

THE PLACE OF ARTIFICIAL BREEDING IN KANSAS  
AS INDICATED BY PREVAILING PRACTICES AMONG  
FARMERS WHO ADOPTED THE SERVICE.

by

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## INTRODUCTION

Artificial breeding, as a means of improving dairy cattle is only 14 years old, the initial association being organized in New Jersey in 1938. The state-wide program in Kansas, however, did not start operations until March, 1950.

No other dairy improvement program has received such ready and rapid acceptance as has artificial breeding. This service is provided in practically all dairy sections of the United States, and more than 3½ million dairy cattle were bred in this manner in 1951 (1).

There are many assumptive values which might be attributed to this program and which may have been fundamental in its general acceptance by farmers. Some of the advantages of this program have been suggested to be the improved dairy practices resulting indirectly from the stimulus provided by artificial breeding services (3).

Other than the measurement of improved production per cow, no data have been collected to substantiate the various assumptions regarding either the initial advantages to the average farmer in adopting artificial breeding, or the improved practices which may result from it over a period of years.

The general good resulting from artificial breeding in most communities, when properly operated, is relatively unchallenged. The fact that artificial breeding in Kansas started as late as 1950 offered an opportunity to attempt to measure the conditions best fitted for such a program and



by evaluating initial conditions, lay a foundation to measure comparatively the progress that directly or indirectly may be attributed in the future to this dairy improvement project. The object of this thesis was to study prevailing conditions at the start of the program on the farms of Kansans who utilized artificial breeding services.

The purpose of the survey has been: (1) to investigate and analyze breeding practices on farms previous to and shortly after the operators joined the artificial breeding association, (2) to investigate dairy management practices and herd conditions on the same farms, (3) to determine if dairy practices on farms operated by members of artificial breeding associations differed from those on farms operated by non-members, and (4) to provide a basis for future measurement of the contribution of the artificial breeding program to the farms served and to estimate the influence of this program on related dairy practices.

#### REVIEW OF LITERATURE

In the United States, to date, little effort has been made to specifically ascertain breeding and dairy management practices at the start of the artificial breeding programs in the various states.

Dickenshoet and Herman (2) conducted a survey of factors affecting conception of dairy cattle where artificial insemi-

nation was used under field conditions. Perhaps a study more closely parallel to this study is that of Perry and Bartlett (4), who attempted to learn the chief results of artificial breeding in New Jersey since the first association began in 1938. However, both of these studies dealt with conditions found after the artificial breeding programs had adequate time to influence the breeding and dairy management practices of the farmers using such service.

#### EXPERIMENTAL PROCEDURE

##### Design of the Survey

The study was conducted on a state-wide basis insofar as the artificial breeding program was organized in Kansas in December, 1950. A few counties obtaining semen from sources other than the Kansas Artificial Breeding Service Unit were not included in the survey.

The data were gathered by the use of questionnaires (Form 1, Appendix). Each manager-technician in the local cooperative units, the county associations, was personally contacted and asked to collect the desired information. The questionnaire was fully explained to him, in person by the author, to prevent misunderstandings. Whenever possible, the manager-technician was given assistance in filling out a questionnaire for one member of his assigned group.

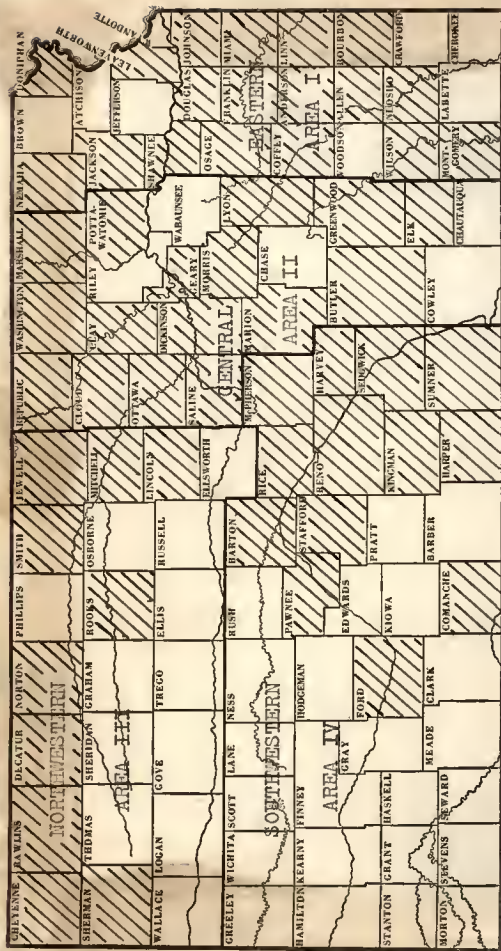
The counties participating in the Kansas artificial

breeding program were separated into four major areas for the purpose of contrasting some of the dairy practices in different types of farming areas among members of the associations. Not all practices were contrasted, however. These areas were designated as Eastern, Area I; Central, Area II; Northwestern, Area III; and Southwestern, Area IV. Figure 1 illustrates the boundaries of the four areas as well as the counties associated with K.A.B.S.U. in December, 1950, when this survey was undertaken.

Approximately 10 percent of the members of each county association were selected to be interviewed. The selection was made in the following manner: membership lists for each association were obtained from the Kansas Artificial Breeding Service Unit, referred to as K.A.B.S.U.; a table of random numbers (5) was used to determine the names of the members (between the first and the tenth on the list of each association) which would be included in the survey and would serve as a starting point; thereafter, every tenth name on the list was included in the survey. A total of 603 members were selected to be questioned.

For every fifth association member selected--starting from a randomly determined number between one and five (5)--a non-member neighbor, who owned dairy cattle, was also to be interviewed. A check was thereby provided to determine if any differences existed between farmers who joined the artificial





Counties in which artificial breeding associations affiliated with the statewide program were organized as of December, 1950.

Non-organized counties.

Fig. 1. The division of the state into areas for comparison of some dairy practices.

breeding program and their neighbors who did not use the program. A total of 120 questionnaires were distributed to be filled out for non-members of the artificial breeding program. Since few non-members were interviewed in each area, differences between members and non-members were compared only on a state-wide basis.

#### Use of I.B.M.-Cards to Record the Data

The information received from the returned questionnaires was coded (Form 2, Appendix) and transferred to International Business Machine (I.B.M.) cards. This was done for two reasons: (1) to facilitate the sorting and tabulation of data taken from the questionnaires, and (2) to better aid in preserving the data for a future comparative study. Since the sorting and tabulating were done mechanically by I.B.M. machines, the greatest labor involved after the questionnaires were returned was coding and recording the data.

Each county was given a number corresponding to the K.A.-S.U. Master Code number (Form 4, Appendix). Within each county farm numbers from 10 to 49 were assigned to questionnaires filled by members. Non-member farm questionnaires were numbered from 00 to 09. The first four columns of each I.B.M. card were used for identifying the county and farm from which the information was obtained.

The I.B.M. column assigned to record the information of

each question in the questionnaire is listed in Form 1, Appendix. Because of the length of the questionnaire, two I.B.N. cards were required to record the information from each farm.

#### Determining Error in Coding and Transferring

The data were recorded on code sheets in preparation for transfer to I.B.N. cards. Each code sheet contained 25 horizontal lines and 30 vertical columns. Seven pairs of code sheets were used, each pair of which listed data from 25 questionnaires (one questionnaire per horizontal line). An attempt was made to determine the degree of error incurred while transferring the information from the questionnaire to the code sheet. A spot check was carried out in the following manner: Using Snedecor's (5) tables of random numbers, (1) one pair of the seven pairs of code sheets was selected, (2) the line corresponding to the questionnaire to be checked on the selected code sheets was determined, and (3) the vertical column on the code sheet that was used as a starting point for the check was then selected. Starting from this column, a group of 25 consecutive spaces were checked horizontally for agreement between the information of the questionnaire and the code assigned that same information on the code sheet. This procedure was repeated 12 times until a total of 300 spaces were checked. Two errors were found. Based on this sample, the calculated error contracted while coding and transferring

the data was 0.667 percent.

## PRESENTATION OF EXPERIMENTAL DATA

### Response to Questionnaires

A total of 723 questionnaires were distributed among the manager-technicians of all associations except Rawlins County and north Dickinson County. In both of these associations the inseminators were resigning their positions and it was deemed inadvisable to leave questionnaires. Of the total questionnaires distributed, 603 were to be used for members of artificial breeding associations and 120 were to provide a non-member comparison.

The total number of completed questionnaires returned was 360, or 50 percent of those distributed. Of the questionnaires returned, 11 were substitutes for members originally selected and, therefore, were not used in this study. Thus, 349, or 48.2 percent, completed questionnaires were used in this study. Of these, 302 questionnaires represented association members, and 47 represented non-members. The member-non-member ratio of questionnaires returned was 7.4 to 1.

The number of questionnaires distributed to each county and the number returned are shown in Fig. 2.

### Personal and Economic Data

Age of Farm Operators. The ages of the farmers inter-







viewed were separated into groups covering ten year periods. Most of these farmers (55 percent of the members and 49 percent of the non-members) were between 30 and 49 years of age as shown in Table 1. Only two of the members were younger than 20 years and only seven were older than 70 years. All of the non-members were between 20 and 69 years of age.

Table 1. Age group comparisons between member and non-member farm operators

Age (in Years)	Total		Total	
	Members		Non-members	
	No.	%	No.	%
10 - 19	2	1	0	0
20 - 29	37	12	6	13
30 - 39	90	30	11	23
40 - 49	75	25	12	26
50 - 59	49	16	6	13
60 - 69	23	8	9	19
70 - 79	7	2	0	0
Unknown	10	6	3	6
Total	302	100	47	100

Ninety member farmers, or 30 percent were in the 30-39 year age group. This was more than was found in any other member age group. Among non-members, 26 percent were in the 40-49 year age group, and 23 percent were in the 30-39 year age group. No definite conclusion can be drawn from age comparisons of members and non-members as pertains to artificial breeding due to the small numbers of non-members interviewed.

Married or Single. Two hundred eighty six of the members (95%) questioned were married and 14 (almost 5%) were single.

Two members gave confusing answers and therefore were not included in the report concerning the question. Among the non-members interviewed, 45 (96%) were married while two (4%) were single.

Grade of School Last Attended. In an effort to determine the general educational level of farmers answering questionnaires, each was asked to indicate the grade of school last attended. The numbers of member and non-member farmers attending or completing the various levels of the school system--grade school, high school, and college--are shown in Table 3.

Table 2. The number of farmers indicating the division of the formal education system last attended.

	Number Members			Number Non-members		
	No.	:	%	No.	:	%
Attended						
Grade School 10	3			2		4
Graduated						
Grade School 77	26			14		30
Attended						
High School 54	18			4		9
Graduated						
High School 101	33			19		40
Attended						
College 32	11			5		11
Graduated						
College 20	7			3		6
Unknown	8			0		0
Total	302		100	47		100

Once enrolled in either grade school or high school, most of the farmers completed that particular division. The number of farmers who failed to finish their grade school or high school studies, once started, was not large. Twenty-six percent of the members and 30 percent of the non-members graduated from grade school and did not continue formal schooling. Of farmers attending high school, 33 percent of the members and 40 percent of the non-members graduated.

At the college level, 18 percent of the members and 17 percent of the non-members received some degree of training. However, in contrast to the grade school and high school levels, the number of farmers graduated from college was fewer than the number who stopped their studies before completion of the requirements for graduation.

Children on the Farm. The number of children on the farm contribute to the labor potential of that farm. Dairy production can utilize much of the labor contributed, especially by older children.

In order to better estimate the labor potential, the farmers interviewed listed the number of children still on the farm. The children were placed in one of four groups depending upon sex and age: (1) boys, 8 years and younger; (2) boys, 9 years and older; (3) girls, 8 years and younger; (4) girls, 9 years and older. The younger children represent a future labor potential, whereas the labor contributions of the

older children were already being utilized.

The differences between member and non-member farms were generally slight. No attempt was made to record the total number of children still on the farm as the identity of the number of children still on the farm was lost through coding.

More than 60 percent of the farmers reported no children in any group as shown by Table 3. The percent of farmers with one child in one or more groups ranged from 17 percent to 26 percent. Farmers with two children in one or more groups comprised from four percent to 11 percent of the total number interviewed. Farmers with three children in one or more groups ranged from one percent to six percent and those with four in one or more groups comprised from less than one percent to two percent of the total.

Table 3. The number of children, divided into sex and age groups, as reported by member and non-member farmers.

Number Children (Member Farms)	Boys				Girls			
	8yrs-below		9yrs-older		8yrs-below		9yrs-older	
	No.	%	No.	%	No.	%	No.	%
0	191	63	190	63	207	69	214	71
1	68	22	76	25	57	19	57	19
2	32	11	22	8	26	9	18	6
3	3	1	4	1	3	1	6	2
4	1	1	3	1	1	0	0	0
Unknown	7	2	7	2	8	2	7	2
Total	302	100	302	100	302	100	302	100
(Non-member Farms)								
0	31	66	31	66	32	68	33	71
1	12	26	10	22	10	22	8	17
2	2	4	3	6	4	8	2	4
3	2	4	2	4	1	2	3	6
4	0	0	1	2	0	0	1	2
Total	47	100	47	100	47	100	47	100



No appreciable differences were noted between members and non-members concerning the number, age, and sex of children still on the farm.

Source of Cash Income. Wheat was the main source of cash income on both member and non-member farms as shown by Table 4. Twenty-nine percent and 36 percent respectively reported wheat sales as the principle source of their revenue.

Table 4. The main source of cash income on member and non-member farms.

Source	Members			Non-members		
	No.	:	%	No.	:	%
Wheat	89		29	17		36
Dairy	50		17	11		24
Other	40		13	3		6
General Livestock	32		11	4		9
Beef	30		10	4		9
Beef - Wheat	19		6	3		6
Poultry - Hogs	11		4	4		9
Dairy - Wheat	9		3	0		0
Dairy - Poultry	5		2	0		0
Unknown	17		5	1		1
Total	302		100	47		100

Dairying played an important part in providing income for the members and non-members. Other than wheat, dairy operations seemed to provide the main income for more farmers than any other farm program. However, it must be remembered that general livestock probably involved a few dairy cattle.

Beef operations provided the main income on 10 percent of the member farms and on nine percent of the non-member farms.

General livestock was most important to 11 percent of the



members and nine percent of the non-members. It was hoped that a more specific answer would be given to the question, but since so many farmers gave "general livestock" as the main source of income, it was tabulated as received. Livestock and crops-livestock combination answers were discouraged, although farmers listed such combinations as their main source of income. Conceivably, many crops were marketed through the medium of livestock which may have accounted for some of the combination answers.

Differences noted between member and non-member answers concerning the main source of income were not great.

Comparison among members in the four areas showed wheat as the main source of income in three areas. The eastern area was the exception. Dairying and general livestock enterprises surpassed wheat in the eastern area. Also, dairying held a relatively minor position in regards to income in the northwestern and southwestern areas, as shown by Fig. 3.

Percent of Gross Income Provided by Dairying. As an additional measure of the financial contribution of dairying to the farm income, the percent of gross income provided was tabulated as received. Thirty-five percent of the members and 34 percent of the non-members received less than 10 percent of their gross income from dairy operations. As dairying provided an increased percentage of gross income, the number of farmers involved decreased as shown in Table 5.

Only 11 percent of the members and 14 percent of the non-

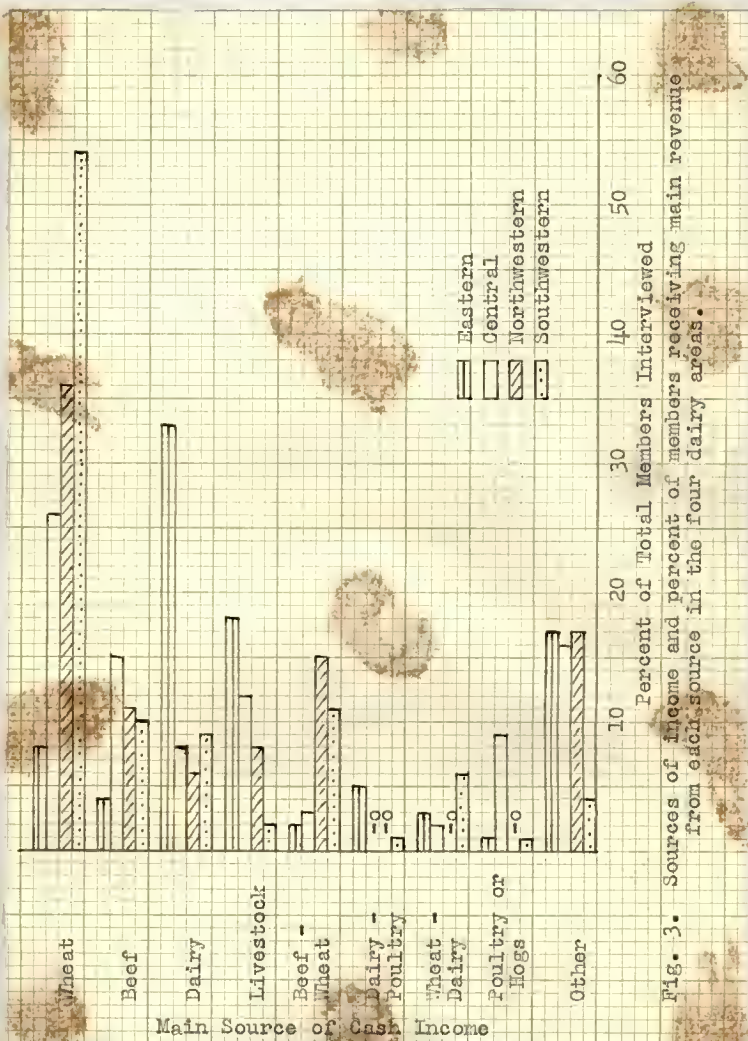


Fig. 3. Sources of income and percent of members receiving main revenue from each source in the four dairy areas.

members received more than half of their gross income from dairy operations. This fact seemed to be in general agreement with the report of 17 percent of the members and 24 percent of the non-members whose main source of cash income was provided by dairying (Table 4).

