POTATO VARIETY DEVELOPMENT SCREENING CRITERIA

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The Potato Variety Development program at the University of Idaho R&E Center in Aberdeen, Idaho is responsible for breeding and commercializing new varieties. New varieties must offer advantages over their predecessors and be free of serious problems. Prior to release clones are subjected to extensive testing to ensure superior quality. Some of the criteria evaluation used for resistance screening are shown here.

One of the first criterion is a visual selection of attractive appearance. The first two years of selection are based on general appearance that is tubers are free of external defects, such as growth cracks (Figure 1), skin checking (Figure 2), and misshapen tubers.

Figure 1. Growth cracks.

Figure 2. Skin checking.

Selections are made on a clones' ability to avoid stress related malformations. Unacceptable tuber shape includes curves, bottlenecks, and pointed ends (Figure 3). Secondary growth and knobs (Figure 4) are other malformations causing clones to be rejected.

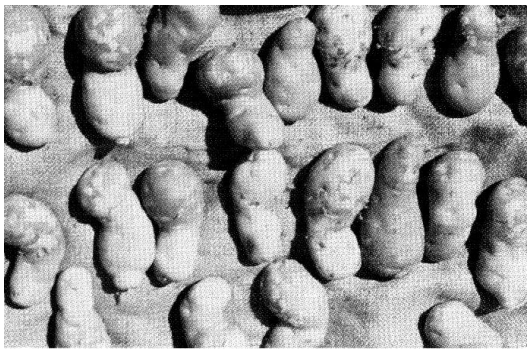

Figure 3. Tuber shapes including dumbbells and pointed ends.

Figure 4. Knobs.

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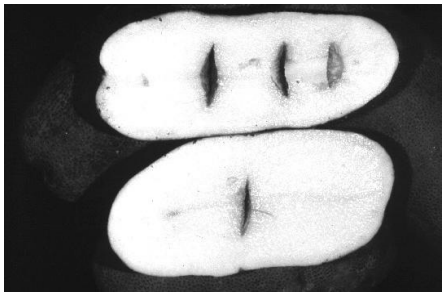
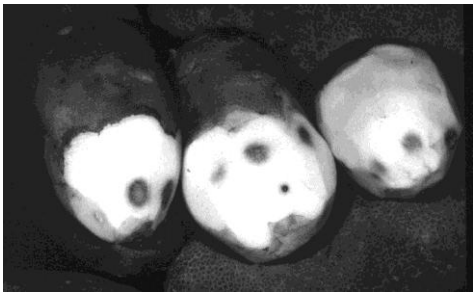
During subsequent years, selected clones are entered into trials and evaluated for yield and quality. Internal defects are noted: A) Hollow heart, B) blackspot bruise, C) internal brown spot, D) net necrosis, E) stem end discoloration.



A



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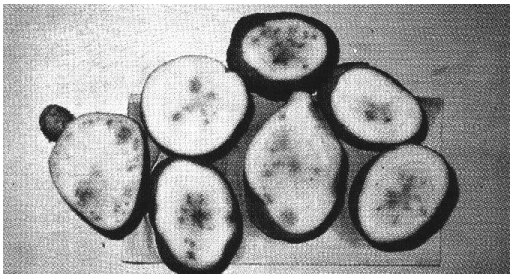

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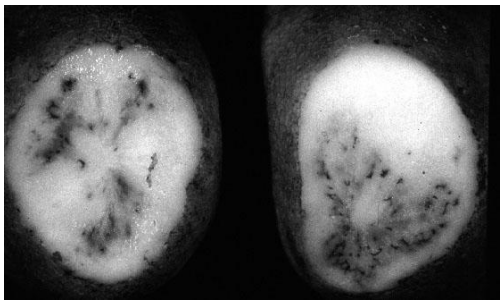

D

E

The ability to fry after being stored at relatively cold storage temperatures and maintain light fry/chip color is a very important trait for new varieties. This characteristic is tested after storing tubers at 40° and 45°F for 3 to 5 months (Figures 5 and 6).

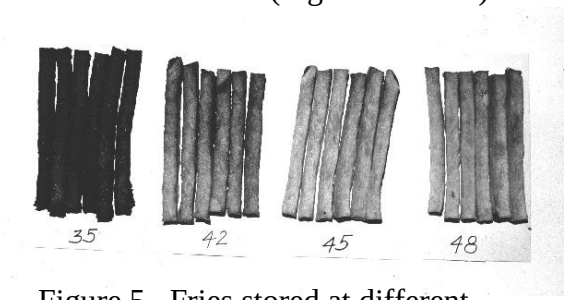

Figure 5. Fries stored at different temperature regimes.

