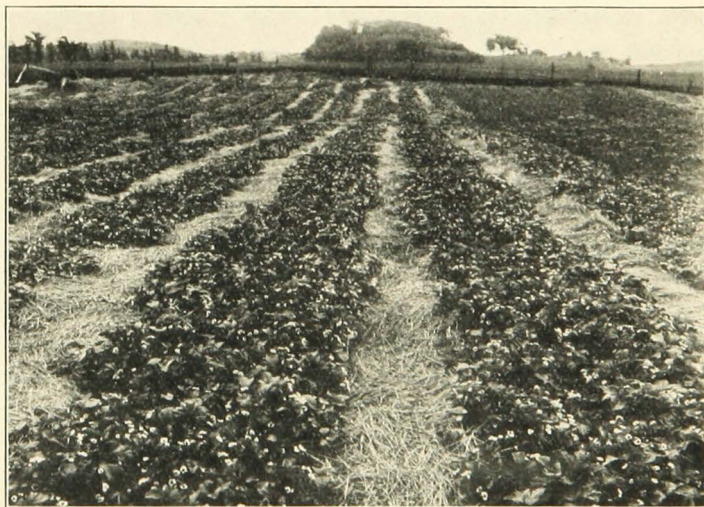


UNIVERSITY OF MINNESOTA
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Raspberry and Strawberry Production Trends in Minnesota

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INTRODUCTION

Casual observation has indicated a marked increase in the commercial planting of red raspberries and strawberries in Minnesota in recent years. Altho unfavorable weather conditions in 1933 held down the yield per acre, particularly of strawberries, commercial growers have sensed the possibility that expansion in planting has outstripped the marketing development. Raspberry production has already grown beyond the capacity of local markets to absorb the crop and carlot shipments to markets outside the state have increased. Discussion of the necessity for organizing more local co-operative marketing associations and the desirability of coordinating the work of such associations by the formation of a central statewide selling organization has been widespread in recent months. Before this problem could be intelligently discussed, it seemed necessary to determine in some manner how extensive has been the expansion in the berry industry and to gain some conception of the probable volume of the crop in 1934 and 1935.

In an effort to secure such information, the divisions of horticulture and agricultural economics of the Minnesota Agricultural Experiment Station mailed questionnaires to 1,359 commercial berry growers early in January of the present year.¹ These questionnaires sought to ascertain the producing acreage and probable production for the next two years as compared to the acreage and crop of 1933. It is gratifying to report that 403 berry growers representing 30 per cent of those to whom inquiries were sent, co-operated in this effort and returned the forms with the information requested. These included 309 producers of red raspberries and 250 producers of strawberries, well distributed throughout the state. It is believed that these growers are sufficient in number and representative enough in distribution to present a reliable picture of the trends that are under way in this industry throughout the state. The approximate location of each grower who supplied the information that is presented in this bulletin is indicated in Figure 1.

During the process of compiling and analyzing the data collected, it was found that many growers were unable to answer all the ques-

¹ Names and addresses were obtained through the courtesy of the Minnesota Fruit Growers Association.

tions on the forms. Because of these unavoidable omissions it will be observed that there is some variation in the number of growers contributing to the information summarized in the various tables.