Table 5. The percent of the gross farm income provided by dairying.

% of Gross Income	Members		Non-members	
	No.	%	No.	%
0 - 10	106	35	16	34
11 - 20	53	17	7	15
21 - 30	46	15	7	15
31 - 40	26	9	5	11
41 - 50	29	10	3	7
51 - 60	9	3	2	4
61 - 70	6	2	1	2
71 - 80	9	3	3	6
81 - 90	4	1	0	0
91 - 100	5	2	1	2
Unknown	9	3	2	4
Total	302	100	47	100

Differences between member and non-member farmers concerning the percent of gross income provided by dairying were not great.

Acres of Land Owned. Thirty-five percent of the members and 26 percent of the non-members farmed land owned by other persons as shown by Table 6. Of the remaining farmers, both members and non-members, a majority (59 percent of members and 66 percent of non-members) owned units of 240 acres or less.

Among members more units of 80 to 160 acres were owned than any other size unit. Units of one to 80 acres were

owned by 49 members, whereas 161 to 240 acre units were owned by 31 members.

There seemed to be no great differences between member and non-member farms in regards to acres of land owned.

Table 6. Acres of land owned by farmers (multiples of 80 acres).

Unit (Acres)	Members			Non-members		
	No.	:	%	No.	:	%
None	106		35	12		26
80 - Below	49		16	7		15
81 - 160	67		22	10		34
161 - 240	31		10	7		15
241 - 320	14		5	0		0
321 - 400	10		3	2		4
401 - 480	8		3	1		2
481 - 560	4		1	0		0
561 - 640	4		1	0		0
641 - Above	8		3	2		4
Unknown	1		1	0		0
Total	302		100	47		100

Acres of Land Rented. Seventy-four members (24%) and 14 non-members (30%) did not rent any land. Presumably, these farmers owned all the land necessary for their particular operations.

Table 7 indicates the number of members and non-members renting land and the approximate unit of land rented. As was found with land owned, more member farmers rented units of 81 to 160 acres than any other size unit. In contrast with land owned, however, more units of larger sizes were rented than owned (compare with Table 6).

Forty-one percent of the farmers interviewed both owned



and rented land. However, the acreages of land owned and rented could not be determined without further study of the original data.

Member and non-member differences were small.

Table 7. Acres of land rented by farmers (multiples of 80 acres).

Unit (Acres)	Members			Non-members		
	No.	:	%	No.	:	%
None	74		24	14		30
80 - Below	37		12	6		13
81 - 160	51		17	7		15
161 - 240	26		9	0		0
241 - 320	37		12	6		13
321 - 400	20		7	2		4
401 - 480	17		6	4		9
481 - 560	7		2	1		2
561 - 640	8		3	3		6
641 - Above	18		6	4		8
Unknown	7		2	0		0
Total	302		100	47		100

Mortgage on Farm. Of the 302 members interviewed, 86 (29%) had mortgages on their farms. One hundred three (34%) of the members were listed as not having a mortgage on their land. The latter members presumably were listed as owning their farms, since 94 additional members (31%) rented their land and therefore did not own mortgages. Nineteen members (6%) did not give usable answers.

Among the total non-members answering questionnaires, 26 percent, or 12, had mortgaged farms, 21 farms (45%) were free from mortgage, and 11 farmers (23%) rented their land and consequently owed no mortgage. Three non-members (6%)



did not answer the question concerning a mortgage on their land.

Residence on Present Farm. Figures supplied by the questionnaires indicated a large number of short-term residences on the present farms. Forty percent of the members and 43 percent of the non-members lived on their present farm five years or less as shown by Table 8. Fifty-five percent of the members and 60 percent of the non-members had resided 10 years or less on the farm they were currently occupying.

Table 8. The number of years that member and non-member farmers have resided on their present farms.

Residence (Years)	Members			Non-members		
	No.	:	%	No.	:	%
0 - 5	122		40	20		43
6 - 10	45		15	8		17
11 - 15	27		9	5		11
16 - 20	27		9	1		2
21 - 25	13		4	2		4
26 - Over	29		10	7		15
Lifetime	36		12	4		8
Unknown	3		1	0		0
Total	302		100	47		100

Farmers who had lived their lifetime on one farm, regardless of the number of years, were listed in a separate group. This group consisted of 36 members (12%) and four non-members (8%).

Again, member and non-member differences were not great.

Fig. 4 indicates the percentage of members interviewed in each area that had lived on their present farms for each of the five-year multiple periods. The trend was much the

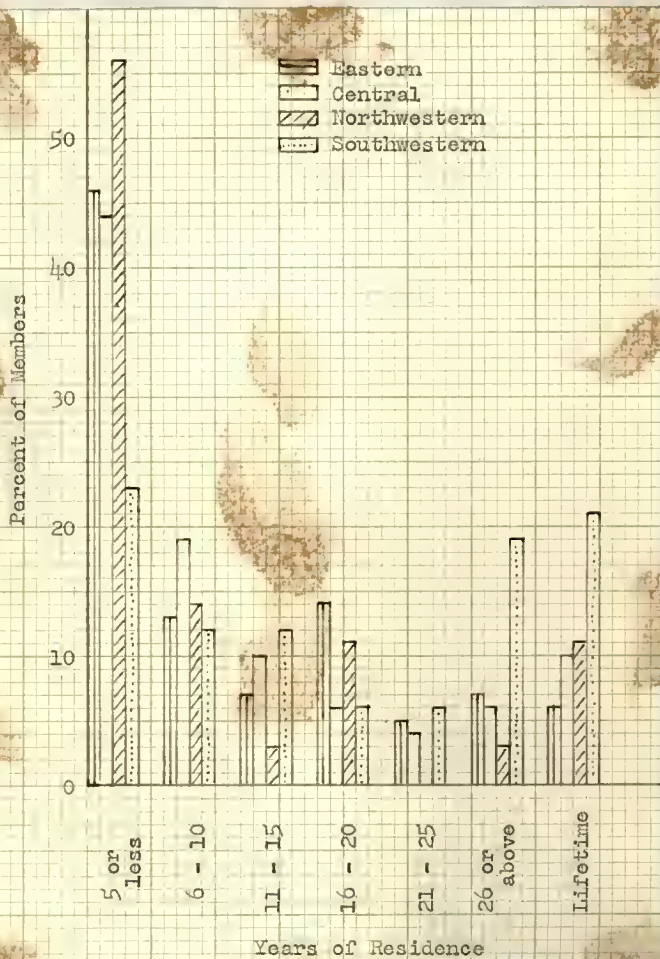


Fig. 4. Years member farmers have resided on their present farms in the various areas.

same as that shown by the total members, with more members in each area occupying their farms less than five years than any other period. Also, with the exception of the Eastern area, members who had lived on one farm for their lifetime outnumbered members who had lived on the same farm for over 26 years. This was especially evident in the Southwestern area.

Men Hired Yearly. The majority of the farmers interviewed did not hire any men on a permanent basis. Two hundred sixty-two members (87%) relied on partial or no farm help during the year. Thirty-one members (10%) hired one man on a yearly basis; four members (1%) hired two men; and only one member (1%) hired three men for continuous farm work. Four members (1%) did not give an answer. Forty-six (9%) non-members had no full time help and only one non-member (2%) hired one man on a yearly basis.

The tendency seems to be for farmers to do as much of their own work as possible, as would be expected. No attempt was made to determine the reasons for the lack of full time farm help. However, mechanization on the farm and the shortage of farm labor undoubtedly resulted in less hired help.

Men Hired Six Months or Less. As a further breakdown, the number of men hired for less than six months of regular farm work per year was determined.

Twenty-two (7%) of the members interviewed failed to give an answer. However, 150 member farmers (50%) used no part-time labor on the farm. Eighty-two members (27%) hired one

man; 36 members (12%) hired two men; 10 members (3%) hired three men; and two members (1%) hired four men for part-time work. Presumably, this additional help was needed only during the summer. Also, some of the farmers not hiring additional labor undoubtedly exchanged work with neighbors, but the extent of the labor exchange was not determined.

Among the non-members, 22 farmers (47%) needed, or used, no additional help; 14 farmers (30%) hired one man; six farmers (13%) hired two men; two farmers (4%) hired three men; and two farmers (4%) hired four men on a part-time basis. One interviewed non-member (2%) did not give an answer.

Years in Dairy. More farmers interviewed, both members and non-members had been engaged in dairying less than five years than any other five-year multiple group. Twenty-nine percent of the members and 36 percent of the non-members were listed in the five-year-or-less category. Although the general trend was for the number of farmers to decrease in each succeeding five-year period, it did not do so consistently as shown by Table 9.

Fifty-nine percent of the members and 57 percent of the non-members had been engaged in dairying less than 15 years. It was interesting to note that 12 percent of the members and 19 percent of the non-members had been dairymen for 26 years or longer.

Differences between members and non-members were not large.



Table 9. The number of years that interviewed farmers had been engaged in dairying.

Years (5yr groups).	Members		Non-members	
	No.	%	No.	%
0 - 5	89	30	17	36
6 - 10	46	15	3	6
11 - 15	42	14	7	15
16 - 20	43	14	5	11
21 - 25	25	8	2	4
26 - Over	37	12	9	19
Lifetime	10	3	1	2
Unknown	10	4	3	7
Total	302	100	47	100

Fig. 5 shows the percent of interviewed member, in each of the four areas, that were engaged in dairying during each of the successive five-year periods. Fewer farmers in the Southwestern area had engaged in dairying less than five years than had farmers in the other three areas. The indication seems to be that more farmers in the latter areas were entering the dairy field. In the six to ten year category, the Eastern area (20%) led by about seven percent the other three areas which were constant at approximately 13 percent. The Northwestern area had a low percentage of farmers in the 11 to 15 year group, but lead all areas in the percent of farmers engaged in dairying for 16 to 20 years. The Central and the Southwestern areas had the highest percent of farmers engaged in dairying for 26 years and over. These were also the only areas in which farmers who had spent their lifetime engaged in dairying were listed.



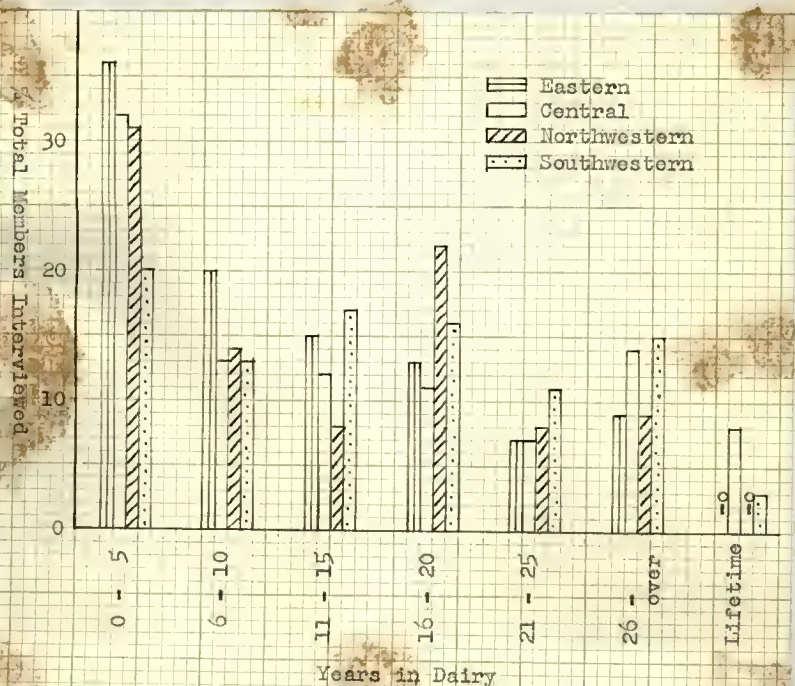


Fig. 5. Members engaged in dairying (five year periods).

### Dairy Management Practices

Milk by Machine. The number of member farmers that used milking machines for milking their cows was less than the number that used other means. One hundred forty-two members (47%) milked their cows by machine, whereas 159 members (53%) used hand milking or other means. One member (0.7%) and three non-members (6%) gave answers that were unusable. In comparison,

20 non-members (43%) milked their cows with milking machines. Twenty-four (51%) used other means of milking.

The differences between members and non-members, concerning the use of milking machines, did not seem to be great.

Grade A Milk Production. The differences in percent of farmers producing Grade A milk also were not great. Approximately 15 percent of the non-members were on Grade A production, whereas 21 percent of the members were producers of Grade A milk. Sixty-four members and seven non-members were Grade A producers. Two hundred thirty-three members (77%) and 39 non-members (83%) did not produce milk for Grade A marketing purposes.

Sell Whole Milk. One hundred six members (35%) sold whole milk; 175 (50%) sold cream only. Eight members (3%) sold both whole milk and cream and 12 (4%) sold neither. In all areas, except the Eastern area, the majority of farmers sold cream. In the Eastern area, however, the majority sold whole milk.

Among the non-members, sixteen (34%) sold whole milk, 23 (49%) sold cream only, one (2%) sold both whole milk and cream, and five (11%) sold neither whole milk nor cream. The trend among non-members was much the same as that among members.

One member (0%) and two non-members (4%) gave confusing answers.

Raise Herd Replacements. A majority of both members and non-members raised all or a major part of their own herd replacements. Only 49 members (16%) and 11 non-members (23%)

did not raise herd replacements. Two hundred fifty-two members (83%) and 36 non-members (77%) did not raise calves for herd replacement purposes.

Only one member (less than one percent) did not answer the question.

Sell Calves for Veal. One hundred twelve members sold all or part of their calves on the market for veal. Slightly over one-third (37%) of the members were thus involved. Sixty-three percent (189 members) did not sell their calves for veal. One member did not answer the question.

Thirty-one non-member farmers (66%) also did not veal their calves. However, 16 non-members (34%) did follow the practice of selling calves for veal.

No attempt was made to determine the sex of calves sold for veal. Undoubtedly some farmers sold only male calves.

Tuberculosis and Brucellosis Testing, Calfhood Vaccination. One hundred ninety-nine members and 32 non-members, 66 percent and 68 percent respectively, followed a tuberculosis testing program in their dairy herds. In contrast, 97 members (32%) and 13 non-members (20%) did not make periodic tuberculosis tests in their herds. Answers from six members (2%) and two non-members (4%) were not used.

Fewer farmers tested their dairy herds for brucellosis than those who tested for tuberculosis. One hundred eighty-three members (61%) and 29 non-members (62%) had their milking herds tested for brucellosis, whereas one hundred sixteen

members (38%) and 16 non-members (34%) did not test. Three members (1%) and two non-members (4%) gave answers that were unusable.

As an additional disease prevention measure, 145 members (48%) practiced calfhood vaccination for control of brucellosis. Similarly, 19 non-members (41%) vaccinated their calves to help give immunity to the brucellosis microorganisms. However, the number of farmers who did not vaccinate calves included 151 members (50%) and 26 non-members (55%). Six members (2%) and two non-members (4%) did not answer the question. Differences between members and non-members regarding disease testing and calfhood vaccination were small.

Table 10. Percent of member farmers in the four areas who tested for tuberculosis and brucellosis, and who practiced calfhood vaccination for control of brucellosis.

Area	Tuberculosis	Brucellosis	Calfhood
	Testing	Testing	Vaccination
	%	%	%
Eastern	66	42	59
Central	60	60	47
Northwestern	58	56	17
Southwestern	77	83	52
Average	65	60	44

Eleven percent more member farmers in the Southwestern area of Kansas practiced tuberculosis testing than did members in the Eastern area as shown by Table 10. However, slightly more Eastern area members practiced calfhood vaccination as an aid to brucellosis prevention. The Southwestern area members also led, by 23 percent, the Central area members in the prac-



tice of brucellosis testing. The Northwestern area members, however, did not practice disease prevention as intensively as did members in the other areas. In regards to Bang's vaccination of calves, 30 percent fewer Northwestern members used the practice than did the members of the Central area.

Future Herd Plans and Expansion. It was recognized that current economic conditions influence the future plans of the farm operator. Therefore, the interviewed farmers were asked to indicate whether they were planning on increasing the size of their dairy herd, reducing the herd size, or maintaining the present herd size. About 43 percent of the farmers intended to increase the number of cows in their herd, whereas less than 10 percent planned to reduce the herd size as shown in Table 11.

Table 11. The future intentions of farmers questioned regarding the size of their dairy herds.

