

Man Labor Requirements for
Harvesting Pole Snap Beans
In Oregon



Oregon State System of Higher Education
Agricultural Experiment Station
Oregon State College
Corvallis

Station Circular 166

May 1945

FOREWORD

Under wartime conditions bean growers have had to depend more and more on women, children, and older people to pick pole snap beans. This bulletin presents data analyzed to show the relative accomplishments of different types of bean pickers according to age, experience, and sex. The results of this study, conducted in the summer and fall of 1943, will be helpful in estimating the labor needs of individual bean growers. Intelligent use of the facts here presented will increase the efficiency of those agencies charged with the responsibility of supplying seasonal harvest help in this industry. *The Summary and Conclusions appear on page 31.*

WM. A. SCHOENFELD
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Man Labor Requirements for Harvesting Pole Snap Beans in Oregon

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INTRODUCTION

GROWERS of truck crops that require considerable hand labor have been acutely affected by the general manpower shortage created by the present wartime economy. With much of the mature skilled labor formerly available to harvest these crops now otherwise employed, the growers have had to seek their workers from among women, young people, and older people not usually employed.

The problem arises as to how many of the immature or unskilled workers are needed to take the places of those formerly available.

Purpose of study

The present study was made to determine the relative efficiency of persons of different ages and sex in the harvesting of pole snap beans. It is part of a larger study in which the harvesting of strawberries, cherries, cane fruits, hops, and prunes was also studied.‡

Scope of study

This bulletin is presented in four separate yet related parts as follows: (1) The **INTERVIEW STUDY** is a discussion of the results obtained from a field study of bean pickers of both sexes and of all ages and years of experience who were interviewed as they worked. (2) The **PLATOON STUDY** presents an analysis of the daily picking records of several hundred school-age youngsters organized into 14 platoons working out of Salem, Oregon. (3) **RECORDS FROM TWO BEAN GROWERS** is an analysis of picking accomplishments obtained from actual book records on certain specific bean fields.

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‡ The Oregon Agricultural Experiment Station is indebted to the county agricultural agents of Linn, Lane, and Marion counties, the nineteen growers, their pickers, and personnel of the Emergency Farm Labor, Oregon Extension Service, and the United States Employment Service for their generous cooperation. Special credit is also due John H. Blosser, formerly Research Assistant, Department of Farm Management, who supervised the collection of the field data.

The authors are indebted to the Emergency Farm Labor, Oregon Extension Service, for the pictures used in Figures 2, 6, and 7; and to the Department of Visual Instruction, Oregon State College, for the pictures used on the cover page and in Figures 1, 12, and 13.

(4) SUMMARY AND CONCLUSIONS bring together and combine, where possible, the results analyzed and presented separately in the preceding sections.*

INTERVIEW STUDY

Scope

Nineteen bean growers located in three Willamette Valley counties (Lane, Linn, and Marion) cooperated in the study. Between August 15 and September 15, 1943, 704 bean pickers were interviewed.

Method

The study was confined to the three counties of the state in which the largest acreages of pole snap beans are grown. The county agricultural agents in the three selected counties were asked to suggest the names of growers whom they thought would be willing to cooperate in the study.

Each grower was interviewed by an experienced field enumerator concerning the number of pickers hired, wages paid, method of hiring, age and sex composition of the crew in normal times as well as in 1943, the variety of beans grown, acreage, approximate yield, and comparison of the 1943 yield with that of former years. The grower was also asked for permission to talk to the pickers.

Field workers went into the bean fields and systematically followed the rows, interviewing each picker met. An attempt was made to cover at least half the rows in which the pickers were working. In all, 52 per cent of the total number of pickers in the 19 fields were interviewed.

Evaluation of the sample

The combined area of the 19 bean patches studied was 210 acres. For the three counties in which they were located the estimated total acreage for processing and for fresh market in 1943 was 2,620, which made the sample 8.0 per cent of the total. These three counties contained 54.0 per cent of the state's 4,850 acres of snap beans in 1943.†

The estimated state average yield of snap beans for processing in 1943 was 6.7 tons per acre. The growers cooperating in the present study estimated their yields at an average of 8.3 tons, which is 1.6 tons, or 24 per cent, greater than the state estimate.

* The present study does not consider the question of how to pick beans. A moving picture entitled "Picking Pole Snap Beans" has been prepared along with a coordinated film strip bearing the same title.

† Oregon State College Extension Circular 432.

According to the 1940 U. S. Census of Agriculture there were 272 bean growers with a combined acreage of 1,641 in Marion, Lane, and Linn counties in 1939. Thus the average for that year would be about 6 acres per patch. It is known that the number of acres has increased since that time, but it is not known whether the number of growers has changed. The patches in the sample studied averaged 10.6 acres in size, and ranged from 3 to 28 acres. Eight of the 19 were between 5 and 7 acres. It is not known what the average size of bean patch was in the three counties studied, because the total number of growers in 1943 is not known.

It cannot be stated how representative the sample of bean patches selected is of the whole, but from the facts pertaining to yield it can be assumed that they were as good as or better than the average run in the state or in the counties studied. It may be assumed further that since the growers selected were known to the county agent as willing to cooperate on such a study they probably represented the more progressive ones.

The method of selecting the pickers was such that a representative cross-section of the workers in each patch was interviewed. The coverage was sufficient to assure an adequate sample. It can be safely assumed, therefore, that the pickers interviewed were at least representative of all the pickers in the 19 patches selected.

RESULTS

Who picked

The pickers studied were chiefly housewives and school children who had responded to the call for harvest help. They ranged in age from 4 to 82 years, and in experience from those who were seeing pole beans for the first time to one who had been picking for 20 years. Most of them lived within a few miles of the bean field where they worked but some were from out of state or from distant points within the state.

One-third of the pickers were women 18 years or older, while nearly two-fifths were girls under 18 years. Most of the male pickers were under 14, although there were several high school boys (Table 1).

Table 1. DISTRIBUTION OF POLE SNAP BEAN PICKERS BY AGE AND SEX
Lane, Linn and Marion Counties, Oregon, 1943

Age group	Men and boys		Women and girls		All	
	Number	Per cent	Number	Per cent	Number	Per cent
Under 14 years	92	13.1	130	18.5	222	31.6
14-17 years	61	8.7	143	20.3	204	29.0
18-55 years	24	3.4	193	27.4	217	30.8
56 years and older	24	3.4	37	5.2	61	8.6
ALL	201	28.6	503	71.4	704	100.0

Growers obtained their help by one or more of four methods. Some got the largest share of their workers from among those who came to the farm or volunteered their services directly. Some canvassed the largest proportion of their workers, a few obtained help through the United States Employment Service, while others got theirs through the Emergency Farm Labor Service of the State Extension Service. On the whole, those who took their help as it came

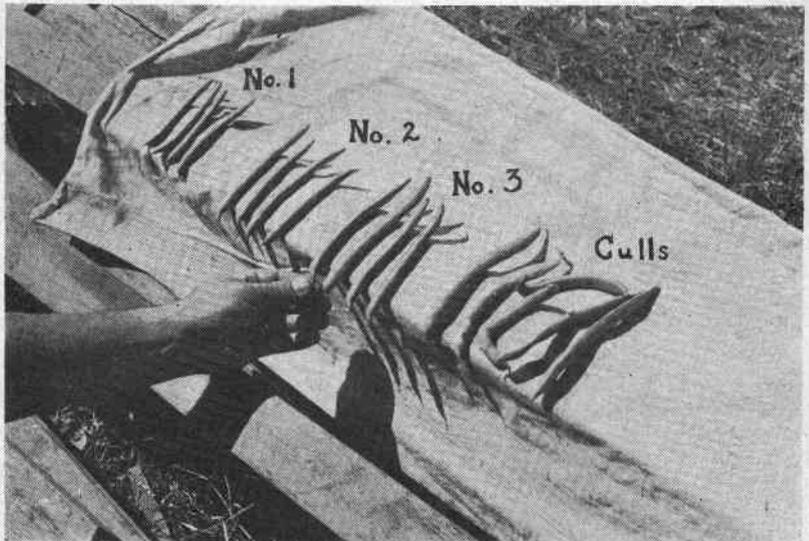


Figure 1. Under favorable growing conditions, beans that grade No. 1 will grow into culls in 4 or 5 days if not picked. This emphasizes the importance of having an adequate number of pickers on hand each day in order to pick the beans before they become No. 3's or culls.

to the farm or sought it through the U. S. Employment Service had a higher proportion of adults than the rest. On the other hand those who canvassed their own help or got it through the Emergency Farm Labor Service had a higher proportion of grade school and high school age pickers than those who used the other channels.

Pickers responded to the call for help for various reasons. For many of the youngsters the job offered a means of purchasing war bonds, school clothes, wrist watches, permanent waves, bedroom furniture, or other goods and services. Some realized how much their help was needed in order to provide food for themselves as well as their brothers in the services. Others picked because their friends or other members of their families were picking.

Many of the women who were doing the best job were working for patriotic reasons. Some had sons in foreign service and found that their home duties did not occupy them sufficiently to keep them from worrying. Others knew that the growers needed their help if the crop was to be saved. (See Figure 1.) A few in their seventies allied to bean picking to prove that they were not growing old.

Men between the ages of 18 and 55 who were in the bean fields were, on the whole, physically unable to be in the army or defense work. Some, who had been working in factories, realized that in order not to lose their health they must work out of doors. A few were migrant harvesters from Arkansas or Oklahoma. Many of them were accompanied by their families.