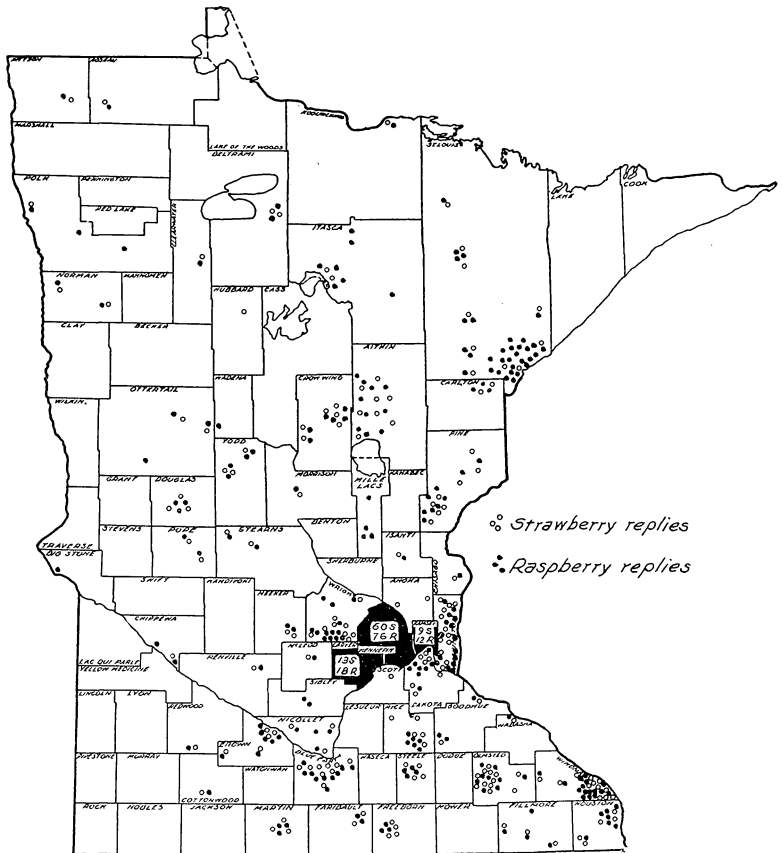


Fig. 1. Location of Growers Replying to Questionnaire

INCREASE IN ACREAGE AND PRODUCTION

Tables 1 and 2 indicate that a marked increase in bearing acreage of raspberries and strawberries is to be anticipated in 1934 and 1935. From the marketing standpoint, it is important to know what this increase in acreage means in terms of probable yields. In the questionnaire growers were asked not only for a record of their production in 1933 but for an estimate of probable production in 1934. It is to be presumed that in estimating the crop for the coming season each grower took into consideration the apparent condition of his plantings in Jan-

uary and assumed reasonably normal weather conditions for the ensuing growing season.

Table 1

Estimated Production for 1934 Compared to Actual Production in 1933 on Identical Premises, Estimates Made by 234 Raspberry Growers and 177 Strawberry Growers

Fruit	Year	Total no. of bearing acres	Production	
			Total no. of of crates*	Crates per acre
Raspberry.....	1933	443.0	47,035	106.2
	1934	519.3	77,680	149.6
Strawberry.....	1933	254.9	26,825	105.2
	1934	361.4	76,848	212.6

* Raspberry, 24-pint crates; strawberry, 16-quart crates.

Table 2

Bearing Acreage and Production on Premises of 309 Raspberry Growers and 250 Strawberry Growers, 1933, 1934 and 1935

Fruit	Year	Bearing acreage		Production*	
		Total no. of acres	Per cent increase over 1933	Total no. of crates†	Per cent increase over 1933
Raspberry.....	1933	510.4	...	54,204	...
	1934	658.1	28.9	98,452	81.6
	1935	774.0	51.6	115,790	113.6
Strawberry.....	1933	324.4	...	34,127	...
	1934	476.2	46.8	101,240	196.6
	1935	552.8	70.4	117,525	244.4

* Production calculated from data supplied by Table 1.

† Raspberries, 24-pint crates; strawberries, 16-quart crates.

Not all of the growers who listed their acreages were able to furnish production figures for 1933, and of those who did many did not venture a prediction regarding their crop prospects for 1934. It is desired to present as full and enlightening a comparison as possible between the crop produced in 1933 and those anticipated in 1934 and 1935, but to do this for the total recorded acreage it is necessary first to determine the probable difference in yield per acre for 1933 and 1934. For this purpose only the reports of growers who gave complete acreage and production records or estimates for both years could be used. The summary of this data appears in Table 1 together with the estimated average yield per acre. This table disclosed three very interesting facts. First, both raspberry and strawberry growers will have a larger bearing acreage in 1934 than they had in 1933. Second, it is apparent that the average yield per acre in 1933 was lower than would be considered normal or satisfactory by good commercial growers. This was particularly true in the case of strawberries. Third, these same growers estimate that their average yield per acre will be decidedly in-

creased in 1934. In fact, they expect to double the abnormally low 1933 yield of strawberries.