Future Herd Plans	: Members		: Non-members	
	: No.	: %	: No.	: %
Expand:				
Natural Increase	73	24	15	32
Purchase	21	7	3	6
Both	35	12	2	4
Total Expansion	129	43	20	42
Maintain	94	31	15	32
Reduce	14	5	4	9
Unknown	65	21	8	17
Total	302	100	47	100

Of the farmers intending to expand the size of their herds, 57 percent of the members and 75 percent of the non-members reported they would do so through natural herd increase. Six-

teen percent of the members and 15 percent of the non-members intended to purchase the additional dairy stock, whereas 27 percent of the members and 10 percent of the non-members intended to expand by both natural increase and purchase of additional stock.

Differences between members and non-members were small, with the exception of the manner of expansion. About 17 percent fewer members intended to increase the herd size by natural increase than did non-members, although more members than non-members intended to use both natural increase and purchase to obtain larger herds.

Beef Operations. Farmers totalling 146 members and 23 non-members, 48 percent and 49 percent respectively, have never been beef operators. However, 143 members (47%) and 22 non-members (47%) had been, or still were, engaged in beef operations. The differences were not great between members and non-members concerning the question of whether or not the farmer had ever been a beef man.

Thirteen members (4%) and two non-members (4%) gave answers that were unusable.

Breeding Cows of Beef Type on Farms. A majority of farmers did not keep any breeding cows of beef type on the farm. Sixty-five percent of the members and 53 percent of the non-members were included in the group of non-beef operators.

Of the 106 members and 22 non-members who kept beef cows, 70 percent and 59 percent respectively, had herds of 25 cows

or less. Apparently men operating on a larger scale were not interested in general dairying.

Table 12. The size of beef breeding herds on member and non-member farms.

Number Cows in Herd	Members		Non-members	
	No.	%	No.	%
None	196	65	25	53
0 - 10	39	13	9	19
11 - 25	35	11	4	9
26 - 50	18	6	5	11
51 - 75	1	0	1	2
76 - 100	2	1	0	0
101 - 125	0	0	1	2
Unknown	11	4	2	4
Total	302	100	47	100

#### Dairy Feeding Practices

Calf Feeding Practices. In an attempt to gain further insight into the dairy practices of member and non-member farmers, questions concerning the length of time calves were fed whole milk, the use of milk substitutes, and the main type of hay used for calf feeding were asked.

The largest number of farmers, 28 percent of the members and 43 percent of the non-members--a difference of 15 percent, fed whole milk to their calves for two to four weeks, as shown by Table 13. More than 50 percent of the farmers interviewed did not feed whole milk to their calves longer than six weeks.

However, milk substitutes for use in calf feeding were not used on a large scale. Thirty-one percent of the members and 34 percent of the non-members used calf feeding formulas (Table 13). The member-non-member difference was not large.

Alfalfa hay was used to greater extent in calf feeding than any of the other roughages. Sixty percent of the members and 57 percent of the non-members, a very slight difference, fed alfalfa hay as the main roughage for calf feeding purposes. Prairie hay was next to alfalfa in popularity among the farmers

Table 13. Some calf feeding practices as used by member and non-member farmers.

Feeding Practice	Members		Non-members	
	No.	%	No.	%
Whole Milk (weeks fed)				
0 - 2	29	10	5	11
2 - 4	84	28	20	43
4 - 6	56	18	3	6
6 - 8	45	15	9	19
8 - 12	40	13	3	6
12 - 16	16	5	1	2
16 - 20	6	2	0	0
20 - 24	9	3	2	4
Unknown	17	6	4	9
Total	302	100	47	100
Milk Substitutes				
Were used	93	31	16	34
Were not used	207	69	31	66
Unknown	2	0	0	0
Total	302	100	47	100
Hay Fed				
None	6	2	0	0
Alfalfa	181	60	27	57
Prairie	81	27	13	28
Sorgho butts or				
Corn fodder	6	2	1	2
Combinations	25	8	6	13
Unknown	3	1	0	0
Total	302	100	47	100

(Table 13). Poorer type roughages and combinations of rough-



ages were used only to a slight extent.

Grain Ration for Dairy Cows. By far, the majority of interviewed farmers fed a grain ration to their dairy cows as a usual practice. Two hundred eighty-two members (94%) and 39 non-members (83%) fed grain. Only 18 members (6%) and eight non-members (17%) did not feed a grain ration. Two members did not answer the question.

Differences among areas were not great. One hundred percent of the interviewed members in the Eastern area fed a grain ration as usual practice as compared with 89 percent for the Northwestern area, the low area. The Central and Southwestern areas were quite similar with 91 percent and 92 percent respectively, of their members feeding a grain ration.

Protein Content of Grain Ration. Of the farmers feeding a grain ration, 22 members and five non-members used rations with protein contents of 10 percent and below. Thirty-three members and four non-members fed grain rations with a protein content of 11 to 14 percent. The most popular ration, however, seemed to be one that contained from 15 to 17 percent protein as shown by the answers of 96 members and 17 non-members. Only one non-member reported using 18 to 24 percent protein rations as compared to 38 members reported using the same ration. The percent of total farmers interviewed using the various protein content rations are shown in Table 14. The Answers of 97 members and 13 non-members were not usable.

As can be seen from Table 14, a greater percentage of

interviewed farmers fed a grain ration consisting of 15-17 percent protein than in any other protein concentration. North-

Table 14. Relationship in percentage of various protein content rations between members and non-members and among areas.

Area	:10% -	: %	: %	: %	:Ration	:Un-
	:Below : 11 - 14:	15 - 17:	18 - 24:	Not Fed:	known	
Non-members	11	8	36	2	15	28
Members	7	11	32	13	5	32
Eastern	7	15	41	14	0	23
Central	6	8	33	12	7	24
Northwestern	3	6	17	22	11	41
Southwestern	11	12	27	7	6	37

western area, however, deviated from this ratio. In this area the large percentage of member farmers fed rations comprising 18-24 percent protein to their dairy cows.

It will also be noted that a higher percentage of non-members than members fed a ration without regard to the protein content.

Grain in Proportion to Milk Production. One hundred eighty members fed grain to their dairy cows in direct proportion to the milk produced by the cows. In contrast, 114 members did not feed in proportion to production. As a difference, 20 non-members weighed and scaled feed to dairy cows in proportion to production. Twenty-four non-members did not follow such a practice.

As can be noted from Table 15, differences between members and non-members who practiced proportionate feeding of grain in relation to milk production were not large.

Twelve percent more members in the Eastern area used a feed to milk ratio when feeding grain than did members of the Northwestern area. The difference among members of the Northwestern area and those of the Central area, was slight. The

Table 15. A comparison among interviewed farmers concerning the practice of grain feeding in relation to milk production.

Grain Fed	Non-		Area Members			
	Members	Members	I	II	III	IV
	%	%	%	%	%	%
In proportion to production	43	60	73	59	61	46
Not in proportion to production	51	38	26	39	36	49
Unknown	6	2	1	2	3	5

Southwestern area members, however, had 13 percent fewer members practicing proportionate feeding of grain than the Central area and 27 percent fewer than the Eastern area. The Southwestern area differed from the other areas in that fewer members (46%) fed proportionate mixtures of grain than the members (49%) who fed their cows without regard to production. The difference was not great, however.

Hay for Cows. Alfalfa hay proved to be the most popular roughage fed to dairy cows by the member and non-member farmers as shown by Table 16. About 10 percent more members than non-members (68 percent and 58 percent respectively), of those answering the question, fed alfalfa as the main source of roughage.

Prairie hay was not used to any great extent. Sorgo butts and corn fodder were used by slightly more farmers.

It was intended that only the primary roughage used be

listed on the questionnaire. Answers listing the use of combination roughages, although discouraged originally, were tabulated as received.

Table 16. The main hay fed to dairy cows belonging to member and non-member farmers.

Hay Fed	Members		Non-members	
	No.	%	No.	%
Alfalfa	203	67	26	55
Prairie	6	2	1	2
Sorge butts or Corn fodder	22	7	6	13
Combinations	67	22	13	28
Unknown	4	2	1	2
Total	302	100	47	100

The majority of members in each area fed alfalfa hay to their dairy cows as the primary roughage as is shown by Fig. 6.

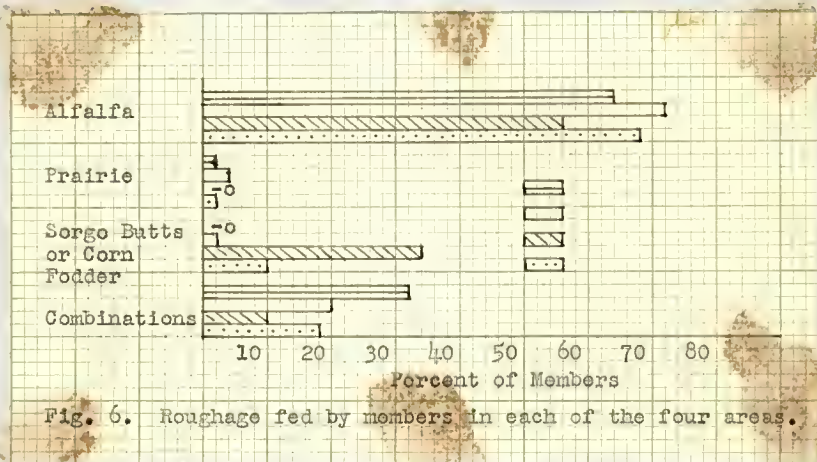


Fig. 6. Roughage fed by members in each of the four areas.



Very few members in any of the four areas depended upon prairie hay for roughage requirements. More Central area members used sorgo butts and corn fodder than members in other areas. Combinations of roughages were reported from all areas. However, the Eastern area tended to list more combinations than the other areas.

Acres in Native Pasture. Twelve percent of the members and four percent of the non-members reported no native grass pasture included in their operations. Most of the interviewed farmers had less than 80 acres of native pasture as shown by Table 17. Approximately the same percentage of members and

Table 17. A comparison of native pasture acreage on member and non-member farms

Pasture (in acres)	Members		Non-members	
	No.	%	No.	%
None	37	12	2	4
0 - 80	177	59	29	62
81 - 160	43	14	6	13
161 - 240	13	4	5	11
241 - 320	14	5	0	0
321 - 400	4	1	0	0
401 - 480	2	1	0	0
481 - 560	4	1	0	0
561 - 640	3	1	2	4
641 - over	2	1	1	2
Unknown	3	1	2	4
Total	302	100	47	100

non-members, 14 percent and 13 percent respectively, had from 81 to 160 acres of native grass on their farms for pasture purposes. More non-members (11%) were included among farmers having 161 to 240 acres in pasture than were members (4%). However, due to the vast differences in numbers of members and

non-members interviewed, Table 17 may not give a true perspective in comparison of native pasture acreage above 240 acres.

Temporary and Tame Pasture. Most of the member and non-member farmers apparently did not use temporary and tame pasture to supplement native pasture. Tame pasture, especially, was little used--only 35 percent of the members and 19 percent of the non-members used tame pasture as shown by Table 18. Temporary pasture was more favored by the farmers. Forty-eight percent of the members and 51 percent of the non-members used temporary pasture during the year.

Table 18. A comparison of temporary and tame pasture acreage on member and non-member farms.

Pasture (in acres)	Temporary				Tame			
	Members		Non-members		Members		Non-members	
	No.	%	No.	%	No.	%	No.	%
None	156	52	23	49	195	65	38	81
10 - below	64	21	9	19	36	12	3	7
11 - 20	39	13	7	15	29	10	0	0
21 - 30	13	4	3	7	13	4	1	2
31 - 40	14	5	1	2	9	3	0	0
41 - 50	3	1	3	6	3	1	1	2
51 - over	7	2	0	0	10	3	2	4
Unknown	6	2	1	2	7	2	2	4
Total	302	100	47	100	302	100	47	100

Acreages of temporary and tame pasture were quite low, being generally less than 20 acres. Of the farmers who had planted such pastures, 74 percent of the members and 70 percent of the non-members had planted less than 20 acres of temporary pasture. Similarly, 65 percent of the members and 43 percent of the non-members had planted less than 20 acres of tame pasture. Other than the smaller number of non-members,

these differences were not large.

Months per Year on Pasture. The pasture utilization period in Kansas was found to be from slightly less than five to slightly more than nine months in length. However, the greater number of farmers, about one-third of those questioned, favored a six month pasture period as shown by Table 19. Only slightly more farmers favored an eight month pasturage

Table 19. The pasture utilization period most commonly used by member and non-member farmers.

Pasture Period	: Members		: Non-members	
	: No.	: %	: No.	: %
5 months or less	24	8	5	11
6 months	101	33	17	36
7 months	65	22	8	17
8 months	67	22	10	21
9 months or more	39	13	7	15
Unknown	6	2	0	0
Total	302	100	47	100

than did those reporting seven month usage. Fewer farmers used the combined periods of five months or less and nine months or more.

Member and non-member differences were small.

Silage Fed to Cows. A majority of farmers interviewed did not feed silage. One hundred twenty-three members (41%) fed silage in one form or another to their dairy cows, whereas 173 (57%) did not. Similarly, 22 non-members (47%) fed silage while 24 (51%) did not. Answers of an additional six members (2%) and one non-member (2%) were not usable.

Among the areas, the range of farmers who fed silage

varied from a low 25 percent in the Northwest to a high 63 percent in the Southwest. The Eastern and Central areas were intermediate with 31 percent and 36 percent respectively of the members feeding silage to dairy cows.

Among the farmers who used silage, sorgo silage, made from various sorghums, proved to be the most popular as shown by Table 20. Seventy-two percent of the members and 55 percent of the non-members used sorgo silage. The difference between the

Table 20. The kind of silage fed to dairy cows by member and non-member farmers.

Type Silage	Members		Non-members	
	No.	%	No.	%
Sorgo	89	72	12	55
Corn	16	13	3	14
Sorgo and Corn	11	9	3	14
Other	5	4	4	18
Unknown	2	2		
Total	123	100	22	100

percentage of members and non-members using sorgo silage was quite large. Corn silage was next in popularity with 13 percent of the members and 14 percent of the non-members reporting its use. A combination of corn and sorgo silage was preferred by a few members and non-members. Other types of silage, including grass, were not used to a large extent.

A comparison of the areas tended to show the same pattern. However, 85 percent of the Southwestern members used sorgo silage as compared to 53 percent among Central members, with the Eastern and Northwestern areas falling in between (65 percent and 67 percent respectively).



# Dairy Breeding Information

## Dairy Cows Bred by Natural Service During the Past Year.

This question was concerned with the scope of natural breeding in the year 1950. Table 21 indicates the number of member and non-member farms reporting natural services and the number of cows on each farm.

Table 21. The number of dairy cows per farm bred by natural service on farms of members and non-members who used the practice.

Number Cows	Members		Non-members	
	No.	%	No.	%
None	36	12	1	2
1 - 10	153	51	23	49
11 - 20	52	17	10	21
21 - 30	11	3	2	4
31 - over	2	1	1	2
Unknown	48	16	10	22
Total	302	100	47	100

Thirty-six members and one non-member reported no cows bred by natural service. Generally, fewer than ten cows per farm were bred by natural methods. However, one member reported as many as 60 cows all bred by natural insemination.

A total of 1,939 cows belonging to 218 members were bred naturally. Three hundred sixty-one cows belonging to 36 non-members were also bred by natural service. The average was 8.9 cows per member; the average was 10 cows per non-member.

Forty-nine members and one non-member reported no cows conceiving after the first service. However, the farmers,

who did not use natural service (36 members and one non-member), would be included in this group. Therefore, only a possible 13 members (4%) had no dairy cows conceive after the first natural service.

The number of member and non-member farmers listing first service conceptions and the numbers of cows that conceived are found in Table 22.

Table 22. The number of cows per farm that conceived after the first natural service as reported by member and non-member farmers.

Number Cows	Members		Non-members	
	No.	%	No.	%
None	49	16	1	2
1 - 10	171	57	25	53
11 - 20	20	7	5	11
21 - 30	7	2	1	2
Unknown	55	18	15	32
Total	302	100	47	100

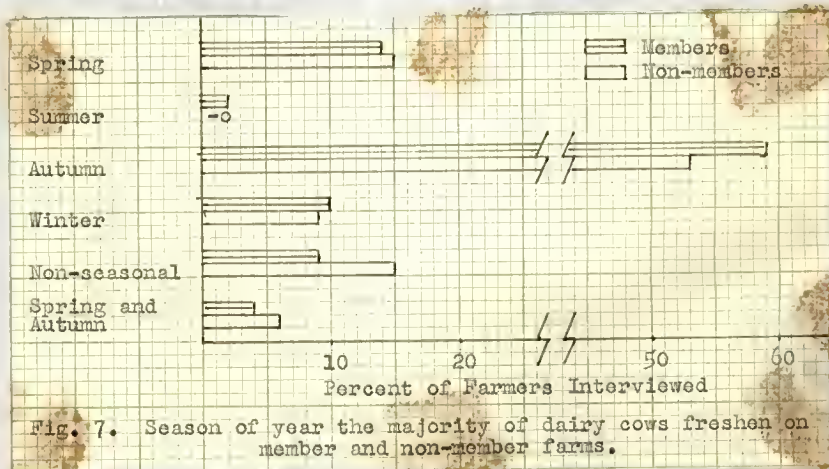
A total of 1,265 cows belonging to 198 members and 207 cows owned by 32 non-members were reported to have conceived after the first natural service. Generally, fewer than ten cows per farm conceived after the first service (6.4 cows average for members and 6.7 cows average for non-members). Differences between member and non-members were small.