Some of the older men, like the older women, wanted to prove to themselves and to others that they were not getting old despite some 70 or 80 birthdays. Most of them saw an opportunity to forward the war in a material way even though their fingers were no longer nimble nor their eyesight clear.

Length of picking day

There was little variation in the number of hours worked by people in the various age groups (Table 2). Most of the days began between 7:00 and 8:00 in the morning and ended between 3:00 and 5:00 in the afternoon. A few of the homemakers worked during

Table 2. HOURS PER DAY SPENT PICKING POLE SNAP BEANS
Lane, Linn and Marion Counties, Oregon, 1943

Age group	Men and boys	Women and girls	All
	Hours	Hours	Hours
Under 14 years	7.9	8.0	8.0
14-17 years	8.1	8.2	8.2
18-55 years	8.8	8.3	8.3
56 years and older	8.1	8.1	8.1
ALL	8.1	8.2	8.2

the forenoon only. Since most of the workers carried their lunches, they required a break of only 15 to 30 minutes for their noon meal. Some of the children took more time off for play, thus bringing the number of hours they worked slightly below that of the other groups.

Furthermore, most of the children did not concentrate on their job as closely as did the older pickers. It was impossible to estimate the number of hours they spent in actual picking.

Amounts picked

The average amount of beans picked for all 704 interviewed pickers was 149 pounds per day, or 18.2 pounds per hour. There was, however, considerable range in the amounts picked by individuals, and there was much variation among the age and sex classes (Table 3). In all age classes, except the oldest, the men and boys

Table 3. POUNDS OF POLE SNAP BEANS PICKED PER PICKER PER DAY AND PER HOUR WITH PICKERS CLASSIFIED ACCORDING TO AGE AND SEX
Lane, Linn and Marion Counties, Oregon, 1943

Age group	Men and boys		Women and girls		All	
	Beans picked		Beans picked		Beans picked	
	Per day	Per hour	Per day	Per hour	Per day	Per hour
	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
Under 14 years	107	13.6	95	12.0	101	12.6
14-17 years	144	17.7	143	17.4	143	17.5
18-55 years	214	24.4	193	23.3	194	23.4
56 years and older	176	21.8	183	22.6	180	22.3
ALL	139	17.1	153	18.6	149	18.2

picked more pounds per day and per hour than the women and girls. Of the males 76 per cent were under 18 years of age, however, as compared with only 54 per cent of the females so young. Consequently, the average picking rate for all women and girls combined, regardless of age, was greater than that for all men and boys.

FACTORS AFFECTING AMOUNT PICKED PER DAY

There was considerable variation between the patches as to the rate at which the beans were picked. Several factors probably are responsible. The age of the pickers, their incentives, the amount of discipline over the youngsters, as well as the "set" of the beans, all seemed to enter into the number of pounds picked per person.

In fields where parents or other adults were interspersed with boys and girls, the picking went faster than where the youngsters were allowed to be near those their own age. Youngsters who were working for a specific end seemed to apply themselves more diligently than those who had no specific goal in mind.

It was impossible to determine from the data the extent of the influence of all the factors that might have had a bearing on the rate of picking. Of those that could be studied age and years of experience seemed to have the most influence.

Age and sex

In the younger age groups there was a marked increase in the number of pounds of beans picked per day or per hour with each year increase in age (Table 4). Among the more mature pickers the rates remained fairly even between the ages of 20 and 60. After

Table 4. POUNDS OF POLE SNAP BEANS PICKED PER PICKER PER DAY AND PER HOUR ACCORDING TO AGE OF PICKER¹
Lane, Linn and Marion Counties, Oregon, 1943

Age group	Number of pickers	Average amount picked per day	Average amount picked per hour	Range in amount picked per day
Under 10 years	9	<i>Pounds</i> 72	<i>Pounds</i> 9.9	<i>Pounds</i> 35-200
10 years	18	74	9.1	30-175
11 years	37	80	10.5	35-155
12 years	58	104	13.0	50-200
13 years	99	114	14.0	24-200
14 years	79	132	16.2	60-325
15 years	78	143	17.5	70-270
16 years	32	162	19.9	80-300
17 years	15	152	18.4	90-200
18-20 years	21	180	21.5	130-275
21-30 years	29	204	24.3	130-300
31-40 years	76	193	23.2	100-310
41-50 years	72	200	24.1	85-325
51-60 years	44	196	23.7	100-350
61-82 years	37	173	21.5	85-350
ALL	704	149	18.2	24-350

¹See Table 17, page 32, for a combination of the "interview" data presented here and the "platoon" data presented in Table 11, page 21.

60 years the rate lowered for the group, although there were individuals in the latter group who maintained a high rate despite their years.

At all age levels there was a wide range in amounts picked, which would indicate that influences other than age were present.

The age group 31-40 picked less than the age groups immediately younger and older. This may have been partly caused by the fact that some had young children with them. Although some of the children were picking beans, the mothers often had to spend some time supervising and helping them. A few had very young children who played near by and required occasional attention.

Considering the number of pounds picked per hour by women 18 to 55 years of age as equal to an efficiency index of 100, the relative efficiencies of the other sex and age groups were as follows:

<i>Age group</i>	<i>Index of picking efficiency per day</i>
Under 14 years	
Boys	58
Girls	52
14 to 17 years	
Boys	76
Girls	75
18 to 55 years	
Men	105
Women	100
56 years and older	
Men	94
Women	97

To the grower the amount picked per day is of greater importance than the amount picked per hour. On the same basis, considering the amount that the women 18 to 55 picked per day as equivalent to an efficiency of 100, the relative efficiencies of the other age and sex groups were:

<i>Age group</i>	<i>Index of picking efficiency per hour</i>
Under 14 years	
Boys	55
Girls	50
14 to 17 years	
Boys	75
Girls	74
18 to 55 years	
Men	111
Women	100
56 years and older	
Men	91
Women	95

Interview versus actual record method

There was some difference in the amounts reported picked according to the method of obtaining the information. The daily records for 61 pickers kept by one Lane County grower were compared with what the same pickers estimated their daily pickings to be. At all age levels more persons overestimated than underestimated their average and those who overestimated averaged a greater difference than those who underestimated (Table 5). There was relatively little difference among the three age groups as to the net percentage of overestimation. The average reported picked by those in the age group under 14 according to the interview was 10 per cent greater than that according to their actual records; for the 14 year

Table 5. COMPARISON OF RECORD AND INTERVIEW METHODS OF OBTAINING DATA ON AMOUNT OF POLE SNAP BEANS PICKED PER DAY (Records and interviews of 61 identical pickers, Lane County, Oregon, 1943)

Age group	Average amount picked according to		Overestimation in interview		Underestimation in interview		Average net overestimation in interview	
	Record method	Interview method	Per cent of pickers	Amount	Per cent of pickers	Amount	Pounds	Per cent
Under 14 years	<i>Pounds</i> 96	<i>Pounds</i> 106	79†	15.5	17	10.8	10	10
14-17 years	117	134	77	23.9	23	9.5	17	15
18-55 years	183	196	73	20.4	27	7.3	13	7
56 and older	*	*	*	*	*	*	*	*
ALL	121	134	77†	19.9	21	9.4	13	11

* No report.

† One picker's estimate was exactly equal to what his record showed.

to 17 year olds, it was 15 per cent greater; for the 18 year to 55 year olds it was 7 per cent. This resulted in a net overestimation for all pickers of approximately 11 per cent.

There may be several reasons for these discrepancies between records and estimates obtained from the interviews. For one thing, the interviewing was done near the peak of the season, when picking was good. The pickers might well have had a memory bias that would lead them to remember their present output more vividly than some of their poorer days. Another reason might be that the inexperienced pickers, who had been picking only during the peak season, had no way of judging how much their production might fall off as the season neared the end.

Experience

In general those having a year or more of experience tended to pick more beans per day than those with no experience in previous years (Table 6). The difference was more marked in the younger pickers up to 20 years of age than it was for those who were older.

Those with more than one year's experience usually picked more than those with but one year. The former averaged 172 pounds per day while the latter averaged 144. The average for these two groups combined—namely, the pickers who had had one or more years of experience picking beans—was 161 pounds per day and the average for those without any previous experience was only 143 (Table 6).*

In other words, based on the interview study, the pickers with one or more years' experience picked 13 per cent more beans per day than those pickers with no previous experience. This is sub-

* Fourteen pickers were excluded from this tabulation because no information was available with regard to their previous experience.

Table 6. POUNDS OF POLE SNAP BEANS PICKED PER PICKER PER DAY ACCORDING TO AMOUNT OF EXPERIENCE*
Lane, Linn and Marion Counties, Oregon, 1943

Age group	No experience		One year or more of experience	
	Number of pickers	Average amount picked	Number of pickers	Average amount picked
10-13 years	122	<i>Pounds</i> 94	90	<i>Pounds</i> 112
14 years	28	109	51	145
15 years	16	128	62	147
16 years	13	151	19	169
17 years	5	142	10	157
18-20 years	7	171	13	184
21-30 years	14	203	14	206
31-40 years	33	185	43	199
41-50 years	25	203	47	199
51-60 years	12	184	30	199
61-82 years	6	143	30	173
ALL AGES	281	143†	409	161

* See Table 24, page 43, for a combination of the "interview" data presented here and the "platoon" data presented in Table 12, page 23.

