape. It is an early-maturing line that is very susceptible to early dying diseases but has a good scab resistance. Has few external or internal blemishes and has good bruise resistance. It has a storage rot problem but generally has had good storability, solids and cooking qualities in preliminary trials. As this line becomes available it deserves more extensive trials.

Targhee (44 Trials). Produces an oblong tuber with heavy russetting that often develops into elephant skin. Has medium to good yield with medium percent No. 1's. Seldom produces second growths but tends to be rough and non-uniform in size or shape and sometimes

has growth cracking. Occasionally has serious hollow heart and often has serious blackspot or shatter bruising. It is susceptible to leafroll net necrosis. It has only fair solids, tends to build up sugars in storage and generally produces poor french fries. It stores fairly well but has rather short dormancy and often shows soft rots. It has excellent resistance to scab, is not very sensitive to Sencor and has some resistance to Verticillium, but is susceptible to early dying diseases. With only medium yield, storability and cooking qualities and serious bruising and internal problems probably not a very good candidate for processing or fresh market.

Russette (52 Trials). Produces low yields of small oblong, flattened tubers with heavy russetting. Has a serious weakness to growth cracking and often has elephant skin and hollow heart. It has long dormancy and stores well. Has good solids and eating quality but builds up sugars in storage which produces dark fries. It is somewhat susceptible to scab and is susceptible to early dying. Will probably have limited use in the Northwest because of low yields and disease susceptibility.

BelRus (7 Trials). An attractive cultivar which produces a low yield of long, heavy-russeted tubers with few external or internal blemishes except a strong tendency toward elephant skin, especially on lighter soils. It is a good eating potato. Is susceptible to scab and early dying. Will probably find very limited use in the Northwest because of low yields and disease susceptibility.

Allagash Russet (8 Trials). An attractive cultivar with low yields of smooth, oblong, russet tubers with few external or internal blemishes except some blackspot bruising. It has fair cooking quality similar to Norgold. Is very susceptible to scab and early dying. Probably will not find a place as a fresh market line in Northwest because of low yields and disease susceptibility.