Few farmers reported any dairy cows that were bred naturally four or more times prior to, or without, conceiving. Only 15 percent of the members and 10 percent of the non-members, 46 and five respectively of the farmers questioned, reported a need for more than four natural services before some of their

problem/<sup>cows</sup>conceived or were abandoned as non-breeders.

One hundred ninety-five members (65%) and 32 non-members (68%) reported no cows being bred four or more times. Answers given by 61 members (20%) and 10 non-members (22%) were not usable.

Season of Year Dairy Cows Freshen. The largest group of farmers, 179 members and 25 non-members, preferred to have the majority of their dairy cows calve during the autumn months as shown by Fig. 7. The spring months were popular with 43 mem-



bers and seven non-members. Only six members reported a majority of calving during the summer months. However, 30 members and four non-members reported that the majority of their cows freshened during the winter months.

A few farmers did not practice a system of season breeding and subsequent calving. Twenty-seven members and seven non-members indicated non-seasonal freshening of their dairy cows and an additional 11 members and three non-members reported spring and fall freshenings of their dairy cows.

Answers from six members (2%) and one non-member (2%) were not used.

Bulls Run with Cows. One hundred seventy-one members and 35 non-members, 57 percent and 74 percent respectively, allowed their bulls to run with the cows. Apparently, pasture breeding methods were used and the bulls were allowed to run with the cows yearly or seasonally depending upon the operation.

Among the farmers who did not allow their bulls to run with the cows were 127 members (42%) and 12 non-members (26%). This difference was moderately large.

A comparison of the four dairy areas indicates the Eastern area (one percent did not answer) as the sole area in which the percentage of member farmers keeping bulls separate from the cows (52%) is greater than those allowing bulls to run with the cows (47%). In the Central area (3% did not answer), 44 percent of the members kept bulls and cows separate, whereas 53 percent did not. In the Southwestern area, 35 percent of the members kept bulls and cows separate; 65 percent did not. The Northwestern area had the largest spread between members who let their bulls run with the cows (72%) and those who kept their bulls separated (28%).



Four members (1%) were not included because of unusable answers.

Systematic Records of Breeding and Calving. One hundred ninety-nine members and 27 non-members, 66 percent and 57 percent respectively, kept systematic breeding and calving records according to their reported answers. In contrast, 100 members (33%) and 20 non-members (43%) did not keep any sort of record pertaining to breeding and calving of their dairy cows. Approximately nine percent more members than non-members followed a policy of keeping such records.

Three members (1%) gave unusable answers.

Number of Bulls used in Past Three Years. The number of different bulls used in the past three years, 1948 to 1950 inclusive, on member and non-member farms ranged from zero to seven. However, only two members (1%) reported use of no bulls for the three year period. Fifty-nine members and 11 non-members, 20 percent and 23 percent respectively, used only one bull in the same period.

Most of the farmers, both member and non-member, used two bulls. One hundred sixty-seven members (55%) and 27 non-members (57%) were included in this group.

Of the remaining farmers, 50 members (17%) and seven non-members (15%) used three bulls in the three year period. During the same time, nine members (3%) and two non-members (4%) used four different bulls. One member used five bulls

and another member used seven bulls in the same period.

Thirteen members (4%) did not answer the question. Member and non-member differences were slight.

Use of One Breed of Bull in Past Five Years (1946 - 1950).  
Sixty-seven percent of the members and 72 percent of the non-members, 202 and 34 respectively, have used only one breed of bulls in breeding the majority of their dairy cows in the past five years. Eighty-eight members (29%) and 12 non-members (26%) have used bulls of more than one breed during the same period.

Answers given by 12 members (4%) and one non-member (2%) were not used.

Breed of Last Three Bulls Used. Among member farmers, the use of Holstein and Hereford bulls to breed the majority of dairy cows were approximately equally favored as shown by Table 23. The last three bulls used by member farmers were totaled and recorded in reverse order (first, the last bull used; second, the next to last bull used; and third, the bull used previous to the next to last bull).

Of the dairy breeds, the total number of bulls listed were as follows: (1) Holstein, 186; (2) Milking Shorthorn, 90; (3) Guernsey, 64; (4) Jersey, 40; (5) Ayrshire, 20; and (6) Brown Swiss, 11.

When the percent of the members who used the various breeds of bulls were compared for each of the last three bulls used (Table 23), the variations per breed were very small. This would tend to indicate rather constant ratios of breed

Table 23. The last three bulls used, by interviewed farmers to breed their dairy cows.

Breed	Members		Non-members	
	No.	%	No.	%
<b>Last Bull Used:</b>				
Holstein	73	26	14	31
Milking Shorthorn	33	12	7	15
Guernsey	29	10	0	0
Jersey	15	5	2	4
Ayrshire	8	3	2	4
Brown Swiss	5	2	0	0
Hereford	73	26	14	31
Shorthorn	30	10	6	13
Aberdeen Angus	16	5	1	2
Other	3	1	0	0
Total	285	100	47	100
Unknown	17		1	
<b>Next to Last Bull Used:</b>				
Holstein	65	27	9	24
Milking Shorthorn	32	13	9	24
Guernsey	23	10	1	3
Jersey	13	5	1	3
Ayrshire	6	3	3	8
Brown Swiss	4	2	1	3
Hereford	60	25	9	24
Shorthorn	21	9	3	8
Aberdeen Angus	11	5	1	3
Other	3	1	0	0
Total	238	100	37	100
Unknown	64		10	
<b>Bull Used Previous to Next to Last:</b>				
Holstein	48	27	11	36
Milking Shorthorn	25	14	8	26
Guernsey	12	7	0	0
Jersey	12	8	1	3
Ayrshire	6	3	2	6
Brown Swiss	2	1	0	0
Hereford	50	28	7	23
Shorthorn	13	7	2	6
Aberdeen Angus	5	3	0	0
Other	3	2	0	0
Total	176	100	31	100
Unknown	126		16	

usage on member farms. Non-member differences, although small, may have been largely due to the small number of reports tabulated.

Many member farmers preferred to use beef bulls on their milking cows. Bulls of the Hereford breed were preferred. A total of 163 Hereford bulls were used. Shorthorn bulls were used by 64 members. Also, 32 Aberdeen Angus bulls were used. Nine additional bulls of other breeds were listed.

Four hundred eleven bulls of the six main dairy breeds were used to breed milk cows as compared to 288 bulls of the beef and other breeds.

Among non-member farmers, bulls of the Holstein and Hereford breeds were again about equally favored. Milking Shorthorn bulls were also used quite extensively (Table 23).

The number of bulls of the different breeds used by non-member farmers were: Holstein, 34; Milking Shorthorn, 24; Guernsey, 1; Jersey, 4; Ayrshire, 7; Brown Swiss, 1; Hereford, 30; Aberdeen Angus, 2; and Shorthorn, 11. A total of 71 dairy breed bulls and 43 beef breed bulls were used.

Type of Last Three Bulls Used by Farmers. The last three bulls used by 40 percent of the members and 36 percent of the non-members were of dairy type and of a specific breed as shown by Table 24. Fewer farmers changed dairy breeds while obtaining the last three bulls used in their herds.

Almost as many farmers--31 percent of the members and 34 percent of the non-members--used beef bulls as used dairy bulls



of one breed. However, it was not determined whether or not these farmers consistently used beef type bulls of one breed or if the bulls were of different breeds.

Table 24. Percent of interviewed farmers and the type of their last three bulls.

Type of Bulls	: Members		: Non-members	
	: No.	: %	: No.	: %
Dairy, all one breed	119	40	17	36
Dairy, mixed breeds	19	6	6	13
Beef	94	31	16	34
Some Dairy, Some Beef	52	17	7	15
Unknown	18	6	1	2
Total	302	100	47	100

The last three bulls of 17 percent of the members and 15 percent of the non-members were of both dairy and beef types. These farmers may have been using dairy bulls to obtain herd replacements and beef bulls to obtain market animals. However, the reasons for using bulls of different types were not determined.

There did not seem to be any appreciable difference between members and non-members regarding the type of the last three bulls used.

The members of the Eastern area tended to use more bulls of one particular breed than members of other areas as shown by Fig. 8. However, the Eastern led the Southwestern area and the Central area by only about nine percent and 13 percent respectively. About 14 percent of the Northwestern area members used one particular breed of dairy bull on their farms.

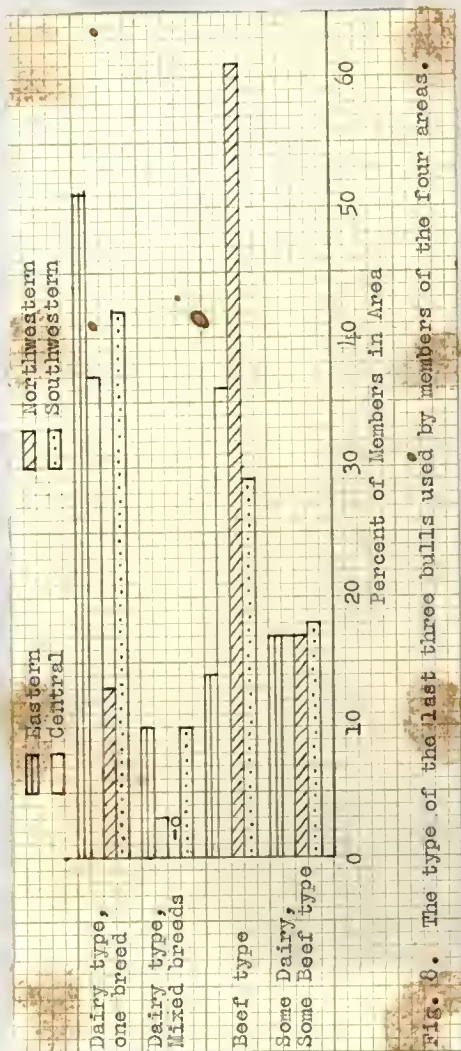


Fig. 6. The type of the last three bulls used by members of the four areas.

About 10 percent of the Eastern and Southwestern area members used bulls of dairy type, but switched breeds from time to time. There were fewer Central area members following this practice.

The Northwestern area members tended to mate their milk cows with bulls of beef type. The Eastern area members used beef type bulls the least. The Central area members tended to use more beef type bulls than the Southwestern area members.

Approximately the same percentage of members in all areas used some dairy type bulls and some beef type bulls.

Purebred or Grade (Last Three Bulls). The last three bulls used by 150 members (50%) and 30 non-members (64%) were purebred. On a percentage basis, 18 percent more non-members than members used purebred bulls (the last three, at least). Seventy-two members (24%) and seven non-members (15%) had used grade bulls. Fifty-six members (18%) and nine non-members (19%) were included in the group whose last three bulls used were both purebred and grade.

Twenty-four members (8%) and one non-member (2%) did not answer the question.

Owned, Borrowed or Leased (Last Three Bulls). The majority of the members and non-members owned the last three bulls used to breed their milk cows as shown by Table 25. Ownership of each of the bulls was acquired through buying or trading, raising the bulls, or receiving them as a gift.

Many more bulls were borrowed for breeding purposes than

were leased. Similarly, more farmers tended to own some of their last three bulls and borrow or lease some than the farmers who only leased their bulls. Farmers tended to borrow the use of bulls rather than leasing them.

Table 25. The source from which the last three bulls used by member and non-member farmers were obtained.

Manner Obtained	Members		Non-members	
	No.	%	No.	%
Owned	157	52	26	55
Borrowed	44	15	6	13
Leased	8	3	2	4
Some owned, some borrowed	57	19	9	19
Some owned, some leased	13	4	3	6
Some borrowed, some leased	1	0	0	0
Some owned, some borrowed, some leased	2	1	0	0
Unknown	20	6	1	3
Total	302	100	47	100

Differences between members and non-members were not great.

Average Price Paid for the Last Three Bulls Used. Seventy-six members and seven non-members, respectively 25 percent and 15 percent, did not list a price given for their last three bulls. Undoubtedly, many of the bulls used were home raised. Sixty-six members (22%) and 17 non-members (36%) listed a price for only one bull. Sixty-six additional members (22%) and eight non-members (17%) listed the price paid for two bulls. Only 77 members (25%) and 14 non-members (30%) listed a price for each of their last three bulls used. Seventeen members (6%) and one non-member (2%) did not give an answer to the question.



The average price paid for the last three bulls used by each of the member farmers reporting ranged from \$3.00 to \$525.00. The average price paid by all members was \$167.09. The mean price paid for the last three bulls used was \$150.00. The mode price was also \$150.00.

The average price paid for the last three bulls among non-member farmers was \$158.87 with a range of \$34.00 to \$367.00. The mean price paid was \$143.00; the mode price was \$200.00.

Although the differences between prices paid by member and non-member farmers were not great, the members tended to pay slightly more for their bulls.

Average Fee Paid for Use of Bulls. Most of the farmers interviewed did not pay a cash fee for the use of bulls. Fifty-six members (18%) and 11 non-members (23%) did not pay any fees or service charges for any of the last three bulls, which were borrowed or leased. Five members paid an average fee of \$1.00. Five members paid an average fee of \$2.00. One member paid \$3.00; two members paid \$4.00, and one additional member paid an average fee of \$5.00.

A total of 14 members (5%) paid an average of \$2.21 for the services of bulls borrowed or leased. One non-member (2%) paid a fee of \$1.00.

Two hundred thirty-two members (77%) and 35 non-members (75%) did not answer the question.

Average Age When Bought of the Last Three Bulls Used.

Eighty-five members (28%) and 14 non-members (50%) did not list any ages for the last three bulls used. Seventy members (23%) and nine non-members (19%) listed ages for only one bull, 78 members (26%) and nine non-members (19%) listed ages for two bulls, and 52 members (17%) and 14 non-members (30%) listed ages for all three bulls used. Seventeen members (6%) and one non-member (2%) did not give usable answers.

The average age of bulls bought by member farmers was 14.8 months. The range was from less than one month to 72 months (six years). The mean was 12 months and the mode was 12 months.

Among non-member farmers the average age of bulls when purchased was 11.6 months. The age when purchased ranged from two months to 36 months (three years). The mode, as in the case of the members, was 12 months and the mean was 11 months.

The number of older bulls purchased was very limited. Only 36 of the bulls bought by member farmers were over two years of age. Only seven of these bulls were over four years of age when purchased by the member farmers. This would indicate that the usefulness of older bulls was not being utilized.

Crossbreeding of Dairy Cows. One hundred thirty-six members and 27 non-members, 45 percent and 58 percent respectively, were practicing crossbreeding with their dairy cows. In contrast, 162 members (54%) and 19 non-members (40%) did not practice crossbreeding.

Four members (1%) and one non-member (2%) did not answer the question.

The Central area led the other areas in percentage of members who did not crossbreed as shown by Table 26. In the Southwestern area, more members used crossbreeding practices than did members who did not crossbreed. The Northwestern area was evenly divided on the issue. The Eastern area had about eight percent more members practicing crossbreeding than the Central area.

Table 26. Area members practicing crossbreeding of dairy cattle.

Crossbreeding	: Eastern :	Central :	Northwest :	Southwest :
	%	%	%	%
Yes	42	39	50	52
No	53	61	50	48
Unknown	5			
Total	100	100	100	100

Future Crossbreeding Intentions. Included among the farmers who intend to practice crossbreeding in the future were 89 members (30%) and 20 non-members (43%). In contrast, 203 members and 24 non-members, 67 percent and 51 percent respectively, were not planning to use crossbreeding practices in regard to their dairy herds.

On a percentage basis, about 13 percent more members than non-members were not intending to crossbreed in the future.

Ten members (3%) and three non-members (6%) gave unusable answers.

Use of Beef Bulls During Last Five Years (1946 - 1950).

A majority of farmers have used beef bulls for the purpose of breeding their milking cows at one time or another during the past five years. One hundred sixty-three members and 26 non-members, 54 percent and 55 percent respectively, were included in this group.

However, 13½ members (44%) and 17 non-members (36%) did not use beef bulls to breed their dairy cows during the same five years.

Five members (2%) and four non-members (9%) did not answer the question.

Of the Eastern area members, 44 percent had used beef bulls whereas 53 percent had not followed such a practice. The Southwestern area members were evenly divided. Fifty percent of the members had used beef bulls and 50 percent had not. Only 28 percent of the Northwestern members and 38 percent of the Central area members had used dairy bulls exclusively during the past five years. Seventy percent and 61 percent of the Northwest and Central members, respectively, had used beef bulls sometime during the same period. The variance from 100 percent was due to unknown answers.

Beef - Dairy Crossbred Heifers Obtained. Of the farmers using beef bulls to mate with dairy cows during the past five years, only 106 members (35%) and 25 non-members (53%) reported any beef crossbred heifers obtained as shown by Table



26. One hundred forty-eight members (49%) and 19 non-members (40%) did not obtain any crossbred heifers.

A total of 841 crossbred heifers were obtained by the 105 members for an average of 8.01 per member. The mean was five and the mode was two crossbred heifers per member. The average for non-members was 7.2. Twenty-five non-members reported a total of 180 crossbred heifers obtained. The mean was four and the mode was three crossbred heifers per non-member.

