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EVALUATION OF FARM TREE PLANTINGS IN IDAHO

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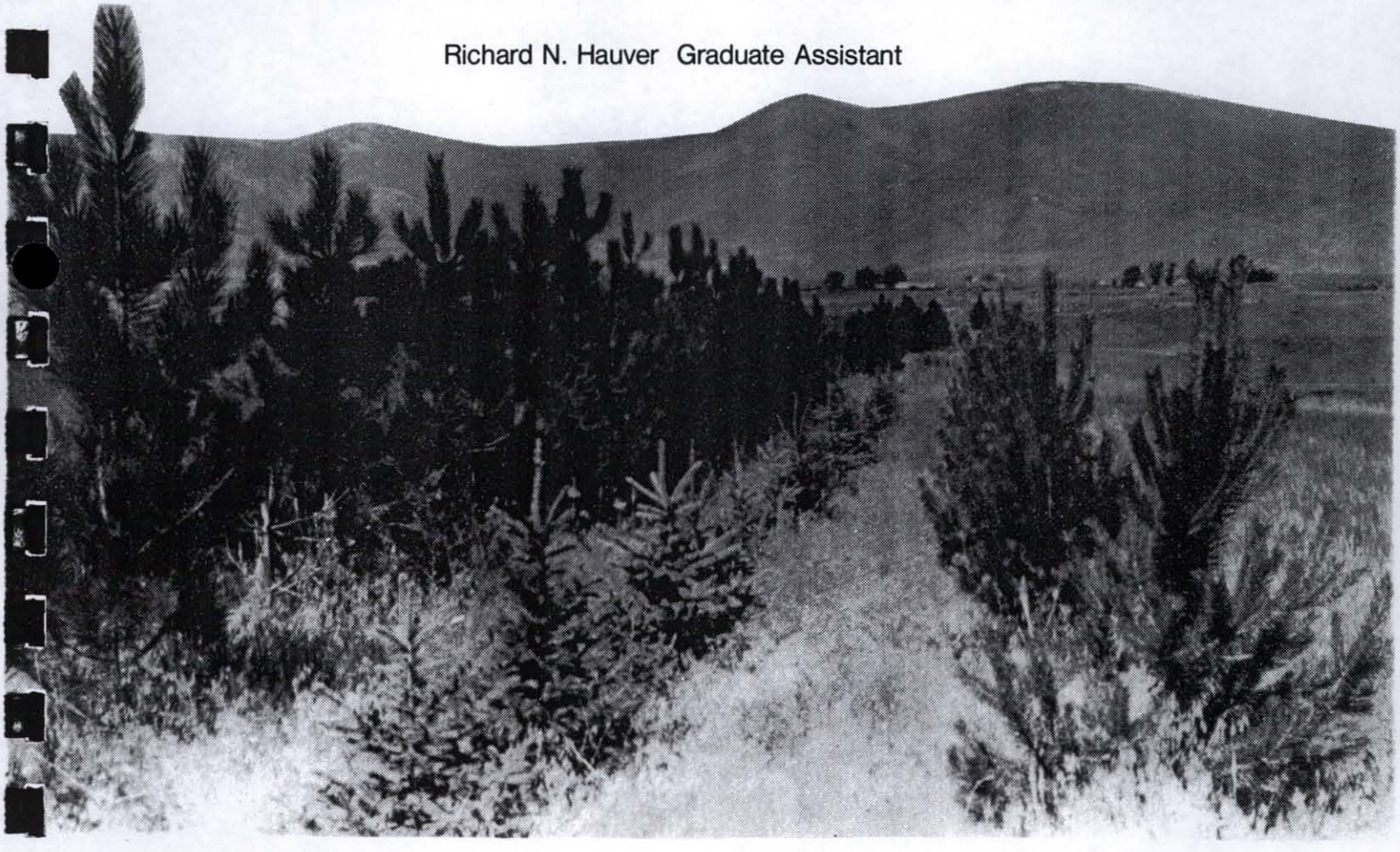

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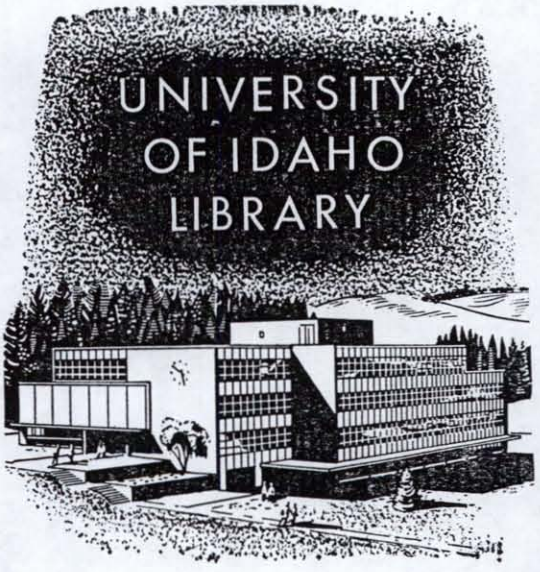

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SUMMARY

An evaluation survey of farm tree plantings was conducted in 1971-72 under the joint supervision of the Cooperative Extension Service and the Forest, Wildlife and Range Experiment Station, University of Idaho. The survey findings are important to personnel of the Cooperative Extension Service, Soil Conservation Service, U. S. Forest Service, Idaho Department of Lands, and other agencies with an interest in Idaho farm tree plantings.