The yields per acre established in Table 1 from data supplied by 234 raspberry and 177 strawberry growers may be presumed to apply equally well to the much smaller groups who reported their bearing acreage but did not furnish crop records. In Table 2 are summarized acreage and production figures for the three-year period beginning in 1933. The bearing acreage for 1935 is based upon the growers' own statements including their anticipated planting in 1934 and deducting the amount they expect to plow under following the crop of that year. In determining the total production for 1935, the estimated average yields per acre for 1934 are used on the assumption that they are more nearly normal than are the relatively low yields recorded for 1933. It is true that such predictions are hazardous, particularly when made two years in advance as in the case of the estimates for 1935. These may be upset by many conditions, such as failure of growers to carry out their present planting plans for 1934 or by extremely favorable or unfavorable weather conditions during the next two years. The producing areas in Minnesota are so widely distributed that there is less danger of predictions being disturbed by abnormal weather than would be the case if the industry were highly concentrated in a single section. For instance, there may be some injury to strawberries in the Twin City area resulting from drouth and lack of snow in the winter of 1933-34, but such injury may be offset in whole or in part by the heavy snowfall and favorable wintering conditions in the northern districts of the state.

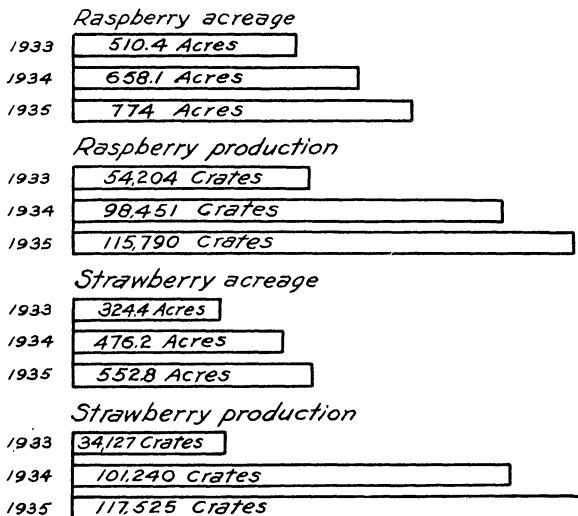


Fig. 2. Raspberry and Strawberry Acreage and Production

An examination of Table 2 and Figure 2 makes clear that there is every indication of a sharp increase in production of raspberries and especially of strawberries. Even if we scale down the average of the estimates of 309 raspberry growers and 250 strawberry growers and make further reductions for unfavorable climatic conditions, we would still be forced to the conclusion that an increased production is probable. If, on the other hand, we accept these growers' estimates as a reliable index of future production, we must look for the raspberry crop to be more than doubled in the next two seasons and for the strawberry crop of 1935 to be nearly three and one-half times that of 1933.

Table 3

Classification of 249 Raspberry Growers According to the Yield Per Acre Obtained from Plantings One Year Old or Older, 1933*

Yield in 24-pint crates per acre	Growers		Acres	
	Number	Per cent	Number	Per cent
Less than 50	51	20.5	83.3	17.9
50 to 100	80	32.1	151.4	32.5
101 to 150	59	23.7	99.2	21.3
151 to 200	31	12.5	94.1	20.2
201 to 250	14	5.6	23.1	5.0
251 to 300	8	3.2	10.2	2.2
301 to 351	4	1.6	3.8	0.8
351 to 400	2	0.8	0.5	0.1
Total	249	100.0	465.6	100.0

* The yields shown in this table include yields from two-year-old plantings which have not yet come into full bearing. Therefore this table shows lower average yields than would be obtained from fields of full bearing age.