Table 27. Beef crossbred heifers obtained during the past five years.

Number of Crossbreds	Members		Non-members	
	No.	%	No.	%
None	148	49	19	40
1 - 5	52	17	13	28
6 - 10	29	10	5	11
11 - 15	11	4	5	11
16 - 25	12	4	2	4
26 - 35	2	1	0	0
Unknown	48	15	3	6
Total	302	100	47	100

Beef Crossbred Heifers Kept, of Milking Age, and Milked in Past Five Years. In an attempt to determine the degree of use in dairying of the beef crossbred heifers obtained, member and non-member farmers were asked to report the number of such heifers kept, of milking age, and milked. However, it must be remembered that 134 members and 17 non-members had not mated their milking cows with beef bulls during the past five years.

Only 70 members (23%) and 20 non-members (42%) kept any beef crossbred heifers. Of the farmers who obtained such heifers (see preceding section), 67 percent of the members and

80 percent of the non-members kept them. There was a moderate difference between members and non-members concerning the percentage who kept heifers.

Forty-one percent of the members and 64 percent of the non-members, who obtained beef crossbred heifers, actual count 43 and 16 respectively, had heifers of milking age.

Also, of the members who had beef crossbred heifers of milking age, 89 percent or 38, had used them for milking purposes. Similarly, 75 percent of the non-members, or 12, had milked their crossbred heifers. There was a moderate difference between the percent of members and non-members who milked such heifers.

Difference in Veal Price. Member and non-member farmers were asked if they had noticed any difference in veal price between beef crossbred calves and dairy calves when sold on the market. One hundred members and 18 non-members, 33 percent and 38 percent respectively, reported they noticed a difference, presumably in favor of the beef crossbreds. Seventy-seven members (26%) and 16 non-members (34%) reported no difference noted. One hundred twenty-five members (41%) and 13 non-members (28%) did not answer the question, or gave confusing answers.

Mate Dairy Cows with Beef Bull Again. Of the farmers questioned concerning beef-dairy matings, 76 members (25%) and 20 non-members (43%) reported that they would crossbreed their dairy cows with beef bulls again sometime in the future.

One hundred forty-eight members (49%) and 16 non-members (34%) indicated that they would not use beef bulls again. This includes the 134 members and 17 non-members originally reported that they had not used beef bulls.

Answers given by 70 members (26%) and 11 non-members (23%) were not used.

Number Dairy Cows of Breeding Age in Herd. Two hundred eighty-eight members reported a range of from one to 60 dairy females of breeding age in their herds. An additional five members (2%) had no dairy cows of breeding age. A total of 3,244 dairy females was reported.

The majority of member farmers had less than 10 breeding age cows in their herds as shown by Table 28. However, among members with females of breeding age, the average number of such cows was 11.3 for all herds. The median was 10 breeding females per herd and the mode was five breeding females per herd.

Table 28. A comparison of the herd components and the number of members who reported the number of animals in each component.

Number in: Herd	Cows		Calves		Unbred Heifers		Bred Heifers	
	No.	%	No.	%	No.	%	No.	%
None	5	2	47	15	117	39	156	52
1 - 10	164	54	207	69	155	50	128	42
11 - 20	92	30	40	13	9	3	2	1
21 - 30	26	9	3	1	1	0	1	0
31 - over	6	2						
Unknown	9	3	5	2	10	3	15	5
Total	302	100	302	100	302	100	302	100

One non-member (2%) did not have any breeding age dairy cows. The remaining 43 non-members (92%) reported from one to 40 breeding age cows. A total of 497 cows were reported for an average of 11.6 per herd. The median was eight cows and the mode was six cows. Three non-members (6%) gave unusable answers.

Number of Calves in Herd. Forty-seven members (16%) did not have any calves--below one year of age--in their herds. Two hundred fifty members reported from one to 30 calves in their herds as shown by Table 26. One thousand five hundred eighty calves total were reported.

The average number of calves per member herd was slightly over 6.3. The mode was two calves per herd and the median was five calves per herd.

Among the non-members, seven (15%) did not have any calves. Thirty-seven non-members (79%) reported a total of 230 calves, ranging from one to 17 per herd. The average number of calves per herd was 6.2, the median was five calves per herd, and the mode was two calves per herd.

Three non-members (6%) did not answer the question satisfactorily.

Number of Unbred Yearling Heifers in Herd. As before, Table 26 indicates the number of member farmers who reported the number of unbred yearling heifers in their dairy herds. One hundred seventy-five member farmers reported a total of



707 unbred yearling heifers. One hundred seventeen members (39%) did not have any unbred yearling heifers.

The number of unbred heifers ranged from one to 22 per herd. The average was about four unbred heifers per herd. The median was three unbred heifers per herd and the mode was two unbred heifers per herd.

Eighteen non-members (38%) did not have any unbred yearling heifers. Twenty-four non-members (51%) reported from one to ten such yearling heifers for a total of 89. The average number of unbred heifers per non-member farm was 3.7, considerably less than the average for member herds. The median was two heifers and the mode was one heifer.

Five non-members (11%) gave unusable answers.

Number of Bred Yearling Heifers per Herd. One hundred fifty-six members (52%) did not have any bred yearling heifers. One hundred thirty-one members reported a total of 426 bred heifers. The herd average per member was 3.3 heifers. The median was two heifers per herd and the mode was one heifer per herd. Table 26 also indicates the number of bred yearling heifers reported on member farms.

Eighteen non-members reported a total of 62 bred heifers on their farms. The average number of bred heifers was 3.4 per farm, the median was three per farm, and the mode was one per farm. The range was from one to seven such heifers per farm. Twenty-three non-members (49%) did not have any bred heifers. Six non-members gave unsatisfactory answers.

Number of Milk Cows in Herd. Included as milk cows in the herd were bred heifers and dry cows as well as those cows milking at the time the questionnaire was answered.

A total of 2,729 milk cows was reported by 271 members. The average number of milk cows per herd was 10.1. The mode was five cows per herd whereas the median number was eight cows per herd.

Twenty-seven non-members reported a total of 233 milk type cows on their farms. An average of 8.6 cows per farm was therefore recorded; the median and the mode numbers were eight cows per farm.

Table 29. The number of bred heifers and milk cows, including dry cows, on farms of members and non-members.

Number Cows	: Members		: Non-members	
	: No.	: %	: No.	: %
1 - 5	100	33	5	11
6 - 10	71	24	11	23
11 - 15	55	16	5	11
16 - 20	19	6	5	11
21 - 25	15	5	1	2
26 - over	11	4		
Unknown	31	10	20	42
Total	302	100	47	100

The size of the milking herd was quite small, generally being below 10 cows. Of those who answered the question, 63 percent of the members and 59 percent of the non-members had fewer than 10 cows. This difference was small.

Average Herd Age of Milk Cows. Among both members and non-members the average age of cows in most of the herds studied was four and five years. One hundred forty-six members

(48%) had herds the cows of which averaged four or five years of age. Fourteen non-members (30%) had herds in the same age group.

As indicated by Table 30, only 15 percent of the members reported average herd ages below four years. However, only four percent of the non-members reported average herd ages below four years. In both of these instances the average herd age was three years.

Table 30. The average age of all cows in the milking herd as reported by member and non-member farmers.

Average age (yrs)	Members		Non-members	
	No.	%	No.	%
2	6	2		
3	40	13	2	4
4	86	28	10	21
5	60	20	4	9
6	39	13	5	11
7	14	5	2	4
8	5	2		
9	5	2	2	4
Unknown	47	15	22	47
Total	302	100	47	100

The number of herds in which the average age of cows exceeded five years was 63 (21%) for the members and nine (19%) for the non-members.

Type of Milk Cows in Herd. Sixty-three percent of the member farmers and 67 percent of the non-member farmers who reported their herd type, had all dairy animals in their herds although not necessarily of one breed. However, herds of dairy and mixed composition were found on more farms than were dairy

herds composed of different breeds as shown by Table 31.

Table 31. The general type of the milking herd of member and non-member farmers.

Herd Type	Members		Non-members	
	No.	%	No.	%
Dairy, one breed	119	39	14	30
Dairy, different breeds	52	17	4	9
Mixed	4	1		
Dairy, Mixed	57	19	5	11
Dairy, beef	23	6	2	4
Dairy, beef, mixed	14	5	1	2
Other	3	1	1	2
Unknown	30	10	20	42
Total	302	100	47	100

Although most farmers tended to have some dairy type cattle on their farms, mixtures of cattle of other types with the dairy was a common occurrence.

Basic Milking Herd Type. This summation was intended to indicate the degree to which cattle of any one particular breed appear in the herd. One hundred twenty-two members (40%) and 16 non-members (34%) had herds in which the cows within the herd were all of one breed. Eighty-nine members (29%) and six non-members (13%) had herds in which the majority of cows were of one breed. Herds in which there was no majority of any breed of cattle were reported by 58 members (19%) and five non-members (11%).

Answers given by 33 members (17%) and 20 non-members (42%) were not used.

Basic Breed of Milking Herd. Holstein cattle seemed to be the breed upon which most milking herds were based. One hun-



dred four members (34%) and 13 non-members (28%) had essentially Holstein herds as shown by Table 32.

Next to Holstein, however, cattle of the Guernsey, Jersey, and Milking Shorthorn breeds, in that order, were most common.

Table 32. The basic breed of the milking herd as reported by interviewed farmers.

Basic Breed	Members		Non-members	
	No.	%	No.	%
Holstein	104	34	13	28
Milking Shorthorn	20	7	1	2
Guernsey	27	9		
Jersey	24	8	2	4
Ayrshire	9	3	1	2
Brown Swiss	4	1		
Mixed Dairy	30	10	3	6
Dairy - Beef	22	7	2	4
Beef - Mixed Dairy	19	6	1	2
Beef	9	3	4	9
Unknown	34	12	20	43
Total	302	100	47	100

It should be noted that, with the exception of the Holstein herds, basic herds of mixed dairy breeds were more common than the dairy breed herds.

Differences between members and non-members were slight.

Comparisons among members of the four areas tended to indicate much the same pattern as that so far reported. The Central area members reported a larger percentage of Holstein herds than other areas as shown by Fig. 9. The Eastern area, in addition to a large percentage of Holstein herds, had higher percentages of Guernsey and dairy mixed herds than the other areas. The Northwest area, low in Holstein herds, led the other areas in Milking Shorthorn and dairy-beef combination

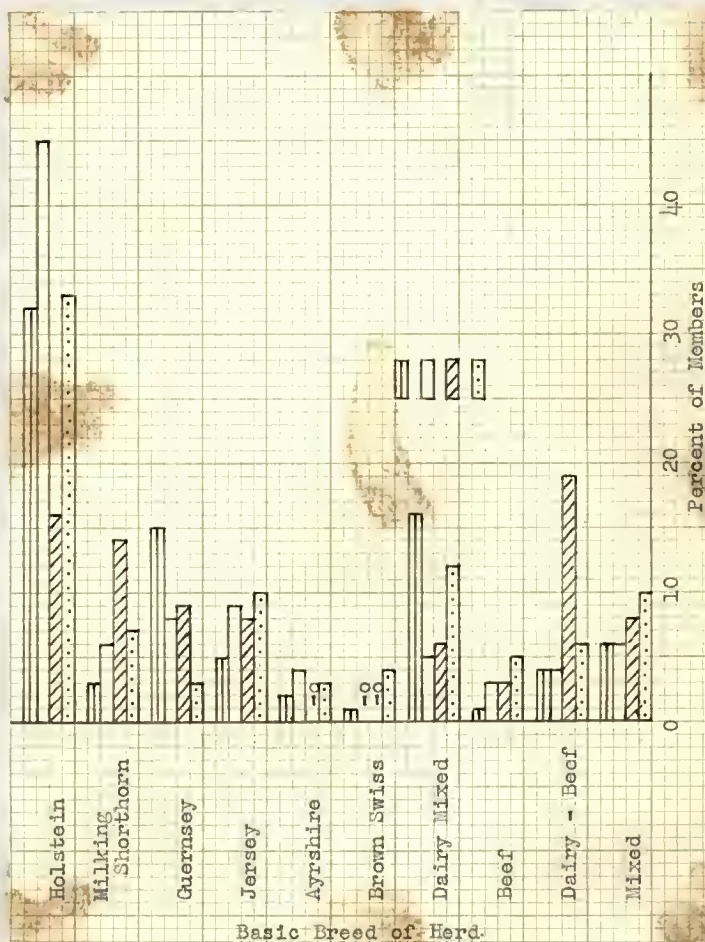


Fig. 9. Basic composition of the milking herds of member farmers in the four areas.

herds. The Southwestern area, similar to the Eastern area, reported a large number of Holstein herds, dairy mixed herds, and led in beef mixed herds although only by a small percentage.

Milking Herd Purebred or Grade. By far the largest group of farmers, 177 members (59%) and 18 non-members (38%) listed the cows in their milking herds as "grade". Forty-nine additional members (16%) and four non-members (9%) reported the majority of their herds as composed of grade cows.

Fifteen members (5%) and three non-members (6%) had milking herds in which all the cows were purebred. An additional 19 members (6%) and two non-members (9%) had a majority of purebred cows in their herds.

Six member herds (2%) were listed as non-majority grade or purebred.

Answers of 36 members (12%) and 20 non-members (43%) were not used.

Milking Herd Raised or Purchased. The interviewed farmers tended to combine the purchase of replacement cattle with the home raising of calves to obtain their milking herds as shown by Table 33. Fifty percent of the members and 52 percent of the non-members, who answered the question, either raised or purchased the majority of their milking herds.

The percent of farmers who raised all their milk cows or who purchased all their cows were approximately equal.

Table 33. The method used by member and non-member farmers to acquire their milking herds.

Herd Acquired	Members		Non-members	
	No.	%	No.	%
Raised all	56	18	8	17
Raised majority	71	24	11	23
Purchased all	53	17	5	11
Purchased majority	75	25	3	6
Raised, purchased equally	24	5		
Unknown	33	11	20	43
Total	302	100	47	100

There was little difference between members and non-members regarding the method of acquiring the milking herd.

Age of Milk Cows at Time of Purchase. The average age when purchased per member herd of cattle was about 33 months or slightly less than three years. The average age of cattle at time of purchase in non-member herds was about 46 months or almost four years.

Fig. 10 indicates the average age in six month groupings, of cows at time of purchase as reported by member farmers. Most of the animals purchased were below 36 months of age.

Forty-nine members and 24 non-members did not give usable answers.

#### Information Pertaining to Artificial Breeding Services

Objections to Artificial Service. Both members and non-members were asked to list their three main objections concerning the artificial breeding program. A few objections were listed in order to give the interviewed farmers a selec-



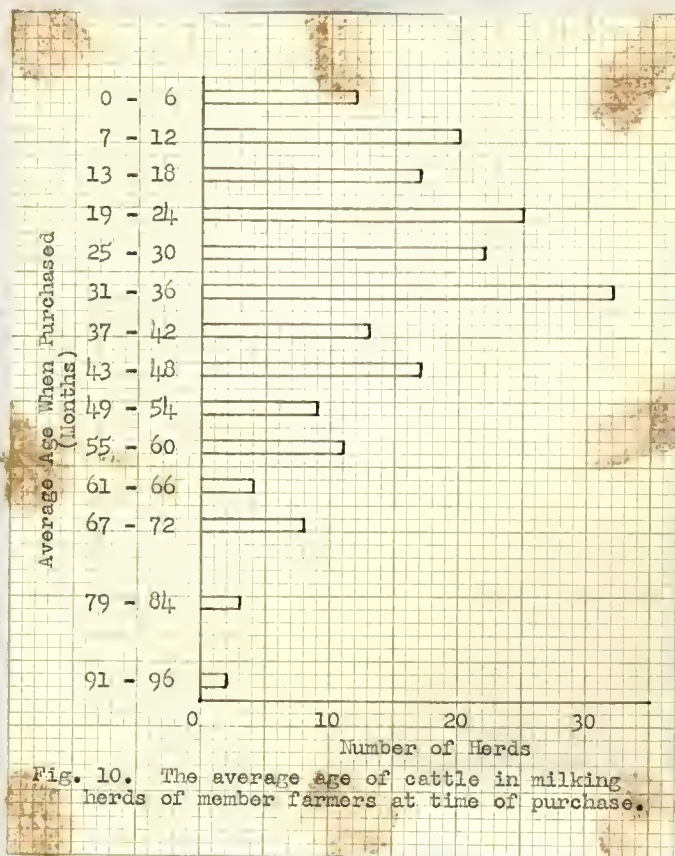


Fig. 10. The average age of cattle in milking herds of member farmers at time of purchase.

tion from which to choose. However, other objections could be written into the questionnaire by the farmer.

Table 34 lists the number of member farmers who listed each objection as first, second, and third in order of importance. A good many members listed only one or two objections as indicated by the increased number of objections identified

by "none" in the second and third choice columns.

Lower conception rates in member herds, increased amount of time required by the farm operator, and the idea that artificial breeding was not economical in larger herds were the main objections advanced by the member farmers. Few objections

Table 34. The main objections to artificial breeding service reported by member farmers.

