

SOME FACTORS AFFECTING PLANT STANDS IN POTATO FIELDS

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In 1967, plant stand counts by the writer indicated that many potato fields in Alberta had plant populations considerably below those planned by the grower. Percentage stands actually ranged from a low of 37% to a high of 93%. The average stand in the Edmonton area was 59%. The average stand in the Lacombe area was 84%. In 1968 and 1969 with the co-operation of Plant Pathologists Dr. W. P. Skoropad and Dr. N. Colotelo, and Agricultural Engineer T. A. Preston, studies were initiated to determine some of the reasons for reduced plant stands.

The 1968 investigations were conducted in 3 fields in the Edmonton area and in 7 fields in the irrigated areas of southern Alberta. At each point where a plant was very weak or missing in a randomly-chosen 200-foot length row the hill was dug with a potato fork to determine, if possible, the reason for the difficulty.

Stands in 1968 averaged 69% in the Edmonton area (up 10 over 1967) and 88% in southern Alberta. On the bases of the information obtained in 1968 it appeared that the major factors reducing plant stands in Alberta potato fields were mechanical in origin (Tables 1 and 2). Investigations of Idaho potato fields in 1967 (1) had indicated that "Loss in stand is primarily due to seed piece decay".

TABLE 1 FACTORS REDUCING PLANT STANDS IN POTATO FIELDS EDMONTON AREA 1968

Factor	Relative Frequency
Seed piece missing	107
Wrong spacing	34
Rhizoctonia	23
Fusarium dry rot	6
Misplaced	3
No eye	2
Sliver	2
Soft rot	1
Mechanical damage	.3
Unidentified disease	.3

TABLE 2 FACTORS REDUCING PLANT STANDS IN POTATO FIELDS SOUTHERN ALBERTA 1968

Factor	Relative Frequency
Seed piece missing	57
Wrong spacing	17
Rhizoctonia	8
Fusarium dry rot	4
Soft rot	3
No eye	2
Sliver	1.5
Misplaced	1.5
Mechanical damage	.3
Unidentified disease	.1

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In 1969 the Alberta investigations were continued on a larger scale. Thirty-one fields were included -- 19 in the irrigated area, 4 in the Lacombe area and 8 in the Edmonton area. In-row spacing and stand data are presented in Table 3.

TABLE 3 % STAND IN POTATO FIELDS 1969

Location	Grower Spacing		Stand	
	Range	Ave.	Range	Ave.
Edmonton	12-16 1/2"	14"	56-92%	75%
Lacombe	14-15 1/2"	15"	81-103%	90%
Southern Alberta	8-13"	11"	48-110%	82%

As was the case in 1968, the 2 major factors reducing stands in 1969 were (Tables 4, 5, and 6), seed piece missing, or seed piece incorrectly spaced so that gaps and bunching occurred. In actual fact the missing seed piece was the major factor associated with stand reduction in 28 of the 31 fields observed. Wrong spacing was the second most important factor in 20 of the 31 fields.

TABLE 4 FACTORS REDUCING PLANT STANDS IN POTATO FIELDS SOUTHERN ALBERTA 1968

Factor	Relative Frequency
Seed piece missing	34.0
Wrong spacing	9.9
Fusarium dry rot	7.1
Sliver	5.1
Rhizoctonia	4.6
Soft rot	3.1
Unidentified disease	1.8
No eye	1.2
Misplaced	0.5
Mechanical damage	0.1

TABLE 5 FACTORS REDUCING PLANT STANDS IN POTATO FIELDS LACOMBE 1969

Factor	Relative Frequency
Seed piece missing	15.25
Wrong spacing	6.00
Fusarium dry rot	2.25
Sliver	1.50
Soft rot	0.50
Rhizoctonia	0.75
Unidentified disease	0.25
No eye	0.00
Mechanical damage	0.00
Misplaced	0.00

TABLE 6 FACTORS REDUCING PLANT STANDS IN
POTATO FIELD EDMONTON 1969

Factor	Relative Frequency
Seed piece missing	38.3
Wrong spacing	7.2
Fusarium dry rot	2.8
Rhizoctonia	2.1
Soft rot	1.2
Unidentified disease	.7
Misplaced	.6
No eye	.5
Mechanical damage	.5
Sliver	.5

Fusarium Dry Rot was the third most important factor in 1969 and the incidence of this disease was greater in 1969 than in 1968. It was a more frequent cause of stand reduction in 1969 than was Rhizoctonia, which in 1968 was a more important factor than Fusarium.

Blind seed pieces occurred more frequently in Norgold Russet fields than in Netted Gem fields. This situation appears to be a logical consequence of the fact that Norgolds develop fewer eyes than Netted Gems.

Four different planting machines were used by the growers co-operating in these tests. On the bases of the information obtained it would appear that the adjustment operation and maintenance of the planter are more important in reducing gaps than are the type or make of the machine.

We believe that one of the major benefits of this study has been the focusing of grower attention on the problem of poor stands --indeed perhaps even the fact that a serious problem did exist. The fact that the two major reasons for reduced stands under Alberta conditions are under the direct control of the grower, through careful operation and maintenance of his planter, should prove to be very useful information.

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Literature Cited

1. Cross, V. S., and R. E. Ohms. Better Potato Stands. Idaho Agricultural Extension Service Bulletin 486. 1967.