Table 4

Classification of 193 Strawberry Growers According to the Yield Per Acre Obtained from Plantings of June Bearing Varieties, 1933

Yield in 16-quart crates per acre	Growers		Acres	
	Number	Per cent	Number	Per cent
Less than 50	60	31.1	91.8	30.2
50 to 100	52	26.9	79.0	26.0
101 to 150	37	19.2	70.0	23.1
151 to 200	17	8.8	32.8	10.8
201 to 250	14	7.2	17.2	5.7
251 to 300	5	2.6	7.3	2.4
301 to 350	4	2.1	3.6	1.2
351 to 400	4	2.1	1.9	0.6
Total	193	100.0	303.6	100.0

Low Yields in 1933

The hot and dry weather conditions of last summer over most of the raspberry and strawberry producing territory in Minnesota caused

a short picking season, low yields, and berries that were below normal in size. The chief interest in Tables 3 and 4 is that they furnish a graphic illustration of how low the production fell, particularly in strawberries. When it is realized that nearly one third of the growers picked less than 50 crates of the 16-quart size per acre, it can better be understood how even a very conservative estimate would show an enormous increase in production for 1934.

MARKETING METHODS

The local market is still the principal outlet for Minnesota berries, but the amount of fruit that is shipped to more distant markets has reached very significant proportions and in Hennepin County it has exceeded the amount sold locally. If it may be assumed that 62.4 per cent of the 1933 raspberry crop sold locally represented all that these markets can use, then it becomes evident that the increase in the production expected in 1934 must nearly all be shipped to other consuming centers. Taking as an example the group of growers represented in Table 5 who produced 48,346 crates of raspberries in 1933 and using the predicted crop increase of 81.6 per cent (Table 2), we may estimate that these growers will have 87,796 crates to market in 1934. If the local markets can consume only the same amounts as were used last year, then 57,547 crates must be shipped in 1934. This is more than three times the amount shipped by these same growers in 1933. It is probable, however, that these figures are somewhat extreme or over-drawn, for it is reasonable to suppose that with improved conditions of employment and increased purchasing power the local market will be better than during the previous year. It must be acknowledged, however, that even if the figures for production increase are discounted somewhat and improvements in local markets are granted there still appears to be a large increase in the exportable surplus that must be shipped to outside markets.

Table 5
Proportion of the 1933 Raspberry Crop Sold
Locally and Shipped by 245 Growers

Method of sale	All districts 245 growers		Hennepin County only 57 growers		All districts except Hennepin County	
	Crates sold*	Per cent	Crates sold*	Per cent	Crates sold*	Per cent
Sold locally	30,149	62.4	5,001	43.3	25,148	68.4
Shipped	18,197	37.6	6,554	56.7	11,643	31.6
Total	48,346	100.0	11,555	100.0	36,791	100.0

* 24-pint crates.

Examination of Table 6 shows that a greater proportion of strawberries are sold locally than of raspberries. It seems probable that figures in this table do not adequately represent the normal capacity of local consumption because the poor quality and relatively high price must have had a tendency to discourage local buying in 1933. Even if the crop increase for 1934 proves as large as expected, it may not mean that a much greater proportion will have to be shipped out than was the case in 1933. The decidedly abnormal strawberry crop of last year offers a poor basis upon which to formulate judgment concerning the market situation in 1934.

Table 6
Proportion of the 1933 Strawberry Crop Sold
Locally and Shipped by 192 Growers

Method of sale	All districts 192 growers		Hennepin County only 46 growers		All districts except Hennepin County	
	Crates sold*	Per cent	Crates sold*	Per cent	Crates sold*	Per cent
Sold locally	20,514	71.1	3,257	48.5	17,257	77.9
Shipped	8,358	28.9	3,453	51.5	4,905	22.1
Total	28,872	100.0	6,710	100.0	22,162	100.0

* 16-quart crates.