** Idaho farm tree plantings are typically small. Only 5% contain more than 1,000 trees. More than 75% contain no more than 400 trees. Nearly one-third contain 100 trees or less. A majority of the plantings are less than one-tenth acre in size, and nearly 80% are less than one-half acre each.

** Approximately 80% of all Idaho farm tree plantings are windbreaks. Half of all plantings are farmstead windbreaks.

** Nearly 25% of all planting stock ordered for establishing windbreaks was placed in garden nurseries at very close spacings and never moved.

** Sixty percent of all farm windbreaks contain only one or two rows of trees.

** Interagency recommendations on spacings for trees in windbreaks were followed in only 10% of the plantings. Trees have low vigor in 25% of the plantings because of too close spacing.

** Approximately one-half of the windbreaks are planted too close to the areas they were designed to protect.

** Summer fallow or fall site preparation was followed by only 6% of landowners who planted trees.

** More than one-half of the plantings were never cultivated.

** Insect, disease, and rodent problems were not widespread. If there was no overlap, only 32% of the plantings showed damage from any of these pests. Soil-induced chlorosis accounted for 70% of the disease in plantings; Russian-olive dieback and Cytospora canker for most of the rest. Spider mites and leaf-eating insects, such as cutter bees, were the cause of nearly all the insect damage. Pocket gophers account-

SUMMARY Continued

ed for over 50% of the rodent damage; mice and rabbits for approximately 20% each.

** Twenty-seven percent of the plantings would benefit from thinning and/or pruning.

** Almost half (47%) of all Idaho farm tree plantings are failures from the standpoint of their accomplishing the purpose for which they were planted.

** Factors controllable by the landowner accounted for 75% of the planting failures. Inadequate watering and cultivation were the two most important causes of failure. Livestock damage ranked third. These three were the major causes in 72% of all planting failures.

** The species which gave the best performance statewide in terms of survival and accomplishment of the purposes for which they were planted are (ranked in order with the best listed first):

Deciduous		Coniferous	
Siberian elm	black locust	Scotch pine	Norway spruce
hybrid poplar	golden willow	Austrian pine	ponderosa pine
Siberian pea	honeylocust	blue spruce	lodgepole pine
green ash	Russian-olive	Rocky Mt. Juniper	Douglas-fir

** The Cooperative Extension Service provided strong motivations to landowners to plant trees and was also an important source of assistance; yet a majority of the owners said they needed assistance they did not recieve on tree care, planning, site preparation and how to plant.

** Two-thirds of the owners expressed a moderate or higher level of satisfaction with their plantings and over two-thirds had plans to improve their plantings.

** Thirty-seven percent of the owners had a moderate or higher level of enthusiasm about the value of their plantings for upland game birds and other forms of wildlife.

** Very little use is made of farm tree plantings for grazing or recreation.

AN EVALUATION

OF

FARM TREE PLANTINGS IN IDAHO

by

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E. W. Tisdale

F. D. Johnson

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and

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INTRODUCTION

For over 20 years personnel of the University of Idaho Cooperative Extension Service and College of Forestry, Wildlife and Range Sciences, the Soil Conservation Service, the Idaho Department of Fish and Game, the Division of Forestry in Idaho Department of Lands, and the U. S. Forest Service with responsibilities in farm tree planting programs have cooperated to establish and maintain one set of farm tree planting recommendations.

These recommendations were first published in "Tree Planting for Idaho Farms", U. of I. Extension Bulletin No. 185, April 1951, by Vernon F. Ravenscroft. Later versions were included in "Trees Against the Wind", Pacific Northwest Cooperative Extension (P.N.W.) Bulletin No. 5,

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January 1953, and its subsequent revisions. Recommendations that dealt only with actual planting were published in a supplemental leaflet called "Plant Your Trees Right", P.N.W. Bulletin No. 33, first printed in 1959 and subsequently revised and reprinted three times. Copies of both bulletins generally have been available from county offices of the Cooperative Extension Service, district offices of the Soil Conservation Service, and offices of the Woodland Foresters. Also, since 1959 the University of Idaho Forest Nursery has included a copy of "Plant Your Trees Right" with the shipping notice to each person who purchased trees.