† This average was obtained by weighting the average amount picked per day for each age group by the number of pickers in the "experienced" group. In this way a fair comparison is possible.

stantiated by a study of actual records from one grower in Lane County where it was found that the experienced pickers in 1943 actually picked 23.5 per cent more beans in a day than those with no previous experience.

Yield per acre

The yield of beans as reported by the grower made little or no difference in the amounts picked per picker per day (Table 7), although pickers in low yielding fields frequently stated that they were not doing as well as when they had worked in more heavily bearing patches. This analysis of course assumes that the same grades of beans were picked in each case. When the data were arranged according to yield of the patch, no definite relationship could be seen. For example, among the inexperienced pickers, those in the two youngest age groups picked fewer pounds per day in the higher yielding fields than those who worked in the lower yielding ones, while in the age class 18 to 55 years the opposite tendency occurred.

Number of pickers needed per acre

It may be concluded from the foregoing analysis that with a crew of the approximate composition of the sample of the present study (Table 1) it would require about 107 picker-days to harvest an acre of beans yielding 8 tons per acre. Assuming that the picking extends over a period of 30 actual picking days, between 3.5 and 4 pickers per day would be required per acre.

Table 7. AMOUNT OF POLE SNAP BEANS PICKED PER PICKER PER DAY ACCORDING TO AGE AND EXPERIENCE OF PICKER AND YIELD OF BEANS PER ACRE (704 pickers in Lane, Linn, and Marion counties, Oregon, 1943)

Age group	Average amount picked per day		
	Low yielding*	Medium yielding†	High yielding‡
<i>No experience</i>			
Under 14 years	Pounds 104	Pounds 99	Pounds 85
14-17 years	131	130	119
18-55 years	168	180	206
56 years and older	152	176	145
ALL	126	136	132
<i>One or more year's experience</i>			
Under 14 years	107	112	113
14-17 years	216	150	141
18-55 years	191	201	199
56 years and older	160	176	206
ALL	181	161	157

* 5 to 7 tons per acre, as reported by grower.

† 8 tons per acre, as reported by grower.

‡ 9 to 14 tons per acre, as reported by grower.

Insofar as the crew might include a higher proportion of older or more experienced workers than the sample studied, the number of picker-days per acre could be shortened and the number of pickers per acre reduced. If more children were used, then the reverse would be true.

PLATOON STUDY

Definition and importance of platoons

A "platoon" in the sense of harvest help is a group of teen-age children who work under direction, supervision, and protection of a leader. The children are mostly of grade school age but frequently high school ages are included. The leader is an older person, often a school teacher, who knows the children well and who has had an opportunity to instruct platoon members in the classroom before entering the harvest fields.

In 1943 there were approximately 185 platoons including something like 8,000 children working in the Willamette Valley. About 70 platoons picked pole snap beans, 14 of which worked out of Salem, Oregon.

Scope and method

Daily records kept by the leaders of these 14 Salem platoons were analyzed to learn how the amount of beans picked per day varied according to the age, sex, and experience of the picker.

Daily records were available for 1,236 youths who picked beans in the Salem area in 1943. Many of these young people worked only



Figure 2. A crack crew of bean pickers receiving instructions from the platoon leader. Each of these youngsters averaged more than 200 pounds per day.

a few days in the bean fields. For this reason most of the analysis here presented includes only those children who picked beans 8 days or more during the season.

Evaluation of sample

The sample studied is considered to be highly reliable because each platoon leader kept a careful daily record of the accomplishments of each member of her platoon. The analysis here presented includes at least 25 per cent of all the platoon children that picked beans in the entire Willamette Valley in 1943. For these reasons it is believed that the sample and therefore the results obtained from the study of these platoon children are fully representative of the pole snap bean picking done by all the children in the 1943 platoons in Oregon.

RESULTS

The pickers

The records obtained were for pickers between the ages of 7 and 17. In each platoon except one, it was customary for a few adults, usually mothers of children in the platoon, to accompany the platoon and its leader daily. The records of these adults, however, were excluded from this analysis. The majority (75 per cent) of the chil-

dren in the platoons were between 11 and 14 years of age, and only a few were in the 16 year and 17 year old classes (Table 8).

There were more boys than girls between the ages of 7 and 12, but more girls than boys from 13 years up.

Length of season and number of days picked

Picking started on July 26 and ended on September 14, a period

Table 8. DISTRIBUTION OF PLATOON PICKERS ACCORDING TO AGE AND SEX
(14 platoons from Salem, Oregon, 1943)

Age	Boys		Girls		All pickers	
	Number	Per cent	Number	Per cent	Number	Per cent
7-8 years	5	.8	3	.5	8	1.3
9 years	16	2.7	5	.8	21	3.5
10 years	20	3.3	24	4.0	44	7.3
11 years	48	7.9	35	5.8	83	13.7
12 years	59	9.7	56	9.3	115	19.0
13 years	63	10.4	75	12.4	138	22.8
14 years	46	7.6	74	12.3	120	19.9
15 years	16	2.6	42	7.0	58	9.6
16 years	1	.2	12	2.0	13	2.2
17 years	1	.2	3	.5	4	.7
ALL	275	45.4	329	54.6	604	100.0

**NUMBER OF PLATOON CHILDREN
PICKING BEANS EACH DAY**

Salem, Oregon — 1943

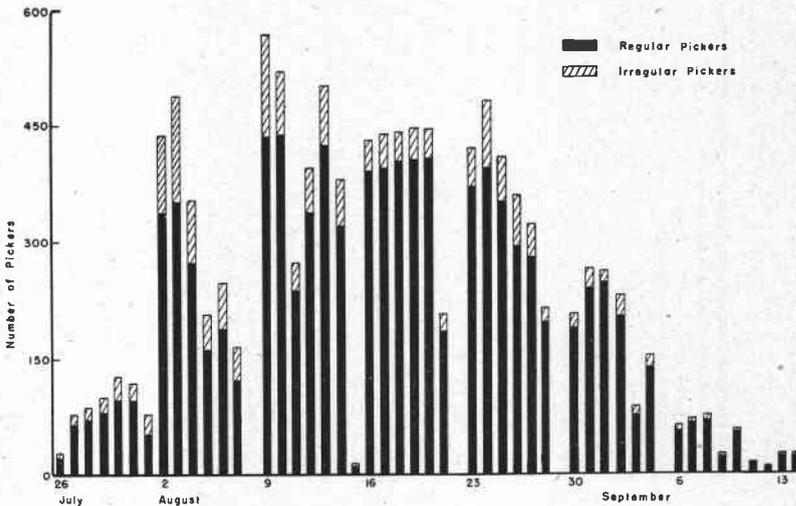


Figure 3. The harvest season extended over a period of about seven weeks. Out of a total of 1,236 children who were enrolled in these bean picking platoons, 628 were "regular" pickers (picking 8 days or more) and 608 were "irregular" (picking only 1 to 7 days). (Data from Table 20, page 41.)

of 51 days.* During this time there were platoon children actually picking beans each day except 4 out of the 7 Sundays, making a total of 47 picking days. This does not mean that each platoon and each child worked all 47 days, as will be shown presently.

During the first week of the bean picking season an average of

Table 9. AVERAGE DAILY NUMBER OF PICKERS AND PLATOONS PICKING BEANS DURING THE SEVEN AND ONE-HALF WEEKS SEASON (Platoons from Salem, Oregon, 1943)

Week	Number of days picked during week	Average number of pickers per day	Average number of platoons per day
	<i>Days</i>	<i>Pickers</i>	<i>Platoons</i>
1st (July 25-31)	6	87	2
2nd (August 1-7)	7	284	8
3rd (August 8-14)	6	440	12
4th (August 15-21)	7 ¹	405	13
5th (August 22-28)	6	371	11
6th (August 29-Sept. 4) ...	6	201	8
7th (September 5-11)	6	51	2
8th (September 12-18)	3	20	1

¹On Sunday, August 15, only 1 platoon of 14 children picked beans. Therefore in determining the average number of children and platoons working each day during this week the totals were divided by 6 instead of 7.

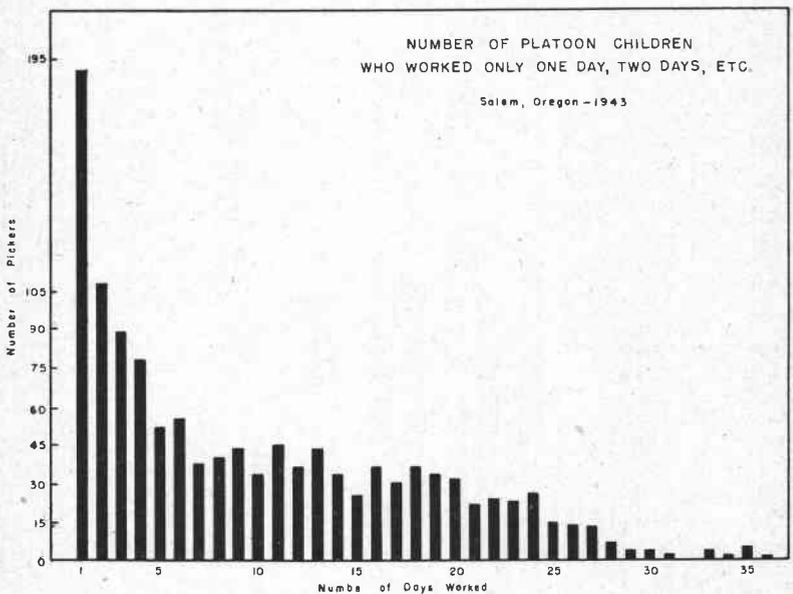


Figure 4. During the entire bean picking season 190 children worked 1 day only, 107 worked 2 days only, etc. One faithful child was on the job 36 days out of the 47 days on which beans were picked. (Data from Table 21, page 42.)