GROWERS' OPINIONS OF LOCAL MARKET CONDITIONS

In the questionnaire the growers were asked a definite question regarding the condition of their local markets. Table 7 and Figures 3 and 4 are based upon the answers to this question. Approximately three-fourths of the raspberry growers and more than two-thirds of the strawberry growers consider their local markets over-supplied now or likely to be so in the near future. These opinions of growers in widely separated districts seem to be well supported by the data contained in Tables 5 and 6. In short, the berry industry in Minnesota has developed to the point where serious efforts must be made by growers to find a

Table 7
Growers' Opinions of Local Market Conditions

Local market conditions	Raspberry		Strawberry	
	Number of replies	Per cent	Number of replies	Per cent
Over-supplied	159	56.0	88	42.3
Will be over-supplied soon	56	19.7	41	19.7
Will not be over-supplied soon.....	69	24.3	79	38.0
Total	284	100.0	208	100.0

satisfactory market outlet for their products. The experience of others would indicate that some form of co-operative marketing on a regional or statewide basis is likely to be the most satisfactory solution of the problem.

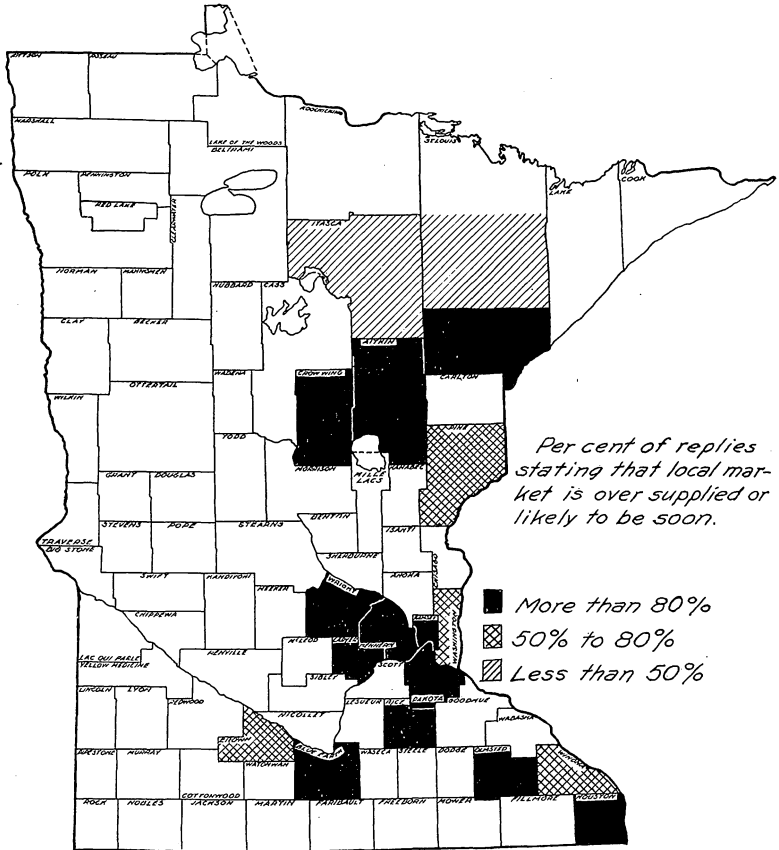


Fig. 3. Raspberry Growers' Opinions of Local Market Condition, in Counties From Which Five or More Replies Were Received

Figures 3 and 4 indicate not only the sections of the state where local markets are becoming inadequate to consume the present crop, but also show graphically the most important production centers. In some of the larger counties, such as Crow Wing, Aitkin, and St. Louis, the densely shaded areas do not necessarily indicate a heavier production than in certain other counties but rather that the production is large in relation to the local consumption.