Common recommendations improved interagency coordination, but they did not achieve the common objective of high level success in the total farm tree planting effort. Recurring observations of plantings indicated that many landowners who planted trees did not follow the recommendations. It was also obvious that a significant number of farm tree plantings failed. Various reasons for tree planting failures were identified, but no one could say how important they were. Therefore, to obtain quantitative information needed by the agencies that provide assistance in the farm tree planting program, the Idaho Interagency Forestry Committee[1/] in the spring of 1970 requested the University of Idaho Forest, Wildlife and Range Experiment Station to consider making an evaluation of Idaho farm tree plantings.

A preliminary study was made in the fall of 1970 by Mel R. Carlson of the Soil Conservation Service, Arnold Coleman of the Idaho Fish and Game Department, and Vernon H. Burlison of the University. Its purpose was

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2/ The Idaho Interagency Forestry Committee, now reorganized into the Idaho Woodland Council, is a group of representatives of private, state and federal agencies and organizations with direct program interests in farm forestry. Its purpose is to coordinate farm forestry program efforts to prevent overlap and to increase efficiency.

to test a proposed method of making field inspections of plantings. Based on the experience gained in this preliminary study, a statewide evaluation of farm tree plantings was initiated in the summer of 1971 and completed in 1972. Funds and personnel for the study were provided by the U. S. Forest Service (Fund for Special Projects), the Cooperative Extension Service, and the Forest, Wildlife and Range Experiment Station, both of the University of Idaho. Dr. Dale Everson, U. of I. College of Agriculture statistician, advised on the design of the survey. Richard N. Hauver, then a graduate student in Forest Resources at the University, made the field inspections of the sample plantings, interviewed the owners, and carried the data through computer processing.

SURVEY METHOD

Information obtained from Extension Agricultural Agents and District Conservationists (Soil Conservation Service) indicated that 90% of the trees planted by Idaho farmers in 1970 were purchased from the University of Idaho Forest Nursery. The percentages for years prior to 1970 were estimated to be greater than ninety. Therefore, the Forest Nursery records of trees purchased were considered an adequate base from which to select samples that would accurately evaluate farm tree plantings.

Since it was thought desirable to be able to compare recent plantings with those that have had time to become well established and with those reaching early maturity, samples were chosen from the nursery order files for the years 1970, 1965, and 1955. Every tenth name was selected from the lists of purchasers of trees for those years. In case some of the plantings could not be located, an alternate list

was compiled from the 11th, 21st, 31st, etc., names on the lists of purchasers.

The study consisted of making detailed performance inspections of 203 plantings, plus interviewing the owners or operators to obtain information on care that had been given the plantings and to get owners' opinions or feelings about their plantings. In order to determine if there were regional differences in the farm tree plantings, the state was divided into four areas (Fig. 1).