* The data here presented apply only to children picking in platoons but information on length of season and the number of days picked are believed to be representative of the entire bean picking operation in the Salem area.

87 pickers in 2 platoons worked each day (Table 9). The peak extended over a period of 3 or 4 weeks. The number of pickers and the number of platoons was the greatest during the third, fourth, and fifth weeks of the season. The peak day was on August 9 when 14 platoons with 570 children picked beans on that day (Figure 3). Note the fact, as mentioned previously, that very few platoon children picked on Sunday. Therefore, usually, there was a good demand for pickers on Mondays and Tuesdays.

The 1,236 platoon children picked a total of 1,390,531 pounds

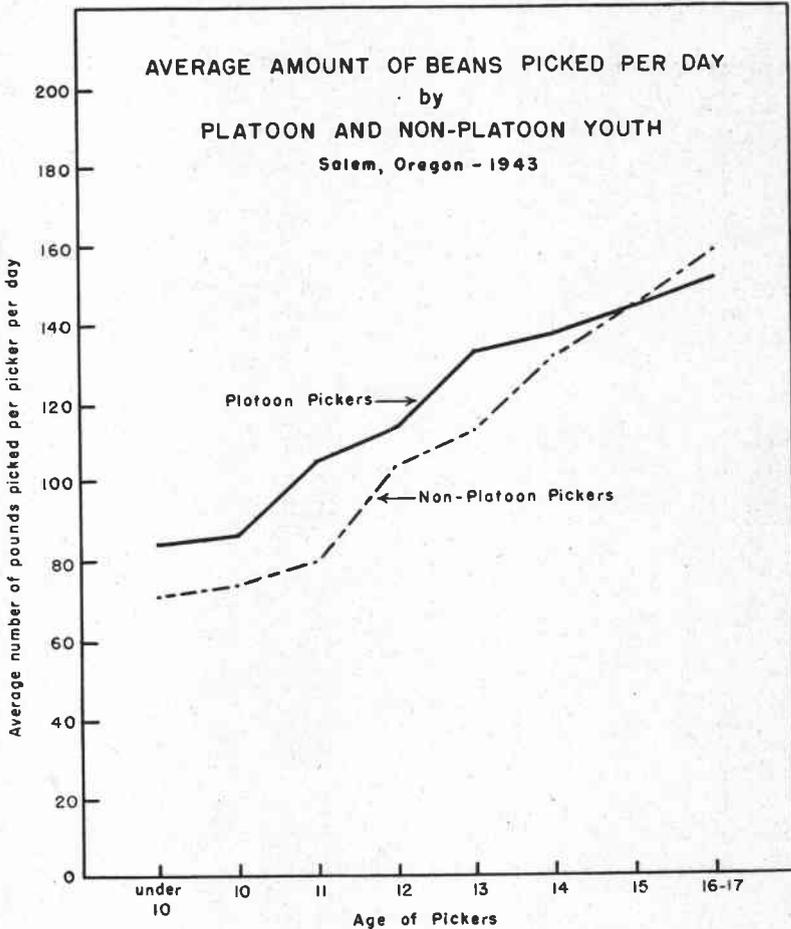


Figure 5. The younger children, especially, picked more beans per day in the platoons than outside of platoons. (Data from Table 22, page 42.)

of beans during the season. Out of this total number of young people only 628 worked as many as 8 days or more in the bean harvest. Figure 3 shows, for each day of the season, how many "regular" pickers and how many "irregular" pickers (those who worked only 1 to 7 days) were on the job. It is of interest to know that each one of the regular or more faithful children picked almost a ton of beans, on the average, whereas the irregular or less faithful youngsters picked only a little more than 300 pounds during the season. Note that the irregular pickers, Figure 3, did not help out just at the peak demand for pickers. On the contrary we find them scattered all through the season.

Regularity of platoon pickers

Figure 4 presents an interesting picture of the regularity or faithfulness of the entire group of 1,236 youthful bean pickers in the Salem area in 1943. Notice that 190 children worked only 1 day out of the 47 picking days, 107 worked only 2 days, etc. At the other extreme one faithful child was on the job 36 days out of the 47. The 608 children who picked less than 8 days contributed little to the job of getting the beans picked and they required transportation, instruction, and supervision that could have been given to other youth determined to stay on the job.

Table 10. AVERAGE QUANTITY OF BEANS PICKED PER PICKER ON EACH DAY THROUGHOUT THE SEASON*
(1,236 platoon pickers, Salem, Oregon, 1943)

Date	Average amount picked per picker	Date	Average amount picked per picker	Date	Average amount picked per picker
	<i>Pounds</i>		<i>Pounds</i>		<i>Pounds</i>
July 26	132	August 12	93	August 29	172
July 27	106	August 13	95	August 30	172
July 28	112	August 14	104	August 31	160
July 29	94	August 15 .....	..... †	September 1	145
July 30	65	August 16	129	September 2	150
July 31	116	August 17	138	September 3	115
August 1	105	August 18	152	September 4	97
August 2	113	August 19	159	September 5 .....	.....
August 3	122	August 20	131	September 6	153
August 4	134	August 21	72	September 7	152
August 5	99	August 22 .....	.....	September 8	180
August 6	87	August 23	129	September 9	148
August 7	102	August 24	129	September 10	111
August 8 .....	.....	August 25	121	September 11	101
August 9	101	August 26	124	September 12	173
August 10	118	August 27	116	September 13	180
August 11	117	August 28	116	September 14	135

* See Table 20, Page 41, for number of children picking each day, and total pounds picked each day.

† Only 1 platoon with 14 children picked this day. The average was not representative and therefore was not included in this tabulation.

Amount picked by average picker each day of season

There was a surprising amount of uniformity in the average quantity of beans picked per picker on each day throughout the season (Table 10). Note that the results on even the very first and the very last days were not too far from the season's average of approximately 123 pounds per day per picker. Also, there was not as much variation during the season as one might expect. The dovetailing together of the harvest dates on many separate fields of beans in the county may have been partly responsible.

FACTORS AFFECTING AMOUNT PICKED PER DAY

Age of picker

Age proved to be the most important single factor influencing the amount of beans picked per picker per day among the platoon children (Table 11). Each successive increase of 1 year in age resulted in a distinct increase in the average number of pounds picked per day.

Table 11. POUNDS OF POLE SNAP BEANS PICKED PER PICKER PER DAY ACCORDING TO AGE OF PICKER*
(14 platoons from Salem, Oregon, 1943)

Age group	Number of pickers	Average amount picked per day
		<i>Pounds</i>
Under 11 years	73	87
11 years	83	106
12 years	115	115
13 years	138	133
14 years	120	137
15 years	58	143
16-17 years	17	152
ALL AGES	604	123

* See Table 17, page 32, for a combination of the "platoon" data presented here and the "interview" data presented in Table 4, page 11.

Platoons versus nonplatoons

Children picking in platoons picked more beans per day than children not in platoons. Figure 5 brings this out in detail and suggests that for the younger children, especially those up to 14 years of age, the platoon system enables them to pick more beans in a day than they could have picked otherwise.* The average advantage for the platoon system, for children up to and including those who were 14 years old, was 15 pounds of beans per child per day or an increase

* For children 15 years old and older there did not appear to be any advantage to the platoon system as far as pounds picked per day was concerned. In fact it appeared that the more capable youngsters more than 15 years old picked outside of platoons. As indicated in Table 8, less than 3 per cent of the platoon pickers were older than 15.

of about 16 per cent.* On this basis a platoon of 30 children could pick 450 pounds more per day than the same number of children picking independently. To the bean grower the platoon leader has more than earned her salary in the additional quantity of beans



Figure 6. A field boss weighing beans for one of the pickers.

picked by the group, to say nothing of her value to the grower in reducing damage and in relieving him of the responsibility of supervising numbers of inexperienced youth. To the parents of the children

* Under the subject of "experience" to be discussed shortly it will be shown that 1 year or more of experience is important in increasing the daily output per worker. It should be mentioned here that 82 per cent of the children in the platoons were "experienced," compared to 56 per cent for the nonplatoon children. Some of the difference, therefore, in the daily accomplishment of platoon versus nonplatoon children must be ascribed to the factor of experience. On the other hand the difference between platoon and nonplatoon pickers may be even greater when it is recalled that the platoon data are based on actual records whereas the nonplatoon data were obtained by the interview method. (See page 12 for discussion of usual upward bias of interview data.)

she has been invaluable in offering them the protection of adult supervision, care, and instruction, both during transportation and when they are on the job.

Experience

Children with one year or more of experience picking beans were able to do much better than those with no previous experience. The data in Table 12 indicate that experienced pickers actually picked 18 pounds or 17 per cent more beans per day than other children of the same ages without a year or more of experience.