Order of Choice :			
1st :	2nd :	3rd :	Objections
93	165	195	None
18	7	3	No choice of bulls
45	5	2	Lower conception in herd
1	0	3	Restricts bull sales
9	9	4	Inconvenience of payment
2	0	1	Inconvenience of keeping records
19	17	4	Not economical for larger herds
17	15	11	Requires more time than natural service
24	10	5	Other
74	74	74	Unknown
302	302	302	Total

were caused by the inability of the farmer to choose the bulls from which his cows were inseminated and the inconvenience of paying breeding fees at time of service. Record keeping required and the effect on the marketing of breeding bulls were not considered great objections.

Among non-members, many (15, 19, and 26 non-members, respectively, in order of choice) did not list any objections to the artificial breeding program. The composite objections advanced by the remaining non-members, in order of importance were:

Not economical for larger herds  
Requires more time than natural services

Inconvenience of keeping records for benefit of inseminator  
 No choice of bulls  
 Inconvenience of payment at time of service  
 Restricts sale of breeding bulls  
 Lower conception in herd  
 Other.

Other objections listed by both members and non-members were recorded. From one to ten farmers objected to each of the following (in order of number of objections):

1. Difficult to find cows in heat
2. Fees too high
3. Not enough proven sires in stud
4. Difficult to keep dairy cows from beef bulls
5. Index on bulls not meeting breed standards
6. Inconvenience--no telephone
7. Using own breeding program
8. Neighbors had low conception
9. Need some beef bulls
10. Like to calve all at one time
11. Difficult to watch cows in summer
12. Restricts raising good bulls
13. Not wanted as member
14. Availability
15. Length of time between freshening periods (the objection was not expanded)
16. Cows decline in production at time of service
17. Very poor results
18. Difficult to watch unbred heifers
19. Inseminator does not come on time

Reasons for Joining Artificial Breeding Program. Non-member farmers did not give information on this question.

Only two members did not have any reason for joining the artificial breeding program. Many farmers joined the artificial breeding program in order to increase the production of their dairy herds as shown by Table 35. Other important reasons farmers joined were to eliminate keeping a bull for reasons of safety, in order to obtain the services of tested

sires, and to help get the local artificial breeding associations started.

Reasons for joining other than those listed in the questionnaire, as listed by a maximum of two farmers per reason were:

1. In order to keep herd sire long enough to be proven
2. Unable to purchase good herd replacements
3. Got cows bred
4. Handier
5. Prevents heifers being bred too young
6. Did not have a bull
7. Expand dairy herd when it is necessary to keep a beef bull.

Table 35. The main reasons for joining the artificial breeding program as reported by member farmers.

Order of Choice :			Reasons for Joining
1st :	2nd :	3rd :	
2	11	31	None
159	45	25	Increase production of herd
79	98	25	Eliminate keeping a bull
26	78	84	Obtain services of tested sires
1	8	11	Prevent disease spread
18	28	43	Help get local association started
1	3	0	Overcome disease already present
3	9	30	Good bulls unavailable for purchase
4	12	42	Cheaper
1	2	3	Other
8	8	8	Unknown
302	302	302	Total

Breed of Bulls Signed as Preference. Member farmers were asked to indicate the breed of bull signed up as their preference at the time they joined the artificial breeding associations. More members preferred Holsteins than the other breeds as shown by Table 36. The order of preference for bulls of the other dairy breeds was in the order listed.

Using One Breed of Bull Only. One hundred eighty-six (62%)



Table 36. Breed of bull signed up as preference by member farmers.

Breed	Number	Percent
None	38	13
Holstein	122	41
Milking Shorthorn	55	18
Guernsey	34	11
Jersey	24	8
Ayrshire	10	3
Brown Swiss	7	2
Unknown	12	4
Total	302	100

members were breeding their cows to only one breed of bull. One hundred six additional members (35%) were using bulls of several breeds to mate with their milking herd.

Ten members (3%) did not answer the question.

Single Breed of Bull used to Mate with Cows. Eighty-six members (28%) were using Holstein bulls to mate with their milking cows. Thirty-eight members (13%) used Milking Shorthorn bulls. Twenty-two members (7%) used only Guernsey bulls for breeding purposes. Nineteen additional members (6%) used bulls of the Jersey breed; nine members (3%) used Ayrshire bulls; and seven members (2%) used Brown Swiss bulls.

Ninety-six members did not list any single breed of bull used. Ten members, apparently misunderstanding the purpose of the question, listed Hereford bulls as the one breed used in their herds. Fifteen answers given by the members were not used.

Number Cows Entered in Artificial Association. Two hundred eighty-nine members reported a total of 2,159 cows entered

in the artificial breeding associations. An average of 7.5 cows per member was entered into the association programs. However, more members had entered five or less cows in associations than any other numbers as shown by Table 37.

Table 37. The number of cows entered in artificial breeding associations by member farmers.

Number of Cows	: Number of Members	: Percent
1 - 5	131	43
6 - 10	101	34
11 - 15	36	12
16 - 20	18	6
21 - over	3	1
Unknown	13	4
Total	302	100

Other Breeds in K.A.B.S.U. Members were asked if they thought other breeds of cattle should be added to the bull stud of K.A.B.S.U. Seventy-six members (25%) answered in the affirmative. However, the majority of member farmers, 188 or 62 percent, did not care to see other breeds of bulls added to the bull battery.

Thirty-eight members (13%) did not answer the question.

Of the 76 members who wished additional breeds added to the bull battery, 73 listed the breed of bull they desired. Thirty-two members (42%) favored the addition of Angus bulls, 31 members (41%) favored Hereford, five members (7%) favored Polled Herefords, three members (4%) favored Shorthorns, and Red Polled and Polled Shorthorn bulls were favored by one

member each (a total of 3%).

Mate Other Bulls with Milking Cows. If other breeds of bulls were added to the K.A.B.S.U. battery, 57 members (19%) would mate them with their milking herd. One hundred thirty-two members (44%) reported they would not breed bulls of beef or dual purpose breeds (not already in the K.A.B.S.U. stud) with their milk cows.

Seventy-three members (24%) did not want additional bulls added to the bull battery. This was a partial duplication of a previous question.

Forty members (13%) gave answers that were not used.

Using Bull of Breed Different from Breed of Cows. Members who were artificially breeding their cows to bulls of a breed different from that of the cows were asked to give their reasons for justifying the practice. However, only 29 members (30%) gave such reasons. The reasons, in order of popularity, were as follows:

1. Better calves are produced
2. Changing to beef herd
3. Want to grade-up cows
4. Increase milk and cream production
5. Obtain larger size cows
6. Produce more valuable cows
7. Smaller calves for heifers
8. Getting out of dairy business
9. Availability

One hundred forty-six members (48%) were not using a breed of bull different from the breed of their cows.

Answers of 127 members (42%) were either omitted or were confusing.

### Addition of Magazine List

At the time distribution of the questionnaires to the manager-technicians was approximately two-thirds completed, it was decided to attempt to determine the magazine to which most of the member and non-member farmers subscribed. Such information would allow material pertaining to dairy subjects and to artificial insemination to be sent to editors of most-read magazines and thereby reach the greatest number of readers.

The magazine names used on the list were simply taken from the magazine shelves of the reading room of the Department of Dairy Husbandry. Magazine lists were then added to the undistributed questionnaires and copies were mailed to the manager-technicians to be added to questionnaires not already filled out. Interviewed farmers were asked to check all magazines to which they subscribed. If they subscribed to magazines not on the list, they were asked to write in the name of the magazine.

Of approximately 350 magazine lists sent to the manager-technicians, 138 lists were returned from various counties in Kansas. No provision was made for identification of the lists, thereby making it impossible to determine the associations represented. However, Table 38 indicates the magazines most widely read by members of the artificial breeding program returning questionnaires. Each member was asked to check all the



magazines to which he subscribed.

Table 38. Magazines to which farmers in the artificial breeding associations subscribe, listed in order of popularity.

No.	Magazine	Number : Subscribers	Percent : of Total
1.	Successful Farming	100	72
2.	Kansas Farmer	97	70
3.	Capper's Farmer	94	68
4.	Weekly Kansas City Star	92	67
5.	Farm Journal	86	62
6.	Country Gentleman	77	56
7.	Hoard's Dairyman	26	19
8.	Breeder's Gazette	10	7
9.	Holstein-Friesian World	7	5
10.	Western Farm Life	7	5
11.	The Kansas Stockman	6	4
12.	The Ayrshire Digest	5	4
13.	Milking Shorthorn Journal	4	3
14.	National Livestock Producer	2	1
15.	The Dairy Farmer	2	1
16.	Wallace's Farmer	2	1
17.	The Brown Swiss Bulletin	1	1
18.	Guernsey Breeder's Journal	1	1
19.	The Jersey Bulletin	1	1
20.	The Farmer	1	1
21.	Publications not listed	23	17
Total - 138			

In Kansas, the general farm publication proved to be more popular than those dealing with any one major field of agriculture.

#### DISCUSSION AND SUMMARY

This study was conducted for the purpose of ascertaining the dairy practices existing on farms of members of artificial breeding associations which are associated with the Kansas Artificial Breeding Service Unit. Conditions on member farms were compared with those of non-member farms in order to pro-

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vide a basis upon which to judge future artificial breeding progress. The manager-technicians of the county artificial breeding associations gathered the information using questionnaires. Completed questionnaires answered by 302 members and 47 non-members were returned and used in this study.

The use of questionnaires to obtain the desired information had several disadvantages. Probably the most important disadvantage is the variation in interpretation that can be placed upon a question even though considerable effort is expended in trying to get the wording precise. Also, questions requiring multiple answers should be avoided. Not only are the chances for misinterpretation and error increased, but necessary problems concerning the use of coding methods and procedures are introduced.

Five general categories were dealt with in this study: (1) personal and economic data, (2) dairy management practices, (3) dairy feeding practices, (4) dairy breeding practices, and (5) information pertaining to artificial breeding services. It must be remembered, however, that there is no exact line of separation among any of these groupings and that they are merely groupings of convenience.

Comparison of answers given the various questions by member and non-member farmers revealed little difference--only a few major differences were apparent--between the two groups. Such conformity of answers indicated similar conditions on farms of both members and non-members of the artificial breeding associations. An analogous condition existed and any

future difference may be attributed in part to the artificial breeding program.

Most of the farmers questioned were between 30 and 49 years of age, over 95 percent were married, and a majority, 63 to 70 percent, did not have any children still on the farm. Most of those with children had only one child.

Wheat proved to be the main source of cash income for both member and non-member farmers in all but the Eastern area. Only 11 percent of the members and 14 percent of the non-members received more than half of their gross income from dairy operations. In contrast, about 35 percent of the farmers received less than 10 percent of their income from dairying. Although artificial breeding undoubtedly will improve the dairy stock on member farms, most members evidently joined the program for reasons other than the increased revenue it might provide toward the gross income of the farm.

About 35 percent of the members and 26 percent of the non-members did not own any land. Of the remaining farmers, 59 percent of the members and 66 percent of the non-members owned units of 240 acres or less. Similarly, 24 percent of the members and 30 percent of the non-members did not rent any land. The general unit of land rented by most of the remaining farmers ranged in size from 80 to 160 acres. Also noticeable was the fact that more units of larger acreages were rented than owned.

Mortgages were found on about the same percent of member

farms as non-member farms indicating little difference in economic circumstances. Apparently the level of indebtedness did not influence the farmers' decision to use or not to use artificial breeding.

The term of residence on the present farm of about 40 percent of the farmers was less than five years. Only about 10 percent of the farmers had spent a lifetime on their present farms. Apparently farmers changed farm rather often or a younger group of farmers in general were now engaged in farming enterprises. The general age of farmers questioned tends to bear out the latter idea.

The tendency seemed to be for farmers to do as much of their own work as possible. About 90 percent of the farmers hired no yearly help and about 50 percent hired no seasonal help.

More farmers, 30 percent of the members and 36 percent of the non-members, had been engaged in dairying less than five years than farmers in each of the succeeding five year periods. Only about three percent of the farmers had been engaged in dairying for a lifetime.

As an indication of importance of dairying, less than 50 percent of the farmers used milking machines. However, the small number of cows per herd, less than ten cows, may have been the reason for not using machines. About 35 percent of the farmers sold whole milk although only 21 percent



of the members and 15 percent of the non-members were on Grade A production. Artificial breeding seems to fill a need of the farmer, with only a few dairy cows, whose primary interest may not be dairying.

Since about 80 percent of the farmers indicated they raised their own herd replacements, The need for good quality sires was emphasized strongly. This need could be met most conveniently through the artificial breeding program. However, slightly over one-third of the farmers sold calves for veal. To most of these men, calves of improved dairy type probably would not be desirable.

In the interest of preventing disease, about 67 percent of the farmers regularly tested their dairy herds for tuberculosis. Slightly fewer farmers, about 61 percent followed a brucellosis testing program. Possibly calftlood vaccination programs supplanted brucellosis testing on some farms. About 45 percent of the farmers vaccinated their calves to help control brucellosis.

Many farmers, about 43 percent, planned to increase the size of their dairy herds in the future. The most popular method of expansion was to be through natural increase. Once again the need for superior sires was indicated.

Slightly more farmers, about 48 percent, had never been engaged in beef operations than farmers, about 47 percent, who had. However, a majority of the farmers (members, 65 percent, and non-members, 53 percent) did not have any beef cows of

breeding type on the farm at the time of this study. Of the remaining farmers, most had less than 10 beef cows.

In regard to calf feeding practices, the largest group of farmers, 28 percent of the members and 43 percent of the non-members, fed whole milk to their calves for a two to four week period. Non-members tended to feed their calves whole milk for longer periods than members. Milk substitutes did not prove popular with a majority of the farmers. Over 66 percent of the farmers preferred to feed whole milk. Almost 60 percent of the farmers preferred alfalfa hay as a source of roughage for their calves; most of the remainder preferred prairie hay.

Grain rations were fed to dairy cows by 94 percent of the members and 83 percent of the non-members. The most popular protein content in the ration was that which provided from 15 percent to 17 percent protein. More member farmers, 60 percent, tended to feed grain to the cows in proportion to milk production than non-members, 43 percent.

The primary roughage fed to dairy cows was again alfalfa. Sixty-seven percent of the members and 55 percent of the non-members used alfalfa. Also sergo butts and corn fodder proved to be in wider use than prairie hay.

Most of the interviewed farmers had less than 80 acres of native pasture. About 50 percent of the farmers did not have any temporary pasture to supplement other pasture. The majority

of the remaining farmers had less than twenty acres of temporary pasture. Even fewer farmers made use of tame pastures (included were 65 percent of the members and 81 percent of the non-members). As with temporary pasture, the majority of the farmers who had tame pasture had less than twenty acres.

The grass utilization period ranged from five to nine months. However, the greatest number of farmers, about one-third, favored a six month pasture period.

Only about 45 percent of the farmers interviewed fed silage to their cows. Sorgo silage was used on a majority of these farms. Of the farmers feeding silage, 72 percent of the members and 55 percent of the non-members used sorgo silage as compared to about 13 percent of the farmers who used corn silage.

Many dairy feeding practices need to be improved in order for farmers to realize maximum production. Of the items studied, pasture management and the increased use of tame and temporary pastures should be encouraged. Undoubtedly, the use of balanced grain rations are needed to make maximum use of the sorgo butt and corn fodder roughages although this fact was not directly indicated by this study. From the standpoint of both the need for succulent feeds and for a reserve feed supply, silage could be used by more farmers.

Approximately nine cows per member were bred by natural service during 1950. However, an average of 10 cows per non-

member were bred by natural service during the same time. An average of 6.4 cows per member and 6.7 cows per non-member conceived after the first service. The majority of farmers reported that no cows were bred four or more times.

Undoubtedly artificial breeding would improve the dairy stock of the small herds. The fact that it is not necessary to keep a bull in order to breed ten or less cows was one of the factors causing farmers to join the artificial breeding associations.

The majority of farmers preferred fall calving over calvings during any other season of the year. Calvings during the spring and winter months respectively were next in frequency followed by non-seasonal freshenings of the dairy cows.

Pasture breeding was practiced extensively. Fifty-seven percent of the members and 74 percent of the non-members allowed their bulls to run with the cows. According to reported answers, 66 percent of the members and 57 percent of the non-members kept systematic breeding and calving records. However, it is rather difficult to conceive that accurate breeding records could be kept as long as bulls are allowed to run with the cows. Calvings could be systematically recorded but unless very closely watched, some breeding dates would be a guess at best.

The number of bulls used by farmers during the years 1948 to 1950 ranged from zero to seven. However, the majority, mem-



bers 55 percent, and non-members 57 percent, used two bulls during the three year period.

Sixty-seven percent of the members and 72 percent of the non-members had used only one breed of bull during the period 1946 to 1950.

The main breeds of the last three bulls used on member and non-member farms were about equally divided between Holsteins and Herefords. However, about 40 percent of the farmers used bulls of specific dairy breeds as compared to about 33 percent of the farmers who used beef type bulls. Farmers who varied the breeds of the last three bulls used ranged between those who used only one dairy breed and those who used beef type bulls.