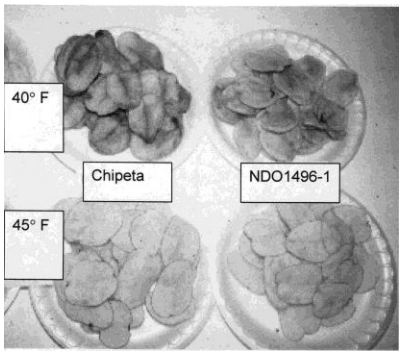

Figure 6. Varietial differences in chip color stored at the same temperatures.

Bruise resistance potential is another characteristic selections are evaluated on. Tubers are abrasive peeled and incubated for 24 hours to test for blackspot bruise to develop. Tubers are rated on a 1 to 5 scale with 5 being severe (Figure 7).

Figure 7. Blackspot Bruise severity rating with 5 being severe.

Shatter bruise evaluations are conducted by dropping tubers through a shatter chamber and rated on severity of bruise development after 72 hours. Before bruising, tubers are put in 40°F overnight. Severity ratings of 1 to 5 with 5 being severe.

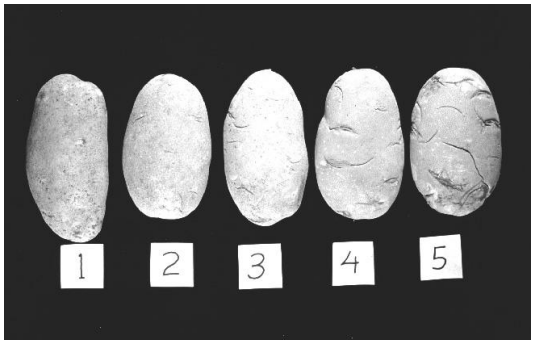

Figure 8. Shatter bruise tubers.

Resistance to pests and diseases is important for new varieties. Many pests are considered during breeding, for example, damage to tubers from corky ringspot or root-knot nematodes can be devastating to crops. Injury can range from slight blemishes to reduced yields to unusable. Clones are screened for resistance to corky ringspot and root-knot nematodes (Figures 9 and 10).

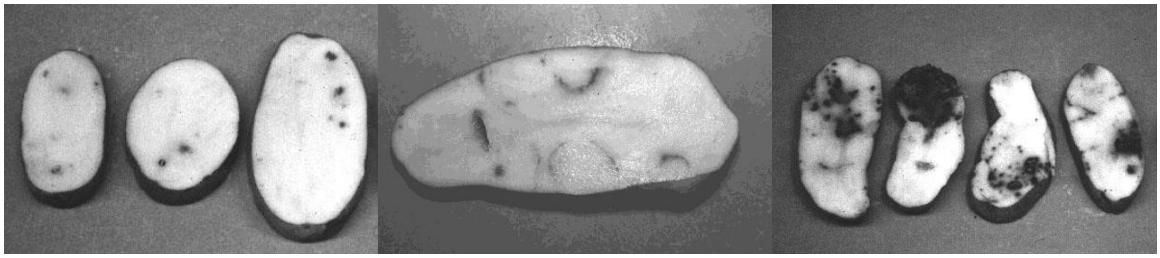
Figure 9. Corky ringspot damage from spots to arcing to rot.

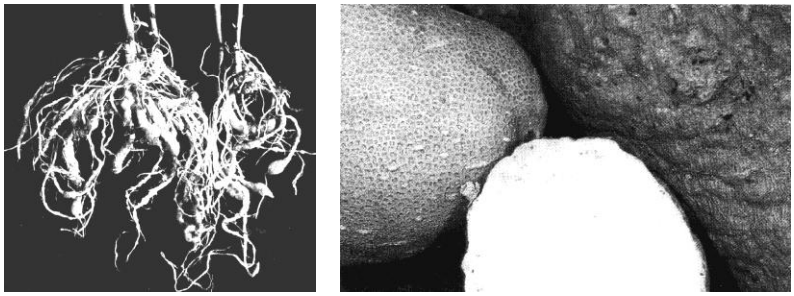
Figure 10. Root-knot nematode damage to roots and tubers.