Boys versus girls

Table 13 presents data that show for boys and girls, separately, the average accomplishment per day and per hour for children of specified ages. In general, the boys did a little better than the girls. This was true of each age group except the one from 14 to 17 years where the girls did a little better than the boys. The same holds true,

Table 12. POUNDS OF POLE SNAP BEANS PICKED PER PICKER PER DAY ACCORDING TO THE AMOUNT OF EXPERIENCE*
(14 platoons from Salem, Oregon, 1943)

Age group	No experience		One year or more of experience	
	Number of pickers	Average amount picked	Number of pickers	Average amount picked
		<i>Pounds</i>		<i>Pounds</i>
Under 11 years	16	83	32	91
11 years	12	89	47	107
12 years	15	103	72	121
13 years	18	118	87	137
14 years	16	122	64	145
15 years	1	125	37	149
16-17 years .....	.....	.....	6	165†
ALL AGES	78	107	345	125

* See Table 24, page 43, for a combination of the "platoon" data presented here and the "interview" data presented in Table 6, page 14. Data for only 423 pickers are presented here because information on experience was not available for the other 181 pickers.

† This figure was not included in calculating the average.

of course, when these results are expressed in terms of "relative efficiency." For this purpose the average accomplishment of adult women (18 to 55 years) has been taken as 100 per cent and the results of each age group of boys and girls have been expressed in terms of these bases. Based upon the results here presented it would appear that there is no significant difference in the rates at which boys of a given age can pick beans compared to girls of the same age although the younger boys would seem to have a slight edge over the girls.

Table 13. RELATIVE PICKING EFFICIENCY OF BOYS AND GIRLS OF DIFFERENT AGES PICKING POLE SNAP BEANS
(564 platoon children, Salem, Willamette Valley, Oregon, 1943)

Age group	Number of pickers		Per day				Per hour			
			Boys		Girls		Boys		Girls	
	Boys	Girls	Average pounds picked per picker	Per cent picking efficiency 193 lbs. =100% *	Average pounds picked per picker	Per cent picking efficiency 193 lbs. =100% *	Average pounds picked per picker	Per cent picking efficiency 23.3 lbs. =100% †	Average pounds picked per picker	Per cent picking efficiency 23.3 lbs. =100% †
Under 10 years	15	7	83.8	43.4	80.1	41.5	12.7	54.5	11.2	48.0
10 years	17	23	90.8	47.0	88.5	45.8	12.2	52.4	12.0	51.5
11 years	44	*31	108.4	56.2	98.7	51.1	15.2	65.2	13.4	57.5
12 years	55	53	118.6	61.4	110.7	57.3	17.9	76.8	15.0	64.4
13 years	59	69	134.6	69.7	130.6	67.6	18.3	78.5	17.6	75.5
14 to 17 years	59	132	138.6	71.8	140.8	72.9	17.6	75.5	18.9	81.1

* The average quantity of beans picked per picker per day by women 18 to 55 years of age was 193 pounds.

† The average quantity of beans picked per picker per hour by women 18 to 55 years of age was 23.3 pounds.

Length of day worked

Until recently the majority of our bean pickers have been adult men and women and therefore the length of the working day was not of prime importance. Now, however, in these war years we find an unprecedented number of children working in the harvest fields. Thoughtful growers as well as parents are concerned with the welfare of these youth.



Figure 7. An illustration of one type of insured, safe, and comfortable transportation for workers. Note these features: (1) sideboards or standards, (2) chains (end gate is preferred), (3) some provision for seating workers, (4) tarpaulin or covering for protection from rain and wind, and (5) a safe and convenient step for loading and unloading.

What length of work day is most desirable for children between the ages, mostly, of 11 and 14 years? Theoretically it is that length of day that will enable them to pick the most beans without becoming too tired for their own good.

To obtain at least a preliminary answer to this question the platoon data were divided into three groups according to the length of day usually worked. Several platoons worked 8 hours, others 7 hours, and still others 6 hours each day. Some striking results of this preliminary analysis are presented in Table 14.* On a per hour basis it was found that when children worked only 6 hours a day,

* These data can not be considered conclusive, because of the limited number of platoons studied, but they are presented here because the results substantiate the conclusions reached by many growers and by many individuals who are in charge of placing youth in the harvest fields.

Table 14. AVERAGE POUNDS OF POLE SNAP BEANS PICKED PER PICKER PER HOUR AND PER DAY ACCORDING TO AGE AND LENGTH OF WORK DAY
(13 Salem platoons, Oregon, 1943)

Age	Number of pickers	Average pounds per picker					
		Per hour			Per day		
		Per 6-hour day	Per 7-hour day	Per 8-hour day	Per 6-hour day	Per 7-hour day	Per 8-hour day
Under 10							
years	22	16.5	11.4	8.2	99.2	80.0	66.4
10 years	40	14.9	14.3	10.6	89.8	100.2	85.6
11 years	75	18.5	14.4	12.8	112.4	101.0	102.6
12 years	108	19.8	18.5	15.0	118.7	129.8	110.4
13 years	128	22.1	19.2	16.3	132.8	136.2	130.8
14 to 17 years....	191	29.2	17.6	17.2	175.6	124.0	139.1
ALL AGES	564	21.3	17.0	15.4	128.2	119.3	122.6

they averaged 21 pounds per hour. This figure fell to 17 pounds per hour for a 7 hour day, and decreased still further to 15 pounds per hour for an 8 hour day. In other words, when the children knew they were going to quit at the end of 6 hours they worked much faster than when they knew they had to last for 8 hours. This was most noticeable in the youngest age group.

On a per day basis, the records indicate that children who picked 6 hours actually picked more beans in a day than those who worked a 7 or 8 hour day. On the basis of these results the shorter work day is desirable for both the grower and the picker, especially for younger children working in platoons. There is less playing around and as a result there is less destruction of vines. With the shorter day there seems to be more incentive to stay on the job, and also the children have more time for recreation and rest at home. It would seem probable that those children who worked a 6 hour day would be able to maintain their efficiency over a longer period of crop harvesting than if they had worked 8 hours every day and had become overtired on many occasions.

The platoon leader

There was considerable variation among the 14 platoons as to the amount picked per person per day (Table 15). Factors such as the ability of the leader to handle the platoon and the cooperativeness of the grower as well as the picking conditions probably influenced the relative achievements of the various platoons. Note that the average platoon had to enroll 88 children in order to get an average daily strength of 34 pickers. Children in certain platoons were far more faithful than in others. One platoon had an average daily strength of 60 per cent of the total number enrolled whereas

Table 15. SUMMARY OF FOURTEEN PLATOONS PICKING POLE SNAP BEANS, SALEM, OREGON—1943

Platoon number	Average age	Total number youth enrolled	Youth per day		Total number days worked	Hours per day	Average number pounds picked per youth per day
			Average number	Per cent of total enrollment			
1	13	83	35	42	25	8	95
2	12	124	45	36	25	6	113
3	13	72	33	46	24	8	131
4	13	81	39	48	30	7	110
5	13	53	32	60	20	6	148
6	14	71	36	51	37	8	148
7	12	116	38	33	28	8	103
8	13	94	39	41	30	8	146
9	12	93	35	38	27	7	130
10	12	117	31	26	27	8	139
11	13	60	21	35	16	8	97
12	13	88	30	34	16	8	102
13	13	69	39	57	24	8	146
14	11	118	24	20	21	8	78
AVERAGE	13	88	34	39	25	7.5	123

another platoon had only one-fifth of its total number picking beans each day the platoon worked on beans.

Influencing the record of each platoon were probably several contributing factors, but the data were not such that they could be determined accurately.

RECORDS FROM TWO BEAN GROWERS

A study of individual bean fields has merit because it presents the problem of the individual bean grower, not the combined problem of all bean growers in an area.

Size and location of bean fields studied

At the end of the season two Lane County bean growers were kind enough to loan the College their 1943 daily field record sheets for analysis. The size of these growers' fields was considerably above the average. One field contained 23 acres of pole snap beans and the other 25 acres.* The average yield on one field was 8.2 tons per acre, and on the other field, 7.6 tons.

Length of bean season and number of days picking

In each field picking began during the first week in August and ended about the middle of September. During this period one farm picked beans on 31 days; on the other farm beans were picked on 27 days.

* The average size of the bean fields discussed in the INTERVIEW STUDY section of this bulletin was 10.6 acres; the average size of bean fields in Linn, Lane, and Marion counties according to the 1940 Federal Agricultural Census was approximately 6 acres.

There was so much similarity between the results of the analyses on these two farms that charts and tables will be presented for only one farm. (See Table 16.) Figure 8 presents a picture of the bean picking season on one farm in Lane County. Note that the entire season extended over only 40 days compared with 51 days for the

Table 16. NUMBER OF BEAN PICKERS PER DAY AND PER ACRE, AND AVERAGE QUANTITY PICKED PER PICKER PER DAY ON ONE INDIVIDUAL FIELD IN LANE COUNTY, OREGON, 1943 (25 acres in field; average yield, 7.6 tons per acre)

Date		Number of pickers per day		Average number of pounds picked per picker per day
		Total	Per acre	
August	2	109	4.4	134
	3	124	5.0	108
	4	.....	.....	.....
	5	.....	.....	.....
	6	111	4.4	157
	7	121	4.8	145
	8	.....	.....	.....
	9	.....	.....	.....
	10	144	5.8	138
	11	148	5.9	118
	12	.....	.....	.....
	13	34	1.4	200
	14	138	5.5	157
	15	83	3.3	180
	16	142	5.7	158
	17	135	5.4	103
	18	126	5.0	151
	19	116	4.6	86
	20	141	5.6	139
	21	78	3.1	115
	22	51	2.0	130
	23	131	5.2	126
	24	141	5.6	133
	25	116	4.6	95
	26	65	2.6	122
	27	.....	.....	.....
	28	65	2.6	166
	29	.....	.....	.....
	30	93	3.7	160
	31	.....	.....	.....
	September	1	126	5.0	104
2		.....	.....	.....
3		87	3.5	103
4		115	4.6	94
5		.....	.....	.....
6		.....	.....	.....
7		108	4.3	152
8		.....	.....	.....
9		.....	.....	.....
10		98	3.9	80
ALL SEASON		109	4.4	129

season when an area is considered (page 18). Note also that on this individual field there were only 27 days of actual picking whereas the area analysis resulted in a figure of 47 days. As indicated previously an attempt is usually made to "stagger" the plantings (early, medium, and late) so that during the peak days of the harvest season more beans will not be produced than can be processed or picked on

those days. On the individual farm there are usually several days on which no beans are picked, especially toward the beginning and toward the end of the season. This is also shown clearly in Figure 8.