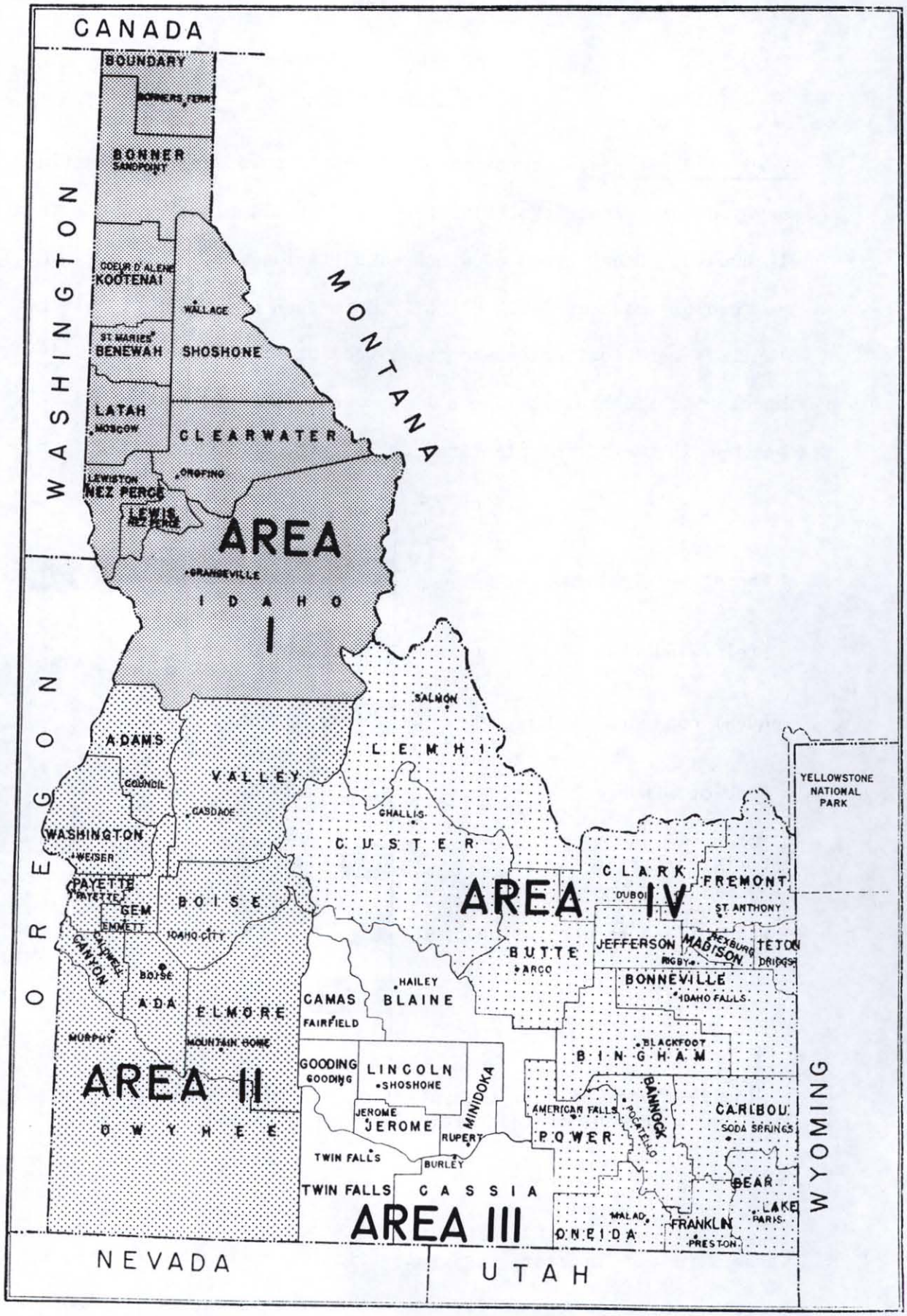

FIG. 1 -- STATE SUBDIVISIONS USED AS AREAS TO DETECT REGIONAL DIFFERENCES IN THE EVALUATION OF FARM TREE PLANTINGS.

SURVEY FINDINGS

Types of Plantings. Approximately four-fifths of all the plantings surveyed were windbreaks (Fig. 2). Half of all plantings were farmstead windbreaks. Other types of windbreaks (field, rural non-farm home, and feedlot) made up 29%. Slightly more than one-fifth of all the plantings were for Christmas trees, woodlot or reforestation, livestock shade, wildlife habitat, fence line trees, and erosion control. Less than one in ten of the plantings fell in the last four categories.

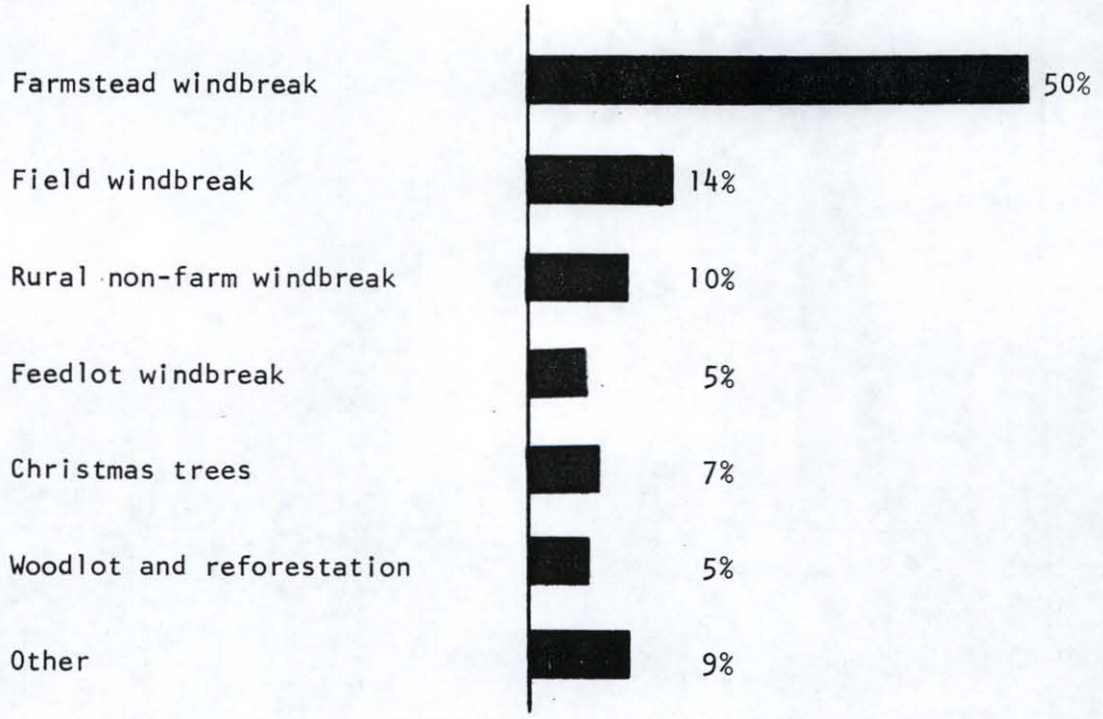

Fig. 2 - Types of farm tree plantings in Idaho shown in percent of the total number of plantings inspected.