The last three bulls used by most of the farmers, 50 percent of the members and 64 percent of the non-members, were purebred. Most of the farmers owned their bulls, although about 13 percent had borrowed the last three bulls that were used to breed their dairy cows. The average price paid for the last three bulls used was \$167.09 by members and \$158.87 by non-members. The average fee paid by member farmers for bull services was \$2.21. The average age of the last three bulls bought by members was about 15 months as compared to an average of about 12 months for bulls bought by non-members.

The low average age of bulls when purchased indicated

that the use of tested and proved sires was not practiced generally. Many farmers probably bought young bulls as cheaply as possible--witness the low average price paid for bulls--for the purpose of breeding their dairy cows as easily as possible with little regard to herd improvement. A good many of the bulls so bought were probably later sold as butcher beef before their transmitting abilities could be tested. Artificial breeding could help overcome the faults of these practices.

Almost one-half of the members (45%) and more than one-half of the non-members (58%) were practicing crossbreeding of their dairy cows. When asked about their future crossbreeding intentions, 30 percent of the members and 43 percent of the non-members reportedly planned to continue crossbreeding. It was gratifying to note the number of farmers who intended to cease crossbreeding as shown by the decrease in percentage of farmers who had practiced crossbreeding and those whose future plans included the practice.

A majority of farmers, about 55 percent, had used beef bulls for the purpose of breeding their milking cows at one time or another during the past five years. The average number of crossbred heifers obtained from such matings by member farmers was eight. The average number of crossbred heifers obtained by the non-members was seven. Of the farmers who had obtained beef crossbred heifers, 67 percent of the members and 80 percent of the non-members kept them. Forty-one percent of the

members and 64 percent of the non-members had heifers of milking age. The distressing fact is that of the farmers who had heifers of milking age, 89 percent of the members 75 percent of the non-members, had milked such heifers.

Undoubtedly many farmers could not afford to buy both a beef and dairy bull, especially if their main interest was in the beef herd. However, the use of crossbred heifers, although by a minority of the total farmers, in no way contributed to the improvement of dairying. Again, artificial breeding meets the needs of farmers who cannot afford a dairy bull, but who do not wish to mate dairy cows to beef bulls.

When asked if they would mate their milk cows with beef bulls again, most of the members reported they would not. In contrast, most of the non-members planned on crossbreeding their milk cows again.

Slightly more farmers noticed a difference in veal price of beef crossbred calves than farmers who did not notice such a difference.

The number of cows in the breeding herd ranged from one to 80 on member farms. The average number of cows per herd was about 11 for both members and non-members. The average number of calves was about six per farm. The average number of unbred yearling heifers was about four per herd as compared to about three bred heifers per herd.

The total number of milk cows, including bred heifers and

dry cows, was about 10 per member herd. The average number of cows was about nine on non-member farms. More farmers reported an average herd age of four years than any other year average.

More of the herds of members (39%) and non-members (30%) were composed of cows of one dairy breed than herds which were composed of different dairy breeds. Some mixed and beef type herds were also reported. However, most milking herds seemed to be based upon cows of the Holstein breed, both purebred and grade. Very few milking herds were composed of all purebred cows. By far the largest group, 59 percent of the members and 38 percent of the non-members, had grade herds.

Most of the farmers had established their milking herds by a combination of natural increase and the purchase of additional stock. The average age of milk cows at the time of purchase was almost four years.

The greatest objections to the artificial breeding program were: (1) the lower conception rates in member herds, (2) the increased amount of time required by the farm operator, and (3) the idea that artificial services were not economical in large herds. Although most of these objections were without factual basis they represent the thinking of member and non-member farmers concerning the subject. Personal experiences to the contrary and an educational program by the officials of the artificial breeding program should largely eliminate these objections in the future.



The main reasons given by member farmers for joining the artificial breeding program were: (1) to increase the production of their herds, (2) to eliminate keeping a bull, or safety, and (3) to obtain the services of tested sires. Reasons such as these are due to the foresight of the member farmers and indicate a portion of the role artificial breeding will be expected to fulfill.

The main breed of bull signed up as preference by member farmers was Holstein followed by Milking Shorthorn and Guernsey in that order. At the same time, an average of about seven cows per member were entered into the artificial breeding program.

A majority of the members, about 62 percent, did not care to see additional breeds of bulls added to the K.A.B.S.U. bull battery. However, about 25 percent of the members were interested in obtaining artificial services from breeds not available at present. Bulls of the Angus and Hereford breeds were mainly requested by the member farmers interested in seeing other breeds available. If other breeds were available, only about 19 percent of the total members planned on mating such bulls with their milking herd. However, of the members who wanted other breeds added, 75 percent wanted to mate such bulls with the milk cows.

In general, there was indicated a need for artificial breeding in Kansas. Also, considerable improvement in dairying, especially in smaller herds, could be expected as a

result of the artificial breeding program.

It is yet too early to attempt to measure the contributions of artificial breeding to general dairy improvement in Kansas. Future studies would establish any differences between now and that time. It is to be expected that future studies will provide a favorable measure of dairy improvement due to artificial breeding.

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## APPENDIX

Form 1. Questionnaire used with column on I.B.M. card indicated.

(County Number - blanks 1 and 2)

Name of member (Farm Number - 3 and 4) Date of Interview \_\_\_\_\_

Address \_\_\_\_\_ Age (5) \_\_\_\_\_

To which association do you belong? \_\_\_\_\_

1. Are you married (yes or no)? \_\_\_\_\_ (6)
2. Encircle the grade of school last attended: (7)  
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
3. List below the number of children still on the farm.  
Boys, 8 years or younger \_\_\_\_\_ (8)  
9 years or older \_\_\_\_\_ (9)  
Girls, 8 years or younger \_\_\_\_\_ (10)  
9 years or older \_\_\_\_\_ (11)
4. What is the main source of cash income on your farm? \_\_\_\_\_  
\_\_\_\_\_ (12)
5. What percentage of your yearly gross income does dairying provide? \_\_\_\_\_ (13)
6. How many acres of land do you own? \_\_\_\_\_ (14)  
Rent or lease? \_\_\_\_\_ (15)
7. Do you have a mortgage on your farm (yes or no)? \_\_\_\_\_ (16)
8. How long have you resided on this present farm (years)?  
\_\_\_\_\_ (17)
9. How many men do you hire on a yearly basis (number)? \_\_\_\_\_ (18)  
Six months or less (number)? \_\_\_\_\_ (19)

10. How many years have you been actively engaged in dairying?  
\_\_\_\_\_ (20)
11. Do you milk your cows by machine (yes or no) \_\_\_\_\_ (21)
12. Are you a Grade A milk producer (yes or no) \_\_\_\_\_ (22)
13. Do you sell whole milk (yes or no)? \_\_\_\_\_ (23)  
Cream? \_\_\_\_\_ (23) (as a general practice)
14. Do you raise your own herd replacements (yes or no)? \_\_\_\_\_ (24)
15. Do you sell dairy calves on the market for veal (yes or  
no)? \_\_\_\_\_ (25)
16. How long do you feed whole milk to your calves? \_\_\_\_\_ (26)
17. Do you use a milk substitute for feeding young calves (yes  
or no)? \_\_\_\_\_ (27)
18. What kind of hay do you feed primarily to your calves  
under 4 months of age?  
Alfalfa \_\_\_\_\_ (28)  
Prairie \_\_\_\_\_ (28)
19. Are your cows fed a grain ration as a usual practice (yes  
or no)? \_\_\_\_\_ (29)  
If so, what per cent protein do you use in this grain  
mixture? \_\_\_\_\_ (30)  
Do you feed grain to each cow in proportion to her  
milk production? \_\_\_\_\_ (31)
20. What kind of hay or other roughage do you feed your dairy  
cows primarily?  
Alfalfa or legume \_\_\_\_\_ (32)  
Prairie \_\_\_\_\_ (32)

Sorgo Butts or Corn Fodder \_\_\_\_\_ (32)

21. How many acres do you have in pasture?

Native grasses \_\_\_\_\_ (33)

Temporary \_\_\_\_\_ (34)

Time \_\_\_\_\_ (35)

22. Approximately how many months per year are your cows on pasture? \_\_\_\_\_ (36)

23. Do you feed silage to your cows (yes or no)? \_\_\_\_\_ (37)

If so, what kind? \_\_\_\_\_ (38)

24. How many of your dairy females were bred last year by natural service? \_\_\_\_\_ (39 and 40)

How many conceived after first service? \_\_\_\_\_ (41 and 42)

How many were bred four or more times? \_\_\_\_\_ (43)

25. At what season of the year do the majority of your dairy cows freshen? \_\_\_\_\_ (44)

26. Were your bulls allowed to run with the cows (yes or no)?  
\_\_\_\_\_ (45)

27. Have you kept systematic records of breeding and calving dates (yes or no)? \_\_\_\_\_ (46)

28. How many different bulls did you use in the past three years (Number)? \_\_\_\_\_ (47)

29. In the last 5 years have you used only one brood of bulls in breeding the majority of your dairy cows (yes or no)?  
\_\_\_\_\_ (48)

30. List the last three bulls used on the majority of your dairy cows.

Breed:	Pure-:	Grade:	Owned:	Leased:	Bor-:	Where:	Price paid:	Age
:bred:	:	:	:	:	rowed*:	Acquired:	or fee paid:	When
:	:	:	:	:	:	:	for service:	Bought
(49):	(50):	(50):	(51):	(51):	(51):	:	(52 - 53):	(54):
(55):	(56):	(56):	(57):	(57):	(57):	:	(58 - 59):	(60):
(61):	(62):	(62):	(63):	(63):	(63):	:	(64 - 65):	(66):

\*Owned by a neighbor (Summary: 67 - 77)

31. Are you crossbreeding (yes or no)? \_\_\_\_\_ (78)

Do you intend to crossbreed dairy cattle in the future  
(yes or no)? \_\_\_\_\_ (79)

32. Have you used a beef bull on your dairy cows in the last five years? \_\_\_\_\_ (80)

(Second I.B.M. card begins)

How many beef crossbred heifers did you obtain? (5 - 6)

How many did you keep? \_\_\_\_\_ (7)

How many of the beef crossbred heifers are of milking age? \_\_\_\_\_ (8)

How many have you used for milking purposes? \_\_\_\_\_ (9)

Have you noticed a large difference in veal price  
between the crossbred calves and dairy calves (yes or no)? \_\_\_\_\_ (10)

From your experience, would you use a beef bull on dairy cows again (yes or no)? \_\_\_\_\_ (11)



33. Do you follow a tuberculosis (T. B.) testing program (yes or no)? \_\_\_\_\_ (12)
- Is your milking herd tested for brucellosis (Bangs disease) (yes or no)? \_\_\_\_\_ (13)
- Are you vaccinating calves for brucellosis (Bangs disease)? \_\_\_\_\_ (14)
34. How many females of breeding age are in your herd? (15 - 16)
- How many calves below one year of age? \_\_\_\_\_ (17 - 18)
- How many unbred yearling heifers (below two years)? (19 - 20)
- How many bred yearling heifers (below two years)? \_\_\_\_\_ (21 - 22)
35. What are your plans concerning the future size of your herd? (Check one only)
- Same number of cows? \_\_\_\_\_ (23)
- More cows? \_\_\_\_\_ (23)
- Less cows? \_\_\_\_\_ (23)
- If you plan expansion of your herd do you expect to expand by natural increase? \_\_\_\_\_ (24) Or by the purchase of cows? \_\_\_\_\_
36. Have you ever been a beef man? (yes or no) \_\_\_\_\_ (25)
37. If you have any objections to artificial breeding service, list the main three objections in the order of their influence:

## 37. (Cont.)

- \_\_\_\_\_ no choice of bulls
- \_\_\_\_\_ percentage of conception by artificial service is lower in your herd
- (27) \_\_\_\_\_ it restricts sale of breeding bulls
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- 29) \_\_\_\_\_ the inconvenience of payment at the time of service
- \_\_\_\_\_ inconvenience of keeping breeding records for benefit of inseminator
- \_\_\_\_\_ not economical for larger herds
- \_\_\_\_\_ it requires more time than natural service
- Other \_\_\_\_\_

K.A.B.S.U. Members continue, non-members omit

## 38. Number the three main reasons, in order of their influence, that prompted you to join the artificial breeding program:

- \_\_\_\_\_ in order to increase production of herd
- \_\_\_\_\_ eliminate keeping a bull (safety)
- \_\_\_\_\_ obtain services of tested sires
- (30) \_\_\_\_\_ Prevent disease spread through natural mating
- 31
- 32) \_\_\_\_\_ help get the local association started
- \_\_\_\_\_ try to overcome effects of disease already present
- \_\_\_\_\_ good bulls unavailable for purchase
- \_\_\_\_\_ cheaper
- Other \_\_\_\_\_

## 39. Which breed of bull did you sign up as your preference when you joined K.A.B.S.U.? \_\_\_\_\_ (33)

40. Are you breeding your cows to one breed of bull only? (34)  
 If so, which breed? (35)
41. How many animals have you signed up with the artificial breeding program? (36 - 37)
42. Would you like other breeds of cattle put into the K.A.B.-S.U. stud unit? (38)  
 If so, which breed? (39)  
 If a beef breed were placed in the stud, would you mate them with milking cows? (40)
43. If you have selected a breed of bull different from the breed of the majority of your cows, explain the reasons for your choice. (41)

Bred heifers and milk cows including dry cows

Identification	Age	Breed	*Purebred	Grade	Raised	Purchased
						yes : age**
Number cows						
(42 - 43)	(44)					
Type cows		(45)				
Herd type		(46)				Average
Herd breed		(47)	(48)	(49)	(49)	Age (50 - 51)

\* State apparent breed of cow or describe cow as mixed

\*\*Age when purchased

## Form 2. Code used in transferring questionnaire data to I.D.M. cards.

- |                             |                                |
|-----------------------------|--------------------------------|
| Farm Number                 | 0 - 0 to 10                    |
|                             | 1 - 11 to 20                   |
| Actual Number               | 2 - 21 to 30                   |
| 2 blanks                    | 3 - 31 to 40                   |
|                             | 4 - 41 to 50                   |
| Age of Operator             | 5 - 51 to 60                   |
|                             | 6 - 61 to 70                   |
| Actual Number               | 7 - 71 to 80                   |
| 1 blank                     | 8 - 81 to 90                   |
|                             | 9 - 91 to 100                  |
| 1. Married                  | 6. Acres of land owned, rented |
| 1 - yes                     |                                |
| 2 - no                      | 2 blanks (one each)            |
| 2. Grade of school          | 0 - none                       |
|                             | 1 - 80 acres, below            |
| 0 - attended grade school   | 2 - 81 to 160                  |
| 1 - graduated, grade school | 3 - 161 to 240                 |
| 2 - attended high school    | 4 - 241 to 320                 |
| 3 - graduated high school   | 5 - 321 to 400                 |
| 4 - attended college        | 6 - 401 to 480                 |
| 5 - graduated college       | 7 - 481 to 560                 |
|                             | 8 - 561 to 640                 |
| 3. Children on farm         | 9 - 641, above                 |
| 1 - boys, 8 years, below    | 7. Mortgage on farm            |
| 2 - boys, 9 years, older    | 1 - yes                        |
| 3 - girls, 8 years, below   | 2 - no                         |
| 4 - girls, 9 years, older   | 0 - rented                     |
| 4. Source of income         | 8. Residence on farm           |
| 1 - wheat                   | 0 - 5 years, less              |
| 2 - beef                    | 1 - 6 years to 10 years        |
| 3 - dairy                   | 2 - 10 to 15                   |
| 4 - cattle and wheat        | 3 - 16 to 20                   |
| 5 - dairy and poultry       | 4 - 21 to 25                   |
| 6 - wheat and dairy         | 5 - 26 to 30                   |
| 7 - poultry or hogs         | 6 - lifetime                   |
| 8 - other                   |                                |
| 9 - livestock               | 9. Men hired yearly            |
| 5. Income from dairy        | 1 blank                        |



- Men hired less than 1 year  
 1 blank  
 6 -  $\frac{1}{2}$  to 5  
 7 - 5 to 6  
 8 - 6 to 7  
 9 - 7 months or more
10. Years in dairy  
 0 - 5 years or less  
 1 - 6 to 10 years  
 2 - 11 to 15  
 3 - 16 to 20  
 4 - 21 to 25  
 5 - 26 to 30  
 6 - Lifetime
11. Milk by machine  
 1 - yes  
 2 - no
12. Grade A producer  
 1 - yes  
 2 - no
13. Sell whole milk or cream  
 1 - whole milk  
 2 - cream  
 3 - sell both whole milk and cream  
 4 - sell neither
14. Raise herd replacements  
 1 - yes (wholly or partially)  
 2 - no
15. Sell dairy calves for veal  
 1 - yes  
 2 - no
16. Whole milk fed to calves  
 0 - 2 weeks or less  
 1 - 2 weeks to 4 weeks  
 2 - 4 to 6  
 3 - 6 to 8  
 4 - 2 to 3 months  
 5 - 3 to 4
17. Milk substitute  
 1 - yes  
 2 - no
18. Hay fed calves  
 0 - none  
 1 - alfalfa  
 2 - prairie  
 3 - sorgo or cane  
 4 - combinations
19. Cows fed grain ration  
 0 - not fed  
 1 - yes  
 2 - no
- Protein in mix  
 0 - none fed  
 1 - 10% below  
 2 - 11% to 14%  
 3 - 15% to 17%  
 4 - 18% to 24%
- Fed in proportion to milk production  
 1 - yes  
 2 - no
20. Hay fed cows  
 1 - alfalfa  
 2 - prairie  
 3 - sorgo butts or corn fodder  
 4 - combinations
21. Acres in pasture  
Native  
 0 - none