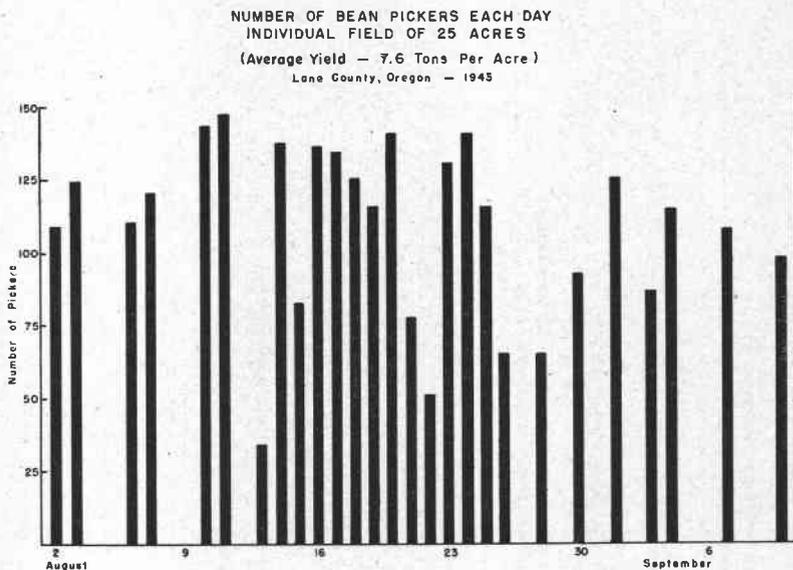


Figure 8. Typical distribution of picking days and number of pickers each day on a 25 acre bean field belonging to one grower. Note that beans were not picked every day toward the beginning and toward the end of the season. (Data from Table 16.)

Number and age of pickers employed

As pointed out previously in this bulletin every picker for one reason or another does not work each day that beans are picked. One of the two individual growers under study hired 200 different workers throughout the season in order to have an average number of 98 pickers on the job every day. The other bean grower employed a total of 180 different people during the season and had a daily average picking crew of 109 for each day beans were picked (Table 16). The age distribution of the 180 pickers was as follows:

Age group	Number of pickers	Per cent of total
Under 14 years	50	28
14-17 years	62	34
18-55 years	56	31
56 years and older	12	7
ALL PICKERS	180	100

By referring to Table 1, page 8, it will be seen that the age distribution of all the bean pickers included in the INTERVIEW STUDY was surprisingly similar to the age distribution of the 180 pickers working for this Lane County grower.

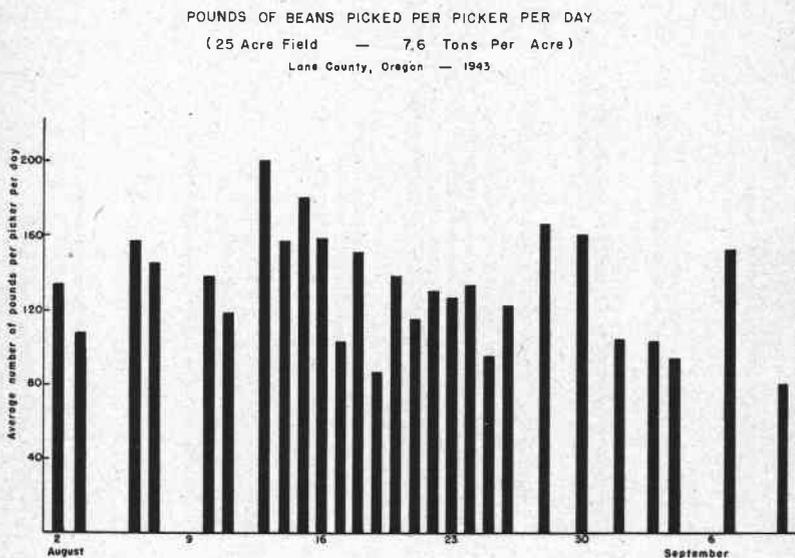


Figure 9. Note that the quantity of beans picked per person per day held up well throughout most of the season. (Data from Table 16.)

Quantity picked per picker per day

As indicated in Table 16 the average quantity of beans picked per picker per day on this one farm in 1943 was 129 pounds. Actual records show that the average amount picked per picker per day did not change, as much as one might think, during the season (Figure 9). The daily average held up very well, there being only 10 days on which the average was below 120 pounds, and only four days when the average dropped below 100 pounds.

It is of interest to note that the average daily accomplishment on the other farm, where detailed records were available, was 123 pounds per picker per day. On this farm, however, a higher proportion of the picking crew was in the youngest age group. This accounts for the 6 pounds lower average.

Average number of pickers per acre

Probably the most common way of expressing a need for pickers

is to indicate how many are needed per acre.* Actual daily records, on the farm in Lane County (average yield of 7.6 tons per acre) reveal that during the season the average daily number was 4.4 persons (Table 16).

Since labor needs in harvesting pole snap beans vary somewhat from day to day depending on the weather, the grower is interested in knowing his minimum and maximum requirements per acre as well as his average. With regard to the farm under consideration there were a few days close to the beginning and toward the end of the season when no beans were picked, but on those days when beans were picked there were only 4 days when fewer than 3 pickers per acre were employed. Referring now to the maximum requirement, there were 8 days during the season when more than 5 pickers per acre were used (Table 16). The absolute peak day required just under 6 pickers per acre of beans. As mentioned previously the other farm studied (average yield of 8 tons per acre) was practically identical in labor needs. It had an average of 4.3 pickers per acre compared with 4.4 shown in Table 16.

There are several factors that affect the number of pickers needed per acre and more discussion on this point will be given in SUMMARY AND CONCLUSIONS.

SUMMARY AND CONCLUSIONS

Purpose of this section

It is the purpose of this section to bring together and discuss briefly some of the more important facts developed separately in the preceding sections and to combine certain data with reference to age and experience. Some new material is also added.

Was the year 1943 an average year?

From the standpoint of the amount of beans picked per picker per day, 1943 was an average or normal year. Statements obtained from 384 interviewed pickers of all ages would indicate that, on the average, the amount picked per picker per day in 1943 was only 3 pounds under the usual or normal accomplishment for these same pickers (Table 23). This difference amounted to only 1.9 per cent.

Who picks beans?

Almost everybody picks beans, from children so young that they must come to the bean field with their mothers, to men and women above 70 years of age. This is more true now, in wartime,

* In calculating this figure, the *total* number of acres of beans is always used.

than it is under normal peacetime conditions. Based on the data presented in this bulletin it would appear that the average picking crew in the Willamette Valley in 1943 was made up about as follows: ages under 14 years, 32 per cent; 14-17 years, 29 per cent; 18-55 years, 31 per cent; and 56 years and older, 8 per cent.

Length of season and number of days picked

The length of the bean picking season and the number of days picked will be quite different depending on whether one is considering an area such as a county or an individual field of beans. From the data obtained in this study it would appear that the Marion County bean season in 1943 lasted for a period of 7½ weeks (July 26 to September 15) during which time beans were picked practically every day. In contrast to this, however, we find that on an individual field of approximately 25 acres in Lane County the bean harvest extended over a period a little less than 6 weeks (August 2 to September 11) with only 27 actual picking days.

FACTORS AFFECTING QUANTITY OF BEANS PICKED PER DAY

There are many things that influence the quantity of beans that a picker can harvest in one day. No claim is made that the present study exhausts the subject but the following discussion considers a number of factors believed to be important.

Table 17. AVERAGE QUANTITY OF POLE SNAP BEANS PICKED PER PICKER PER DAY, AND RELATIVE EFFICIENCY ACCORDING TO AGE OF PICKER (1,308 pickers, Willamette Valley, Oregon, 1943)*

Age group	Number of pickers	Average amount picked per day		Relative efficiency of pickers‡
		Actual	Adjusted†	
		Pounds	Pounds	Per cent
Under 10 years	38	82	82	42
10 years	62	85	86	45
11 years	120	98	97	50
12 years	173	111	110	57
13 years	237	125	122	63
14 years	199	135	134	69
15 years	136	143	146	76
16 years	45	160	158	82
17 years	19	149	170	88
18-20 years	21	180	182	94
21-30 years	29	204	194	101
31-40 years	76	193	201	104
41-50 years	72	200	199	103
51-60 years	44	196	192	99
Over 60 years	37	173	173	90

* Combination of 704 pickers interviewed, all ages; and 604 children from platoon records.

† The actual figures were adjusted to fit a smoothed curve.