These were the important regional variations: In Area I (Fig. 1) Christmas trees accounted for one out of four plantings, a proportion

that was more than three times greater than the average for the state. Field windbreaks were most prevalent in Area IV where they constituted one-fifth of all plantings. Rural non-farm windbreaks appeared sparingly outside areas II and III. Between the two areas they were equally divided.

Size of Plantings. Idaho farm tree plantings were typically small (Fig. 3). Nearly one-third of all plantings used 100 trees each or

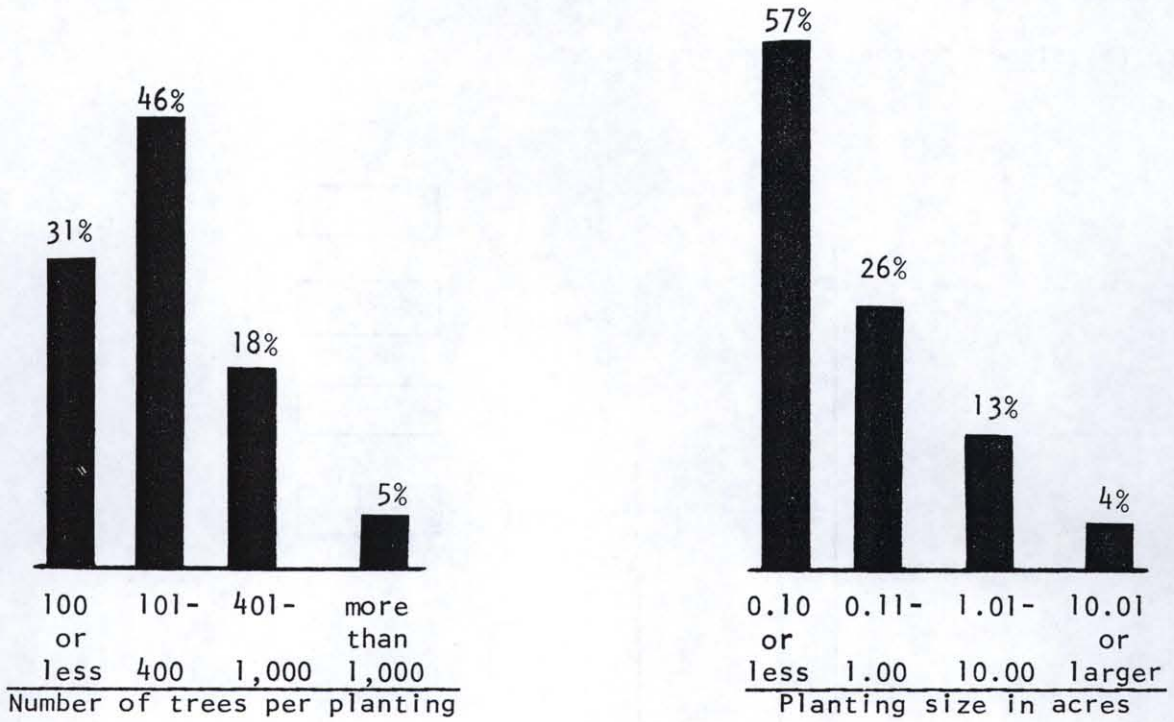

Fig. 3 - Size classes of farm tree plantings in percentages of the whole.

fewer. Slightly more than three-fourths of all plantings contained no more than 400 trees each. Only one planting in 20 contained more than 1,000 trees. A majority of the plantings were less than one-

tenth acre in size. Nearly four-fifths of the plantings were less than one-half acre each. Only one planting in eight exceeded one acre in size, and one in 25 was larger than ten acres.

The greater percentage of Christmas tree plantings in Area I (25% compared to 7% statewide) accounts for the larger average size of planting in that area (Fig. 4). There are many small farms and rural dwelling places in Area II. The farmsteads on these places are small, consequently windbreaks are not as large as they are in Areas III and IV where farmsteads on the average are larger.