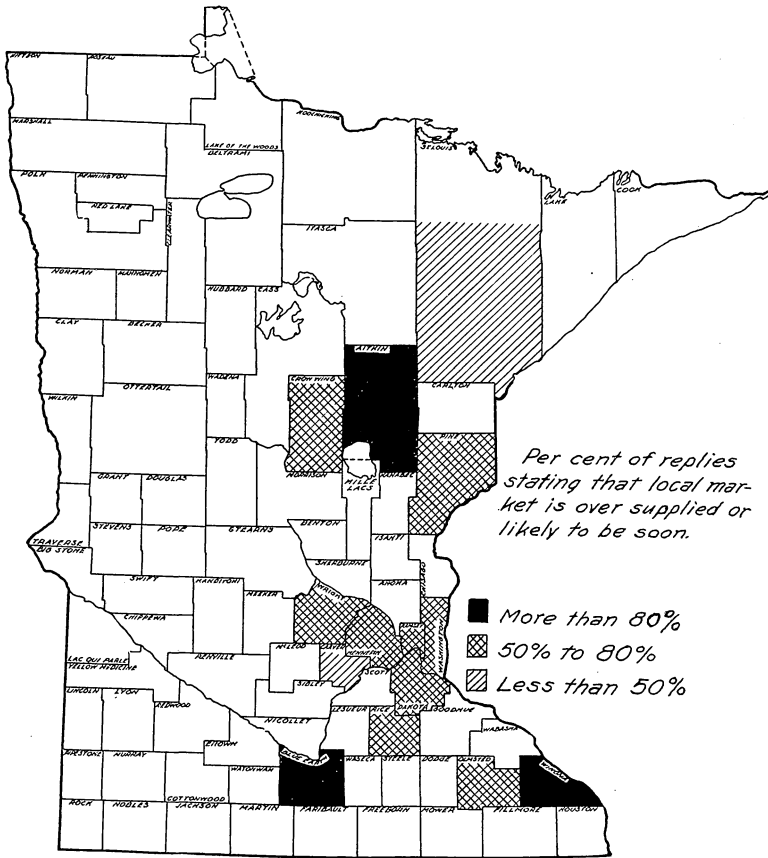


Fig. 4. Strawberry Growers' Opinions of Local Market Condition, in Counties From Which Five or More Replies Were Received

VARIETIES WHICH LEAD IN COMMERCIAL IMPORTANCE

One of the essentials for the development of a successful commercial fruit-growing enterprise is the selection and use of the best varieties available. In Tables 8 to 11, inclusive, data are assembled to show the acreage of each of the principal varieties of raspberries and strawberries grown by the 403 growers who replied to the questionnaire. The two varieties Latham and Chief comprise over 90 per cent of the total acreage represented by this survey. Both varieties were originated by the Minnesota Agricultural Experiment Station. The Latham was introduced in 1920 and the Chief in 1930. There is indicated a slight decrease in the amount of Chief and King in the new

plantings of 1934 as compared to the plantings of 1933, with a corresponding increase in the planting of Latham Chief, which is a recent introduction, has apparently made a place for itself, now comprising 25 per cent of the commercial acreage. Considering the extensive plantings of King in Hennepin County, it is possible that this variety may not be represented quite as fully as it should be in Table 8. There were, however, 76 replies from this county, making up about 25 per cent of the total of 309 raspberry growers representing the entire state.

Table 8
Acreage of Red Raspberry Varieties on
Premises of 309 Growers in 1934

Variety	Bearing acreage in 1934				Non-bearing acreage in 1934		Total bearing and non-bearing acreage in 1934	
	Acres planted in 1932 or earlier		Acres planted in 1933		Acres to be planted in 1934		Acres*	Per cent
Latham	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres*	Per cent
Chief	320.0	66.3	107.0	60.9	107.3	67.8	534.4	65.5
King	116.6	24.2	53.5	30.5	36.6	23.1	206.7	25.3
Other varieties	32.3	6.7	12.0	6.9	2.4	1.5	46.7	5.7
Total	13.7	2.8	3.0	1.7	12.0	7.6	28.7	3.5
	482.6	100.0	175.5	100.0	158.3	100.0	816.5	100.0

* This column does not represent bearing acreage for 1935 unless deductions are made for acreage to be plowed up in 1934. This information is not available separately by varieties.