‡ Adult average for women, 18 to 55 years old, of 193 pounds per day was taken as 100.

Age of picker

The most important factor influencing the amount of beans picked per day is the age of the picker. This is especially true between 10 and 20 years of age (Table 17). Note that an increase in age of 1 year made a real difference in the accomplishment of children.

Figure 10 presents these data graphically for all ages of pickers, from children 10 years old and younger to men and women older than 60. Of course a child 11 years old can not pick as much as an adult but the surprising thing is that children of this age can pick as much as they do. Note that according to this chart the average 11 year old picks 97 pounds per day while the average adult picks 194 pounds per day. In other words, two 11 year old children can pick as many beans in a day as a full grown man or woman. There are exceptions, of course, but this is true on the average. Table 18 presents data showing the average relative picking efficiency per day of each age group in terms of what an average adult woman from 18 to 55 years old can pick. These are expressed in percentages.

In Table 18 all the bean pickers are divided into four main groups: grade school children, high school children, adults, and elderly pickers. The average daily accomplishment is indicated for

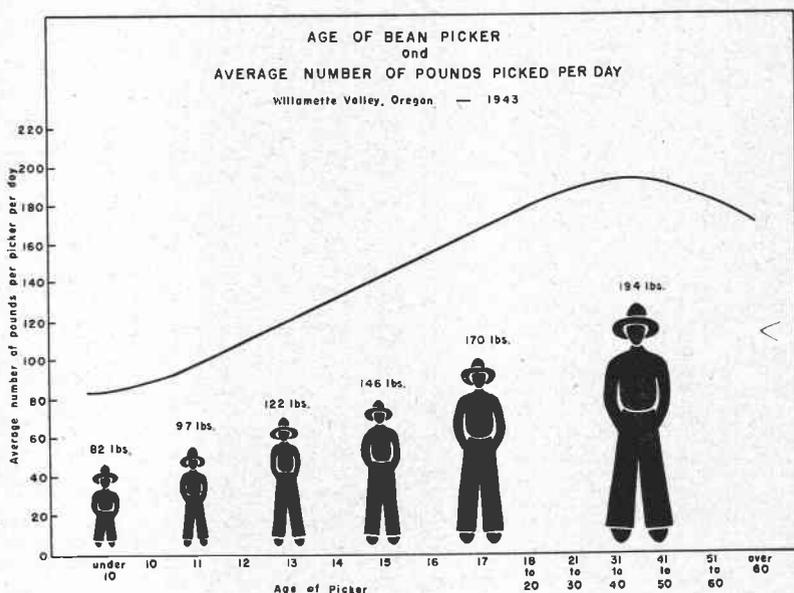


Figure 10. Age is the most important factor affecting the quantity of beans picked per picker per day. Notice, however, that 2 children 11 or 12 years of age can usually pick more in a day than a full grown man or woman.

Table 18. AVERAGE QUANTITY OF POLE SNAP BEANS PICKED PER PICKER PER DAY, AND RELATIVE EFFICIENCY ACCORDING TO AGE OF PICKER (Willamette Valley, Oregon, 1943)*

Four major age groups	Distribution of pickers†	Average amount picked per day‡	Relative efficiency of pickers‡
	Per cent	Pounds	Pounds
Grade school (under 14 years)	32	99	51
High school (14-17 years)	29	152	79
Adults (18-55 years)	21	194	100
Older pickers (over 55 years)	8	180	93
ALL AGES	100	150§	77

* This table mostly condensed from Table 17.

† Figures taken from Table 1 as indicative of picking crews in Willamette Valley, 1943.

‡ Figures condensed from Table 17.

§ Weighted average. See footnote page 35.

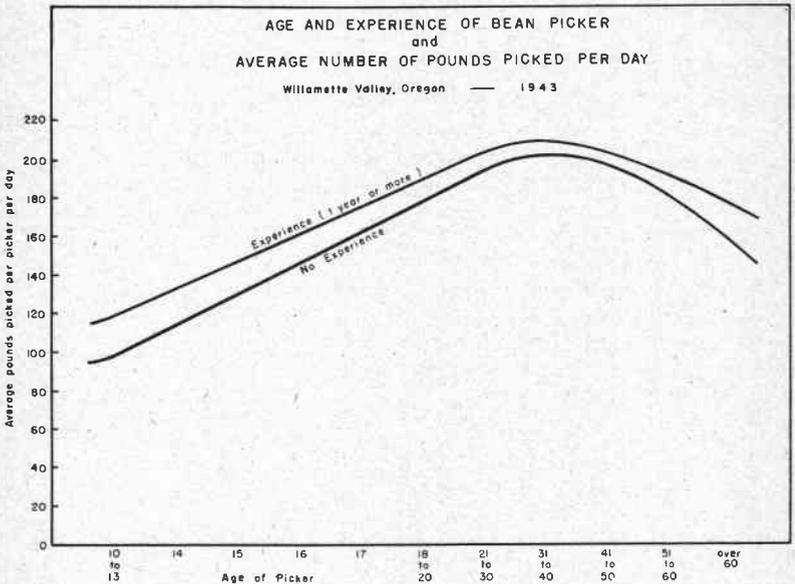


Figure 11. Bean pickers with 1 or more years of experience picked more beans per day than pickers without this experience.

each group together with the relative efficiency rating of each. Note that generally speaking grade school children can do about one-half as much in a day as grown-ups, and that high school youth can do a little better than three-fourths as much as an average adult 18 to 55 years of age. Above this age there is a falling off in accomplishment per day but in these times of extreme labor scarcity we find many elderly people in the bean fields at harvest time.

According to this study it would appear that the average bean picker in 1943 had an efficiency rating of 77 per cent. The average amount picked was 150 pounds per picker per day.*

Experience

Figure 11 presents a picture of the larger quantities of beans that experienced pickers can pick per day compared with inexperienced pickers. This chart represents results obtained from 1,113 pickers—690 interviewed pickers discussed under INTERVIEW STUDY, and 423 platoon pickers discussed under RECORDS FROM TWO BEAN GROWERS.

Note that experience seems to be more important for the younger children than for the adults. As a general average, pickers with 1 year or more of experience picked 158 pounds of beans per day compared with 140 pounds for those with no experience. This is a difference of 18 pounds or 13 per cent in favor of experience.

Platoons versus nonplatoons

Platoon children working under a leader can usually pick more beans in a day than children not working in such a group (Figure 5, page 19). This was especially true for children under 15 years of age. The average amount picked per picker per day by such platoon members was 15 pounds greater (16 per cent) than the amount picked by children of the same ages outside of platoons. See page 21 for a more complete discussion of this topic.

Length of picking day

The majority of bean pickers worked approximately 8 hours per day. Children, especially those in platoons, usually worked a little under 8 hours and adults averaged better than 8 hours.

From the analysis presented on page 25 there is evidence to indicate that children will be more efficient—actually picking more beans per day—if they work less than 8 hours rather than more. In fact there is some evidence to suggest that children will pick as much in 7 hours or even in 6 hours as they will in 8. In this case, of course, it would be necessary for the youngsters to know in the morning that they were going to quit at the end of a 6-hour picking day in order that they could apply themselves to best advantage.

Boys and men versus girls and women

From the data presented in the INTERVIEW STUDY and the PLATOON STUDY, it does not appear that there is any significant differ-

* This average figure perhaps could be reduced to 140 pounds per picker per day when it is considered that more than one-half of the data was obtained by interviews and when it is recalled that there was an upward bias in the interview data compared with the data obtained through actual records. (See Page 13.)

ence between the amount of beans that boys can pick per day compared with girls of the same age. Neither does there seem to be a significant difference between men and women in this respect.

Yield per acre

As indicated in the INTERVIEW STUDY, the yield of beans per acre does not seem to be an important factor affecting the quantity of beans that can be picked per picker per day (Table 7, page 15). Two complicating factors here may be the "set" of the beans on the vine and the number and size of the bean leaves.



Figure 12. A good picker works fast, uses both hands, and does not damage the vine.

Even though the yield per acre may not be important in influencing the rate of picking (pounds per picker per day) it is nevertheless a very important factor in determining the number of bean pickers needed per acre. The heavier the yield, the more pickers needed per acre.

Supervision of pickers

Careful supervision, especially of the younger children picking beans, will increase the quantity of beans picked per picker per day. This has been proved in the discussion under "Platoons versus Non-platoons." Supervision results in more efficiency than no supervision, and some supervisors and platoon leaders are much more efficient than others.

Grower cooperation

There are some growers for whom bean pickers would rather not work. On the other hand there are others who never seem to have much trouble getting pickers. These are usually the growers who always have a cheerful and encouraging word for their pickers, who tell their inexperienced pickers either directly or through a supervisor just which beans to pick and how to pick them, who have plenty of clean cool drinking water handy, who have checking stations conveniently arranged so that the pickers do not have to carry or drag the beans too far, who have an accurate and efficient method of weighing and recording each picker's work, and who provide a shady and convenient place to eat lunch. In other words some growers make picking conditions so pleasant and enjoyable that pickers naturally like to work for them.

A field full of contented and happy pickers is more conducive to a high average accomplishment per picker per day than a field of pickers who are continually complaining about something.



Figure 13. A good day's work for an experienced picker.

AVERAGE NUMBER OF PICKERS NEEDED PER ACRE

Each of the ten factors we have been discussing in this section, and probably still others not mentioned, have a definite bearing on the average number of pickers needed per acre of beans. The three

most important factors are: (1) the yield of beans per acre, (2) the age distribution of the picking crew, and (3) the number of actual picking days in which the entire crop of beans must be picked.