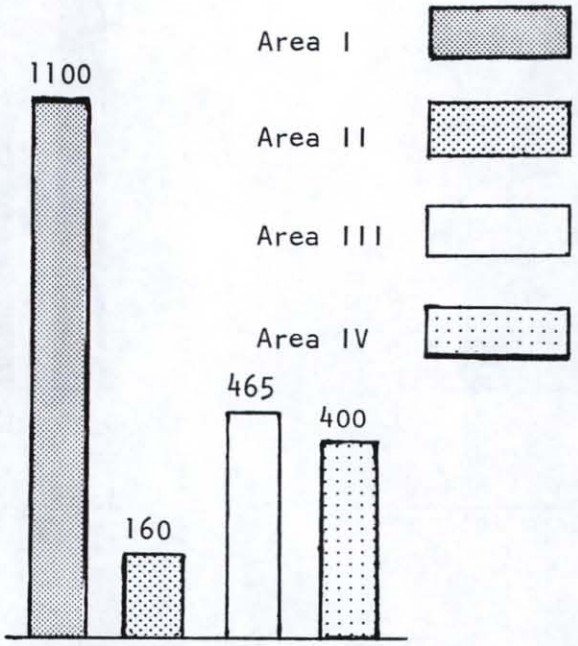

Fig. 4 - Number of trees in the average planting by area.

Windbreak Plantings. The survey revealed that nearly one-fourth of all the trees that had been purchased for windbreaks were still in

garden plots with very close spacing, one foot or less in most instances, between trees. (Antoher 5% of the windbreak orders had been planted as fenceline trees and in odd corners rather than in recommended windbreak arrangements.) These garden tree nursery plots included some trees that were ordered in 1965 and in 1955.

The reasons most frequently given by the owners for their trees being still in nursery plot were:

"Didn't have my land in shape",

"Had no water when my trees arrived",

"Thought I would plant them here until they got a little more size on them", and

"I was in a bind for time when my trees came."

Numbers of Rows in Windbreaks: Interagency recommendations for farmstead windbreaks urge the use of three or more rows of trees in all situations where there is room. Forty percent of the established windbreaks were found to contain three or more rows (Fig. 5) while 60% contained only two rows or less.

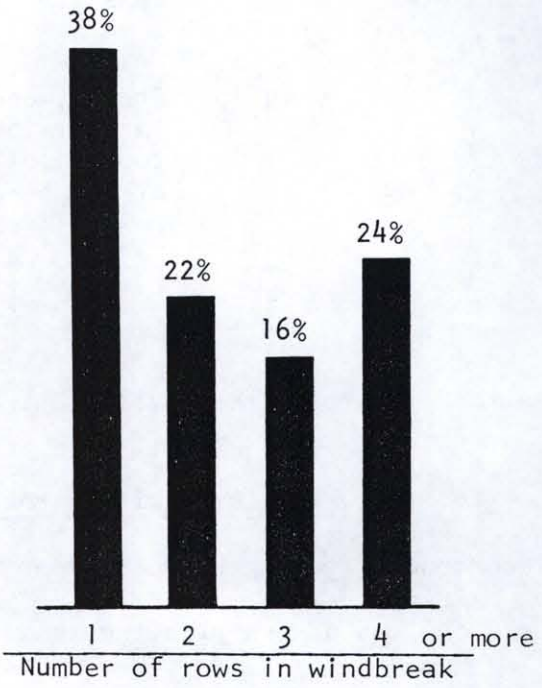

Fig. 5 Most of the farmstead windbreaks contained less than the recommended number of rows.

Spacings Used in Windbreaks: a. Between rows -- Only one windbreak out of ten had the recommended spacing of 16 feet between rows (Fig. 6). Nearly half of the windbreaks inspected had between-row spacings from 7-12 feet, which is too close for good development of trees. The remaining 43% had spacings of six feet or less between rows, which results in severe competition between the trees at an early age and

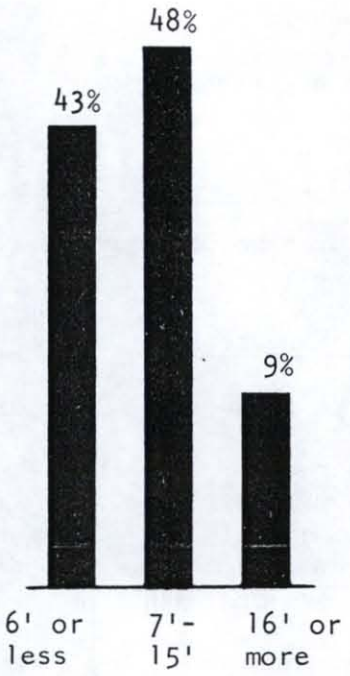

Fig. 6 - The between-row spacings in a large majority of windbreaks were too close for adequate development of the trees. Sixteen feet between rows is recommended.

seriously hampers the development and performance of the plantings.

b. Between plants within rows -- Twelve feet is the Interagency recommended spacing between trees within the rows of a windbreak. Only one out of ten plantings had trees spaced that far apart (Fig. 7).