- 1 - 80 acres, below
- 2 - 81 to 160 acres
- 3 - 161 to 240
- 4 - 241 to 320
- 5 - 321 to 400

Temporary

- 0 - none
- 1 - 10 acres, below
- 2 - 11 to 20
- 3 - 21 to 30
- 4 - 31 to 40
- 5 - 41 to 50
- 6 - 51 to 60
- 7 - 61 to 70
- 8 - 71 to 80
- 9 - above 80 acres

Time

same as above

## 22. Months per year on pasture

- 1 blank

## 23. Feed silage

- 1 - yes
- 2 - no

## Kind of silage

- 0 - none
- 1 - corn
- 2 - sorgo
- 3 - grass
- 4 - corn and sorgo
- 5 - corn and alfalfa
- 6 - alfalfa legume
- 7 - sorgo and legume
- 8 - sorgo and grass
- 9 -

## 24. Cows bred by natural service

- 2 blanks

## Conceive after first service

- 2 blanks

Bred 4 or more times

- 1 blank

## 25. Season freshen

- 0 - spring
- 1 - summer
- 2 - autumn
- 3 - winter
- 4 - non-seasonal
- 5 - spring and fall

## 26. Bulls allowed to run with cows

- 1 - yes
- 2 - no

## 27. Systematic breeding and calving records

- 1 - yes
- 2 - no

## 28. Different bulls in past 3 years

- 1 blank

## 29. Use 1 breed of bulls in last 5 years

- 1 - yes
- 2 - no

## 30. Breed of bull

- 0 - Holstein
- 1 - Milking Shorthorn
- 2 - Guernsey
- 3 - Jersey
- 4 - Ayrshire
- 5 - Brown Swiss
- 6 - Hereford
- 7 - Angus
- 8 - Shorthorn
- 9 - Other

Purebred, grade

- 1 - purebred
- 2 - grade

Owned, leased, or borrowed

- 1 - owned
- 2 - leased
- 3 - borrowed

Price paid

- 0 - free bull service such as raising bull for neighbor
- 1 - \$25. or less
- 2 - \$26. to \$50.
- 3 - \$51. to \$75.
- 4 - \$76. to \$100.
- 5 - \$101. to \$200.
- 6 - \$201. to \$300.
- 7 - \$301. to \$400.
- 8 - \$401. to \$500.
- 9 - \$501. or over

Fee charged

- 0 - free service
- 1 - \$1. or less
- 2 - \$1.01 to \$2.
- 3 - \$2. to \$3.
- 4 - \$3. to \$4.
- 5 - \$4. to \$5.
- 6 - \$5. to \$6.
- 7 - \$6. to \$8.
- 8 - \$8. to \$10.
- 9 - \$10. or more

Age when bought

- 0 - 6 months or less
- 1 - 6 months to 1 year
- 2 - 1 year to 2 years
- 3 - 2 to 3
- 4 - 3 to 4
- 5 - 4 to 5
- 6 - 5 to 6
- 7 - 6 to 7
- 8 - 7 to 8
- 9 - 8 or above

Type bulls listed

- 0 - 1 breed dairy
- 1 - dairy mixed
- 2 - all beef
- 3 - some both

Purebred, grade

- 1 - purebred
- 2 - grade
- 3 - some both

Owned, leased, borrowed

- 1 - owned
- 2 - leased
- 3 - borrowed
- 4 - some owned, some leased
- 5 - some owned, some borrowed
- 6 - some borrowed, some leased
- 7 - some owned, some leased, some borrowed

Number with price given

1 space

Average price paid

3 spaces

Average fee charged

1 space

Bulls listed with age given

1 space

Average age in months when bought

2 spaces

31. Are you crossbreeding?

- 1 - yes
- 2 - no

- Intend to crossbreed?  
 1 - yes  
 2 - no
32. Use beef bull in last 5 years  
 1 - yes  
 2 - no
- Beef crossbred heifers obtained  
 2 blanks
- Percentage kept  
 0 - none  
 1 - 10% below  
 2 - 11% to 20%  
 3 - 21% to 30%  
 4 - 31% to 40%  
 5 - 41% to 50%  
 6 - 51% to 60%  
 7 - 61% to 70%  
 8 - 71% to 80%  
 9 - 81% to 100%
- Percent of milking age  
 Same as above
- Percentage milked  
 Same as above
- Difference in veal price  
 1 - yes  
 2 - no
- Use beef bull in dairy cows again  
 1 - yes  
 2 - no
33. T. B. testing  
 1 - yes
- 2 - no
- Bangs testing  
 1 - yes  
 2 - no
- Vaccinating calves  
 1 - yes  
 2 - no
34. Females brooding age  
 2 blanks
- Calves below 1 year  
 2 blanks
- Unbred yearling heifers  
 2 blanks
- Bred yearling heifers  
 2 blanks
35. Future herd plans  
 1 - same number cows  
 2 - more cows  
 3 - less cows
- Expansion by:  
 0 - no expansion  
 1 - natural increase  
 2 - purchase  
 3 - both
36. Ever a beef man  
 1 - yes  
 2 - no
- Breeding cows of beef type  
 0 - none  
 1 - 10 or less  
 2 - 11 to 25



- 3 - 26 to 50  
 4 - 51 to 75  
 5 - 76 to 100  
 6 - 101 to 125  
 7 - 126 to 150  
 8 - 151 to 175  
 9 - above 176
37. Objections to artificial service
- 3 blanks
- 0 - none  
 1 - no choice of bulls  
 2 - conception lower  
 3 - restricts bull sales  
 4 - inconvenience payment  
 5 - inconvenience keeping records  
 6 - not economical  
 7 - requires more time  
 8 - other
38. Reasons for joining artificial breeding
- 0 -  
 1 - increase production  
 2 - eliminate bull  
 3 - tested sires  
 4 - prevent disease  
 5 - get started  
 6 - overcome disease  
 7 - good bulls unavailable  
 8 - cheaper
39. Bull signed up
- 0 - none signed  
 1 - Holstein  
 2 - Milking Shorthorn  
 3 - Guernsey  
 4 - Jersey  
 5 - Ayrshire  
 6 - Brown Swiss
40. Using one breed bull only
- 1 - yes  
 2 - no
- If so which breed  
 same as #39 above
41. Animals signed up with artificial breeding
- 2 blanks
42. Other breeds in K.A.B.S.U.
- 1 - yes  
 2 - no
- If so, which breed
- 0 - none  
 1 - Hereford  
 2 - Shorthorn  
 3 - Angus  
 4 - Red Polled  
 5 - Polled Shorthorn  
 6 - Polled Hereford
- Mate with milking cows
- 0 - none wanted  
 1 - yes  
 2 - no
43. Reasons for using different breed of bulls
- 0 - not using different breed of bull  
 1 - changing to beef herd  
 2 - better calves  
 3 - obtain larger cows in herd  
 4 - smaller calves for heifers  
 5 - more valuable cows produced  
 6 - want to grade-up cows  
 7 - increase milk, cream production  
 8 - availability  
 9 - getting out of dairy business
- Number cows listed

2 spaces

Average age when purchased  
in months

Average age

2 spaces

Listed as years

1 space

Information on each cow in herd.  
(not used in this study)

Types of cows listed

- 1 - all one dairy breed
- 2 - different dairy breeds
- 3 - all of mixed breeds
- 4 - some mixed, some dairy
- 5 - some dairy, some beef
- 6 - some mixed, some dairy  
some beef
- 7 - other combinations

- 1. County number
- 2. 2 blanks
- 3. Farm number
- 4. 2 blanks

Herd type

- 1 - all 1 breed
- 2 - majority 1 breed
- 3 - non-majority herd

- 5. Age of cow in years
- 6. 2 blanks
- 7. Apparent breed of cow

Herd breed

- 0 - Holstein
- 1 - Milking Shorthorn
- 2 - Guernsey
- 3 - Jersey
- 4 - Ayrshire
- 5 - Brown Swiss
- 6 - mixed dairy breeds
- 7 - beef type
- 8 - mixed dairy beef
- 9 - mixed

- 0 - Holstein
- 1 - Milking Shorthorn
- 2 - Guernsey
- 3 - Jersey
- 4 - Ayrshire
- 5 - Brown Swiss
- 6 - Mixed dairy
- 7 - beef type
- 8. Purebred, grade
- 1 - purebred
- 2 - grade

Purebred, grade

- 1 - purebred
- 2 - majority purebred
- 3 - grade
- 4 - majority grade
- 5 - non-majority

- 9. Raised, purchased
- 1 - raised
- 2 - purchased

Raised, purchased

- 1 - all raised
- 2 - majority raised
- 3 - all purchased
- 4 - majority purchased
- 5 - non-majority

- 10. Age when purchased
- 11. Age in months
- 2 blanks

Form 3. Additional interpretations of some questions and the problems encountered during coding.

Question 4 - Code number "8" will refer mainly to answers given as farming, corn, and mixtures of crops not given otherwise.

Question 7 - Use of "0" if farm was rented and therefore had no mortgage.

Question 14 - If the farmer raised herd replacements wholly or in part, the answer was marked "yes".

Question 18 and 20 - Code number "4" refers to combinations of alfalfa, prairie hay, and others fed to calves and cows.

Question 22 - Code number "9" refers to cattle on pasture nine months or more.

Question 30 - (a) If age of the bull when bought was given solely as "calf", it was assumed to be under six months of age. Code blanks 76 and 77 were marked with (X) since the average age was not known.

(b) In the "type of bulls listed" summary, all dual purpose breed bulls were considered as dairy bulls.

Question 35 - When two or more blanks were checked an inconsistency existed. Code blanks 23 and 24, Card 2, were therefore marked with (Y).

Question 37 - Code number "9" indicates the farmer is using his own breeding program. He uses artificial breeding very little or not at all.

Question 40 - Code number "7" is used to indicate farmers who are breeding dairy cows to beef bulls.

Question 43 - Code number "9" indicates the farmer is buying beef cattle and selling dairy cattle. Code number "1" indicates the farmer is changing to a beef herd by cross-breeding.



## Form 4. K.A.B.S.U. Master Code for County Identification

<u>County</u>	<u>Code No.</u>	<u>County</u>	<u>Code No.</u>
Allen	1	Johnson	25
Anderson	2	Kingman	26
Barton	3	Leavenworth	27
Bourbon	4	Lincoln	28
Butler	5	Linn	29
Cheyenne	6	Lyon	30
Clay	7	Marion	31
Cloud	8	Marshall	32
Coffey	9	McPherson	33
Comanche	10	Miami	34
Dickinson	11	Mitchell	35
Doniphan	13	Montgomery	36
Douglas	14	Nemaha	37
Dwight (Morris)	15	Neosho	38
Elk	16	Norton-Decatur	39
Ford	17	Osage	40
Franklin	18	Ottawa	41
Geary	19	Pawnee	42
Greenwood	20	Phillips	43
Harper	21	Pottawatomie	44
Harvey	22	Rawlins	45
Jackson	23	Reno	46
Jewell	24	Republic	47

## Form 4. Cont.

<u>County</u>	<u>Code No.</u>
Rice	48
Rooks	49
Saline	50
Sherman	51
Smith	52
Stafford	53
Sumner	54
Topeka (Shawnee)	55
Washington	56
Wilson	57

THE PLACE OF ARTIFICIAL BREEDING IN KANSAS  
AS INDICATED BY PREVAILING PRACTICES AMONG  
FARMERS WHO ADOPTED THE SERVICE.

by

JOSEPH LYMAN SHAWCROFT

B. S., Brigham Young University, 1950

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AN ABSTRACT OF A THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Dairy Husbandry

KANSAS STATE COLLEGE  
OF AGRICULTURE AND APPLIED SCIENCE

1953

THE PLACE OF ARTIFICIAL BREEDING IN KANSAS  
AS INDICATED BY PREVAILING PRACTICES AMONG  
FARMERS WHO ADOPTED THE SERVICE.

Joseph Lyman Shawcroft

The purpose of the study was (1) to investigate some breeding practices and dairy management practices on farms previous to and shortly after the operators joined the artificial breeding associations, (2) to determine if any differences existed in dairy practices between farms operated by members of artificial breeding associations and non-member neighbors, and (3) to provide a basis for future measurement of the contribution of the artificial breeding program to the farms served.

The data were gathered by the use of questionnaires. The manager-technicians of each of the organized county artificial breeding associations collected the information from pre-selected members of their respective associations. Approximately 10 percent of the members of each association were to be questioned. To provide a check, for every fifth association member selected, a non-member neighbor was to be interviewed.

A total of 723 questionnaires were distributed. Of these, 48.2 percent were returned and used in this study. Also, the member to non-member ratio of returned questionnaires was 7.4:1.

The data were coded and transferred to I.B.M. cards to ease sorting, counting, and storage problems.

Five general categories were studied: (1) personal and



economic data, (2) dairy management practices, (3) dairy feeding practices, (4) dairy breeding practices, and (5) information pertaining to artificial breeding services. Answers given by members and non-members, with few exceptions, revealed little difference between the two groups. An initial condition existed and any future difference may be attributed in part to the artificial breeding program.

Most of the farmers questioned were between 30 and 49 years of age; over 95 percent were married and about 65 percent did not have any children still on the farm. About 40 percent of the farmers had lived on their present farm less than five years and about 32 percent of the farmers had been engaged in dairying less than five years.

Dairying was not the main enterprise on most of the farms. Only about 12 percent of the farmers received more than half of their gross income from dairying. Less than 50 percent of the farmers used milking machines. However, the number of milk cows per herd was generally less than ten. Only about one-fifth of the farmers marketed Grade A milk.

About 30 percent of the farmers did not own any land, whereas about 25 percent of the farmers did not rent any land. About 60 percent of the farmers owned units of 240 acres or less. Rented units tended to range in size from 80 to 160 acres. About 25 percent of the farmers had mortgages on their farms.

The farmers (80%) tended to raise their own herd replace-

ments. About 67 percent of the farmers regularly tested their herds for tuberculosis and about 61 percent tested for brucellosis. Only about 45 percent of the farmers followed the practice of calfhood brucellosis vaccinations.

Regarding calf feeding practices, the largest group of farmers, 28 percent of the members and 43 percent of the non-members, fed whole milk to their calves for two to four weeks. Only about 30 percent of the farmers used milk substitutes and about 60 percent preferred alfalfa hay as the main roughage for calves.

Similarly, the primary roughage fed dairy cows was alfalfa hay (67 percent of the members and 55 percent of the non-members). Most of the farmers had less than 80 acres of pasture which was used for a six month period generally. Silage, as a dairy food, was used by only about 45 percent of the farmers. Grain rations, with a protein content generally of 15 percent to 17 percent, were fed by 94 percent of the members and 83 percent of the non-members.

Approximately nine cows per herd were bred by natural service during 1950, and about six cows per herd conceived after the first service. Pasture breeding was practiced extensively. Even so, about 65 percent of the farmers reportedly kept systematic breeding and calving records.

The number of bulls used during the three year period, 1948-1950, was about two. About 70 percent of the farmers used only one breed of bulls during that period, the main breeds

being about equally divided between the Holstein and the Hereford. Fifty percent of the member farmers and 64 percent of the non-member farmers used purebred bulls. Approximately \$170.00 was paid for each bull at an average age of 15 months.

About 45 percent of the members and 58 percent of the non-members were practicing crossbreeding of their dairy cows. Thirty percent of the members and 43 percent of the non-members planned to continue future crossbreeding. Only slightly more farmers noticed a difference in veal price for crossbred calves <sup>than</sup> farmers who did not.

The average number of cows per herd was 11; the average number of calves below one year was six. Also present in the average herd were four unbred yearling heifers and three bred yearling heifers. Most milking herds were based upon cattle of the Holstein breed, both purebred and grade. The average age of cows in the milking herd was about four years. Most of the herds had been established by a combination of natural increase and the purchase of additional stock.

The greatest objections to the artificial breeding program were: (1) the lower conception rates in member herds, (2) the increased amount of time required by the farm operator, and (3) the idea that artificial services were not economical in large herds. The main reasons given by member farmers for joining the artificial breeding program were (1) to increase the production of their herds, (2) to eliminate keeping a bull, or safety, and (3) to obtain the services of tested sires.

The main breed of bull signed up as preference by member farmers was Holstein followed by Milking Shorthorn and Guernsey in that order. An average of about seven cows per member were entered into the artificial breeding program. A majority of the members, about 62 percent, did not care to see additional breeds of bulls added to the K.A.B.S.U. bull battery. Bulls of the Angus and Hereford breeds were mainly requested by the member farmers interested in seeing other breeds available.

In general, there was a need for artificial breeding in Kansas. Also, considerable improvement in dairying, especially as concerns breeding problems, in smaller herds, could be expected as a result of the artificial breeding program.