Table 9
Acreage of June Bearing Strawberry Varieties on
Premises of 250 Growers in 1934

Variety	Bearing acreage in 1934				Non-bearing acreage in 1934		Total bearing and non-bearing acreage in 1934	
	Acres planted in 1932 or earlier		Acres planted in 1933		Acres to be planted in 1934		Acres*	Per cent
Dunlap	Acres	Per cent	Acres	Per cent	Acres	Per cent	Acres*	Per cent
Premier	97.3	43.3	72.0	29.8	70.8	27.6	240.1	33.2
Beaver	55.2	24.6	68.3	28.3	74.1	29.0	197.6	27.4
Other varieties	22.2	9.9	45.7	18.9	46.9	18.3	114.8	15.9
Total	49.8	22.2	55.7	23.0	64.4	25.1	169.9	23.5
	224.5	100.0	241.7	100.0	256.2	100.0	722.4	100.0

* This column does not represent bearing acreage for 1935 unless deductions are made for acreage to be plowed up in 1934. This information is not available separately by varieties.

Table 10
Acreage on Everbearing Strawberry Varieties on
Premises of 43 Growers in 1934

Variety	Bearing acreage in 1934				Non-bearing acreage in 1934		Total bearing and non-bearing acreage in 1934	
	Acres planted in 1932 or earlier		Acres planted in 1933		Acres to be planted in 1934			
Mastodon	4.6	59.0	13.8	63.0	8.6	34.8	27.0	49.6
Progressive	2.3	29.5	6.7	30.6	10.8	43.8	19.8	36.4
Wayzata†	0.9	11.5	1.4	6.4	5.0	20.2	7.3	13.4
Other varieties	0.0	0.0	0.0	0.0	0.3	1.2	0.3	0.6
Total	7.8	100.0	21.9	100.0	24.7	100.0	54.4	100.0

* This column does not represent bearing acreage for 1935 unless deductions are made for acreage to be plowed up in 1934. This information is not available separately by varieties.

† Does not include certain growers who are producing this variety mainly for sale of plants.

Table 11
Varieties Selected by Growers as the Best for Commercial Planting

Fruit	Best commercial variety	Number of replies	Per cent
Red raspberry	Latham	200	74.3
	Chief	52	19.3
	King	13	4.9
	4 other varieties	4	1.5
	Total	269	100.0
Black raspberry	Cumberland	27	71.0
	Older	5	13.2
	Plum Farmer	2	5.3
	4 other varieties	4	10.5
	Total	38	100.0
Strawberry June bearing varieties	Dunlap	100	31.8
	Premier	86	27.4
	Beaver	69	22.0
	Minnehaha	10	3.2
	Gibson	7	2.2
	Blakemore	7	2.2
	Nokomis	6	1.9
	Minnesota (Minn. No. 3)	5	1.6
	Easypicker	3	1.0
	15 other varieties	21	6.7
	Total	314	100.0

With strawberries as with raspberries, there are three leading varieties but these do not so completely dominate the field. It will be noticed in Table 9 that nearly one-fourth of the June bearing acreage is made up of other varieties. A study of this table indicates certain rather definite trends over the three-year period of 1932 to 1934. The popularity of Dunlap is apparently waning, and Premier is growing in favor. In the new planting in 1934 the latter variety is being used for the first time in excess of Dunlap, altho in total bearing and non-bearing acreage

for that year the older variety still leads by a fair margin. Since there is a very large acreage of old Dunlap (1932 or older), it is to be expected that there will be a correspondingly large plow-up of that variety, and by 1935 the Premier will lead all others in total bearing acreage. Altho it is a new variety, Beaver is being planted heavily but the new planting for 1934 shows no gain over the previous year. This apparently indicates a conservative attitude on the part of growers, who having put out a liberal planting are waiting to see how successful it will be. An interesting feature of this table is the large acreage planted in 1932 or earlier that is being carried over for fruiting in 1934. Since nearly one-half of the bearing acreage is made up of old plantings, it is quite evident that this is the general practice in Minnesota.