Slightly more than half of the windbreaks inspected had spacings ranging from 6 to 10 feet between trees within the rows. In more

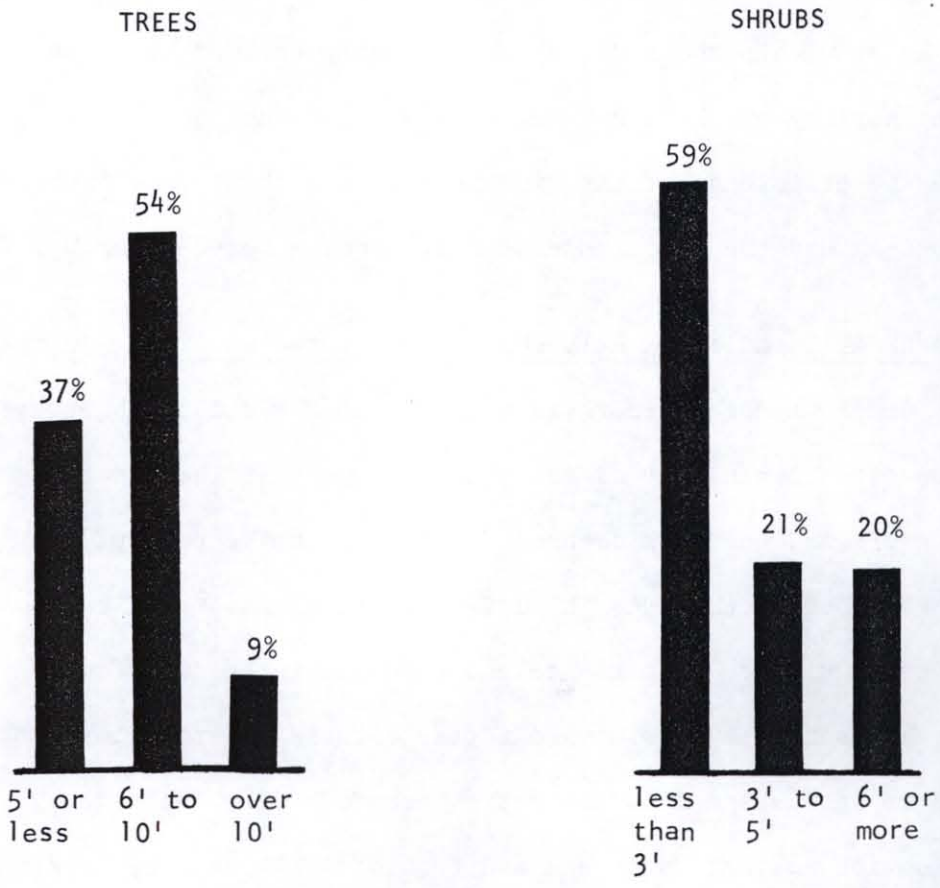

Fig. 7 - In a large majority of the windbreaks, the trees and shrubs were planted too close within the rows to permit normal size to be attained. Recommendations are for 12 feet between trees and 3 feet between shrubs.

than one-third of the windbreaks the within-row spacing between trees was five feet or less. Such close spacing results in serious overcrowding.

Shrubs were also too closely spaced in most windbreaks (Fig. 7). A 3-foot spacing between shrub plants within the row is recommended for

most situations, yet it was found that in approximately three-fifths of all windbreaks the spacings between plants within the shrub rows were two feet or less. One-fifth had the shrubs spaced at six feet or farther apart within the rows, which seriously reduced the wind diverting ability of the shrub row in most instances and thereby impaired the efficiency of the windbreak. Only about one-fifth of the plantings had the recommended 3-foot spacing between shrubs.

Windbreak Location in Relation to the Protected Area: In the lee of a dense windbreak there is a zone, whose width is about 2.5 times the effective height of the planting, wherein the greatest reduction of wind currents occurs. This zone may be nearly devoid of summer breezes. On the other hand it may accumulate troublesome snowdrifts in winter. Experience has shown that the satisfaction from a windbreak is usually diminished if the planting is too close to the area it was designed to protect. Therefore, the Interagency recommendation is that farmstead and feedlot windbreaks be located at least 60 feet to the windward of the areas they are to protect.

Approximately half of the windbreaks inspected had less than 50 feet between them and their respective zones of protection (Fig. 8). Six percent were borderline for location and 45% had at least the recommended minimum distance of 60 feet between the windbreak and the protected zone.

Characteristics of Planting Sites. It was important to find out if many farmers planted trees on sites so severe as to hamper the success

of their plantings. Therefore, soils information and other site data were obtained for each planting inspected.

