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Since the 1961 American Potato Association meeting at Wenatchee, Washington, there has been wide interest in Idaho in the use of press wheels on potato planters. Dr. Robert Kunkel, horticulturist at Washington State University helped develop this with potato growers in the Columbia Basin. The principle behind the use of the press wheel is deep planting coupled with shallow covering of the seed piece, Figure 1. This is in contrast to a high hill which discs normally make. If the moisture can be retained, a shallow covering is desirable because it allows quicker emergence and less likelihood of damage to the plant from *Rhizoctonia solani*.

PLANTING TRIALS AT ABERDEEN

Three methods of planting were compared at Aberdeen: press wheel, normal hill using discs, and hills flattened over the seed pieces by dragging a weighted chain behind the planter. In 1962 these treatments were applied on 3 different dates of planting, 2 dates of planting in 1963 and only 1 date in 1964. There were 3 replicates for each treatment and each date applied across the length of the field. Seed piece spacing was approximately 9 inches with 36-inch row spacing. Normal cultural practices were used during the growing season. Observations were made on differences in rate of emergence. Near the end of July, 10 hills of each treatment were dug up and observed for rhizoctonia on the stems and roots. Each

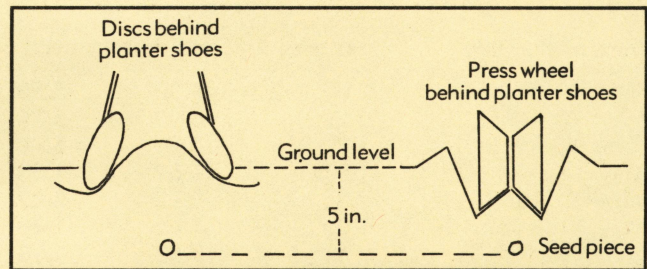


Figure 1. Principles of press-wheel planting.

plant was rated according to the Barratt and Horsfall method of rating plant diseases. Two, 30-foot portions of each plot were harvested the first week of October and later graded for No. 1's, small, malformed, and number of green ends. Specific gravity was determined after the grading.

PRESS WHEEL BENEFITS

One of the benefits derived from the use of the press wheel was more rapid emergence. This was more apparent under cool weather conditions of early plantings or in soils which warm up slowly in the spring. Later plantings that emerged during warmer weather did not show such differences in rate of emergence. Figure 2 shows the types of plants obtained from the use of the press wheel and the discs which form a high hill. The short stubby plants from the press wheel appear healthier and more able to resist the ravages of rhizoctonia.



Figure 2. Types of plants obtained: Left, normal. Right, press wheel.

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Table 1. Rhizoctonia readings of plants from three methods of planting. Ratings in degree of infection.*

| Date of Planting | Treatment | | |
|------------------|-------------|-----------|------|
| | Press wheel | Hill flat | Hill |
| May 8, 1962 | 2.80** | 5.50 | 5.50 |
| May 23, 1962 | 3.20 | 5.50 | 5.70 |
| June 4, 1962 | 3.80 | 4.50 | 5.40 |
| May 16, 1963 | 1.31 | 1.52 | 1.68 |
| June 8, 1963 | 2.30 | 2.72 | 3.87 |
| May 11, 1964 | 1.05 | 1.45 | 1.40 |
| Mean | 2.41 | 3.53 | 3.93 |

* Based on Barratt and Horsfall method of rating

Rating of 1 = 3% infection
 2 = 3-6% infection
 3 = 6-12% infection
 4 = 12-25% infection
 5 = 25-50% infection

** Average rating of 10 plants/replicate and 3 replicates.

Table 1 shows the relative difference in amount of rhizoctonia infection. Most of the lesions were superficial and apparently the plants were able to overcome the effect of rhizoctonia because of no appreciable effect on yield. However, as Table 1 shows, there definitely was less infection with the use of the press wheel.



Figure 3. Differences in tuber set.

Figure 3 shows the comparative difference in method of tuber set between the normal planting with discs and the use of a press wheel. A more compact set of tubers tended to form under the press wheel type of planting. Where the discs are used, a longer stem developed as can be seen in the photograph and tubers are set up and down the stem, some of them closer to the surface of the soil. Some objections have been made of the compact set in that the crowding tends to cause malformation of tubers. Possibly this may happen on heavier soils. However, in none of these experiments was this noticed. Although the photograph appears to show a heavier set under the press wheel, this has not been apparent or reflected in the yield.

Table 2 shows the effect of the different methods of planting on yield. There were no significant differences in yield factors caused by 3 methods of planting. However, in 4 out of 6 planting dates, the press wheel planting yielded slightly higher total yield than the other methods of planting. Under more severe cases of rhizoctonia possibly greater yield differences would have been present.

Table 2. Effect of press wheel plantings on yield (cwt/acre).

| Date of Planting | Yield factor | Treatment | | |
|------------------|--------------|-------------|-----------|------|
| | | Press wheel | Hill flat | Hill |
| May 8, 1962 | Total | 331 | 323 | 305 |
| May 23, 1962 | | 288 | 320 | 331 |
| June 4, 1962 | | 246 | 244 | 232 |
| May 16, 1963 | | 331 | 298 | 336 |
| June 8, 1963 | | 338 | 320 | 315 |
| May 11, 1964 | | 215 | 208 | 200 |
| Mean | | 291 | 285 | 286 |
| May 8, 1962 | No. 1's | 217 | 206 | 197 |
| May 23, 1962 | | 201 | 208 | 216 |
| June 4, 1962 | | 127 | 151 | 122 |
| May 16, 1963 | | 203 | 196 | 195 |
| June 8, 1963 | | 241 | 240 | 232 |
| May 11, 1964 | | 187 | 190 | 183 |
| Mean | | 187 | 190 | 183 |

There were very few green ends so it is difficult to tell the effect of methods of planting on the amount of greening of tubers. Several reports have been received that the press wheel tends to reduce greening of tubers because of deeper set. No appreciable effect on specific gravity has been obtained.

DISCUSSION AND CONCLUSION

The use of press wheels offers some advantages over conventional methods of planting. The benefit derived would appear to depend on a number of factors such as: Time of planting or temperature for a period of 2 to 3 weeks following planting. The results definitely show that a shallow covering over the seed piece allows quicker emergence than conventional planting under cool conditions. Lighter soils which warm up quickly would not derive as much benefit as would heavier soils. A significant reduction in amount of rhizoctonia infection (cankering) on the stems of plants was obtained with the use of press wheels. The short, sturdier stems under press wheel planting appear more able to resist the ravages of rhizoctonia.

There appears to be a trend present of slightly higher yields with the use of press wheels. Possibly under more severe conditions of *Rhizoctonia solani* greater yield differences would have been obtained.

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