Since "other varieties" make up so large a proportion of the present strawberry planting, it is of interest to know something of the make-up of this mixed group which includes at least 37 varieties. Unfortunately the data do not show the acreage in enough detail so that the definite percentage of each variety can be calculated. The most important of these minor varieties are Nokomis, Minnehaha, Blakemore, and Minnesota, in the order named. Blakemore is a recent introduction from the United States Department of Agriculture, and the other three were originated at the University of Minnesota Fruit Breeding Farm. Nokomis is a large and productive berry, especially adapted to local marketing but is too soft for a shipping berry. Minnesota is a very promising variety of the Dunlap type but is of better quality and a better shipper. When first introduced it became badly infected with a mosaic type of disease and for a time was dropped from the Minnesota Horticultural Society's recommended list. Disease-free stock is now available and the variety is very likely to return to popular favor.

Of the everbearing varieties listed in Table 10 there are two which quite decidedly dominate the field, Mastodon and Progressive. A new addition to this group is the Wayzata, which gives promise of being a real contender in the commercial field but is of too recent introduction to have clearly demonstrated its merits.

The commercial production of everbearing strawberries is relatively small as compared to June bearing varieties. The acreages of the two were compared and it was found that they are being grown in the ratio of about 1 to 9. The everbearers seem to be well adapted to growing on well-worked peat soils and on mineral soils where irrigation is available. Many believe that this fruit will ultimately assume an important place in Minnesota horticulture, but at present the volume of production is small and is readily absorbed by the local markets.

Table 11 presents some interesting information which covers much the same ground as Tables 8 and 9, but in a little different way and with the addition of the black raspberry. In this case the growers were asked to express their individual opinions as to the best commercial varieties, while in the preceding tables the leading varieties were classified on the basis of acreage actually being grown. In the present table the opinion of a small grower will carry as much weight as that of a large grower. As might be expected, there is very little difference in the results obtained by the two methods of measuring the importance, value, and popularity of varieties. It is not surprising to find the Cumberland listed as the favorite black raspberry.

SIZE AND TYPE OF CONTAINERS

A decided difference of opinion was recorded regarding the size and type of market package. In Hennepin County the strawberry growers expressed a 5 to 1 preference for the 24-quart crate over the 16-quart size. In the rest of the state, however, the opinions were more equally expressed, with a small majority favoring the smaller crate. Apparently, sections supplying the Twin City market are the principal users of the 24-quart size. The ventilated type of crate is rapidly gaining in popularity, especially in sections where raspberries have to be shipped to market. Not only do berries carry better in these crates than in the old style, but they seem to sell more readily, both in the retail market and on the grower's premises. Many who have tried these new crates report that the slight increase in cost of the container is more than offset by the improved marketability of the package. This style of crate is now used by the Excelsior and the Minnetonka Fruit Growers associations for their raspberry output.

BLACK RASPBERRY PRODUCTION

Because the black raspberry is less winter hardy than the red, it is grown in Minnesota only to a limited extent. Among the 403 growers responding to the questionnaire 49 reported that they were growing this fruit, but production records were received from only 31, who have 27 acres. The average yield per acre in 1933 was 63.8 crates of the 24-pint size. This may be compared to an average yield per acre of 106.2 crates of red raspberries for the same year. There is an active demand for black raspberries, but until hardier and more productive varieties become available there appears to be little likelihood that the industry will become important in Minnesota.

CONCLUSIONS

There seems to be no question but that raspberry and strawberry production is increasing rapidly in Minnesota. In view of this increase, greater emphasis must be placed on the quality of the product which is to be offered for sale and on the development and recognition of standards and grades. The improvement of quality necessitates careful attention on the part of the grower to the details of picking, sorting, packing and handling of the product.

In addition, the market for Minnesota berries must be widened either by increasing the demand in the present consuming areas or by the development of new outlets. The individual grower can do little toward improvement of this phase of the marketing problem. The ultimate solution probably lies in the extension of the co-operative plan of market organization.