Table 19 is based on the analysis presented in this bulletin. It has been constructed so as to show the approximate average number of bean pickers needed per acre under varying conditions of yield per acre, number of days picked, and age composition of the bean picking crew. It will be noted that the first of the five examples chosen assumes a crew entirely made up of adults. The last example assumes a picking force with no adults but 50 per cent grade school and 50 per cent high school children. In between these extremes are three other examples, with example III somewhat similar to the average bean picking crew on many farms in 1943.

It will be noted that the estimated average number of pickers needed per acre, according to Table 19, varied from 0.8 to 8.9. It is hoped that this table will be helpful in making rapid estimates of labor needs in advance and during the bean picking season in the Willamette Valley.

From the standpoint of the individual grower there are other refinements that could be made in this table, based on the results of this study, and it is hoped that growers will take these into account on their own farms.

Table 19. ESTIMATED AVERAGE NUMBER OF PICKERS PER ACRE OF BEANS UNDER VARYING CONDITIONS OF YIELD PER ACRE, NUMBER OF DAYS PICKED, AND AGE COMPOSITION OF BEAN PICKING CREW.
Willamette Valley, Oregon

Example number	Distribution of picking crew by age of pickers				Relative efficiency of entire crew*	Average yield of 4 tons per acre				Average yield of 6 tons per acre				Average yield of 8 tons per acre			
	Grade school under 14	High school 14-17	Adults 18-55	Persons over 55		Number of actual picking days†				Number of actual picking days†				Number of actual picking days†			
						25 days	30 days	40 days	50 days	25 days	30 days	40 days	50 days	25 days	30 days	40 days	50 days
						Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre
I	----	----	100	----	100	1.6	1.4	1.0	0.8	2.5	2.1	1.5	1.2	3.3	2.8	2.1	1.6
II	25	25	45	5	82	2.0	1.7	1.2	1.0	3.0	2.6	1.8	1.5	4.0	3.4	2.6	2.0
III	30	30	30	10	78	2.1	1.8	1.3	1.0	3.2	2.7	1.9	1.5	4.2	3.6	2.7	2.1
IV	25	55	15	5	76	2.1	1.8	1.3	1.1	3.3	2.8	2.0	1.6	4.3	3.7	2.8	2.1
V	50	50	----	----	65	2.5	2.2	1.5	1.2	3.8	3.2	2.3	1.8	5.1	4.3	3.2	2.5

Table 19 (continued)

Example number	Distribution of picking crew by age of pickers				Relative efficiency of entire crew*	Average yield of 10 tons per acre				Average yield of 12 tons per acre				Average yield of 14 tons per acre			
	Grade school under 14	High school 14-17	Adults 18-55	Persons over 55		Number of actual picking days†				Number of actual picking days†				Number of actual picking days†			
						25 days	30 days	40 days	50 days	25 days	30 days	40 days	50 days	25 days	30 days	40 days	50 days
						Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre	Pickers per acre
I	----	----	100	----	100	4.1	3.4	2.6	2.1	4.9	4.1	3.1	2.5	5.8	4.8	3.6	2.9
II	25	25	45	5	82	5.0	4.1	3.2	2.6	6.0	5.0	3.8	3.0	7.1	5.9	4.4	3.5
III	30	30	30	10	78	5.3	4.4	3.3	2.7	6.3	5.3	4.0	3.2	7.4	6.2	4.6	3.7
IV	25	55	15	5	76	5.4	4.5	3.4	2.8	6.4	5.4	4.1	3.3	7.6	6.3	4.7	3.8
V	50	50	----	----	65	6.3	5.2	4.0	3.2	7.5	6.3	4.8	3.8	8.9	7.4	5.5	4.5

* Based on data in Table 18.

† Includes actual picking days only. The 40 day and 50 day examples will usually apply to a county or an area rather than to an individual grower.

APPENDIX

Table 20. TOTAL NUMBER OF POLE SNAP BEAN PICKERS, TOTAL POUNDS OF BEANS PICKED, AND AVERAGE POUNDS PICKED PER PICKER, BY INDIVIDUAL DAYS THROUGHOUT THE SEASON; 1,236 CHILDREN IN FOURTEEN PLATOONS, SALEM, OREGON, 1943

Date	Number of bean pickers			Total pounds picked	Average pounds picked per picker
	Working 1 to 7 days during season	Working 8 days or more during season	Total		
July 26	4	24	28	3,704	132.2
27	15	64	79	8,366	105.8
28	15	68	83	9,273	111.7
29	15	76	91	8,601	94.5
30	30	95	125	8,181	65.4
31	21	97	118	13,744	116.4
August 1	26	52	78	8,200	105.1
2	103	338	441	50,047	113.4
3	141	350	491	59,743	121.6
4	80	276	356	47,607	133.7
5	48	160	208	20,672	99.4
6	62	188	250	21,841	87.4
7	35	131	166	16,978	102.2
8					
9	133	437	570	57,531	100.9
10	84	437	521	61,505	118.0
11	33	239	272	31,910	117.3
12	59	339	398	37,145	93.3
13	77	425	502	47,697	95.0
14	59	321	380	39,445	103.8
15	3	11	14	3,367	240.5
16	41	391	432	55,551	128.6
17	43	397	440	60,929	138.4
18	40	403	443	67,384	152.1
19	43	404	447	71,216	159.3
20	39	408	447	58,763	131.4
21	23	186	209	15,103	72.2
22					
23	51	373	424	54,591	128.7
24	70	416	486	62,914	129.4
25	57	355	412	49,687	120.6
26	65	296	361	44,701	123.8
27	53	280	333	38,776	116.4
28	20	194	214	24,915	116.4
29					
30	19	188	207	35,540	171.6
31	28	239	267	42,768	160.2
September 1	33	228	261	37,788	144.8
2	30	201	231	34,602	149.8
3	10	75	85	9,799	115.2
4	14	139	153	14,867	97.2
5					
6	5	56	61	9,334	153.0
7	5	65	70	10,671	152.4
8	7	65	74	13,308	179.8
9	3	23	26	3,847	148.0
10	4	54	58	6,447	111.1
11		17	17	1,710	100.6
12		11	11	1,900	172.7
13	2	23	25	4,499	180.0
14	2	23	25	3,364	134.6
All season	1,750*	9,640*	11,390†	1,390,531	122.0†

* Picker days.

† Weighted average.

Table 21. REGULARITY OF INDIVIDUAL POLE SNAP BEAN PICKERS
(1,236 children in fourteen platoons, 47-day picking season, Salem, Oregon, 1943)

Number of days picked	Number of pickers	Number of days picked	Number of pickers
1	190	19	33
2	107	20	32
3	89	21	22
4	78	22	25
5	52	23	24
6	55	24	26
7	37	25	15
8	40	26	14
9	43	27	13
10	33	28	7
11	45	29	3
12	36	30	3
13	43	31	2
14	33	32	3
15	25	33	3
16	36	34	1
17	30	35	4
18	36	36	1

Table 22. COMPARISON OF AMOUNT OF POLE SNAP BEANS PICKED PER PERSON PER DAY
BY PLATOON AND NONPLATOON PICKERS
(Willamette Valley, Oregon, 1943)

Age group	Amounts picked per day	
	604 platoon pickers	425 nonplatoon pickers
Under 10 years	85	72
10 years	89	74
11 years	106	80
12 years	115	104
13 years	133	114
14 years	137	132
15 years	143	143
16-17 years	152	159
ALL	123	115

Table 23. COMPARISON OF THE YEAR 1943 WITH A "USUAL OR AVERAGE" YEAR WITH
RESPECT TO THE QUANTITY OF POLE SNAP BEANS PICKED PER DAY BY PICKERS
OF DIFFERENT AGES
(384 pickers, Willamette Valley, Oregon, 1943)

Age group	Number of pickers	Average quantity picked per picker per day	
		1943	Usual or average
10 years	7	81	74
11 years	8	98	96
12 years	25	108	101
13 years	38	117	121
14 years	51	143	134
15 years	60	145	146
16 years	16	171	176
17 years	10	163	173
18-20 years	12	189	194
21-30 years	12	194	190
31-40 years	42	195	206
41-50 years	49	198	206
51-60 years	27	194	214
Over 60 years	27	170	177
ALL AGES	384	155	158

Table 24. AVERAGE QUANTITY OF POLE SNAP BEANS PICKED PER PICKER PER DAY CLASSIFIED ACCORDING TO AGE AND EXPERIENCE
(1,113 pickers, Willamette Valley, Oregon, 1943)*

Age group	Pickers with no experience		Pickers with one year or more of experience	
	Actual	Adjusted†	Actual	Adjusted‡
10-13 years	<i>Pounds</i> 96	<i>Pounds</i> 96	<i>Pounds</i> 118	<i>Pounds</i> 119
14 years	114	112	145	133
15 years	128	128	148	147
16 years	151	143	171	160
17 years	142	159	151	174
18-20 years	171	175	184	188
21-30 years	203	190	206	199
31-40 years	185	199	199	204
41-50 years	203	198	199	202
51-60 years	184	180	199	190
Over 60 years	143	143	173	173
ALL AGES	140‡	140	158‡	158

* Combination of 690 pickers interviewed, all ages; and 423 children from platoon records.

† The actual figures were adjusted to fit a smoothed curve.

‡ Weighted average.

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