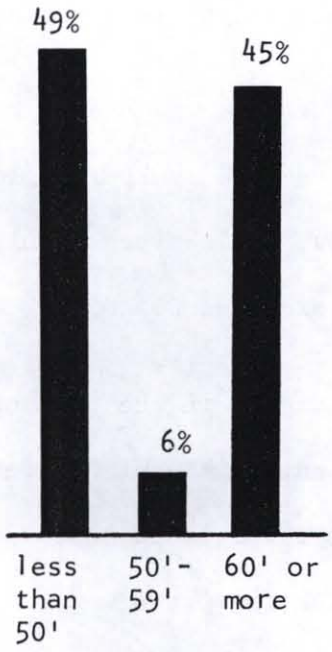

Fig. 8 - Most farm windbreaks were located too close to the areas they were designed to protect -- less than 60 feet between the windbreak and the house or other important points in the protected zone.

Farm tree plantings occupy good sites, as shown by the following summary of the site information obtained:

More than 90% of the farm tree plantings in the survey were located on loam soils with good structure and adequate depth. Soil depth was 30 inches or greater in almost 90% of the cases. Drainage was good to excellent on 85% of the sites. Only 5% of the sites had poor drainage.

Soil permeability was poor in only 3% of the cases. It was moderate on half the planting sites and good to excellent

on the rest.

The soil pH was within the quite acceptable range of 6.0 to 8.0 on 90% of the sites.

Most plantings were on relatively flat land, the slope being less than 5% for 8 out of 10 sites. Only 7% of the plantings were on slopes that exceeded 20%.

Observation and experience in the past have shown that elevation does not hinder the establishment of tree plantings in Idaho until the 5,000 foot level is exceeded. In this survey approximately 90% of the plantings were under 5,000 feet.

The above summary of the characteristics of farm tree planting sites indicates that poor site quality probably could not be considered a significant factor in poor performance of plantings.

Site Preparation. The Interagency recommendation for preparation of farm tree planting sites calls for fall plowing where possible, followed in the spring with disking and harrowing to obtain a firm, moist seedbed condition. Summer fallow is recommended for sites with perennial weeds or volunteer alfalfa.

The study showed that spring preparation of the planting site was the common thing. Only slightly more than 4% of the landowners had used summer fallow or fall plowing.

For 30% of the plantings (Fig. 9), the sites were prepared by using some combination of plowing, disking, and harrowing. Due to their

small size, one-fourth of the sites were prepared by using a garden tiller or rotovator. There was no site preparation for one-fifth of the plantings, and no information was available for the other 25%.

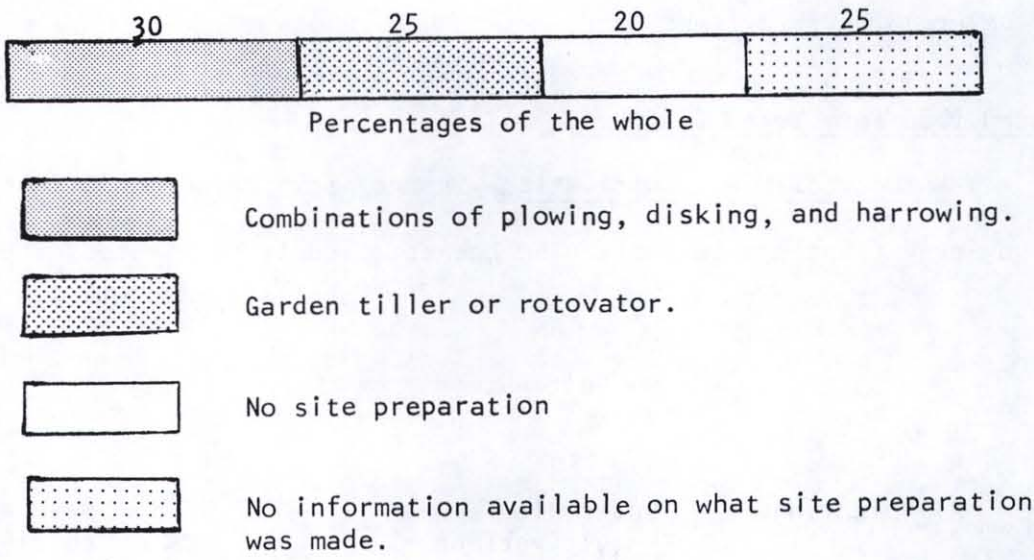

Fig. 9 - Methods followed to prepare sites for Idaho Farm tree plantings.

Planting Methods. No one planting method is recommended over another, excepting that use of a mechanical planter is advised when a planting is to contain more than 2,000 trees. The emphasis in planting recommendations is upon: 1) keeping the roots moist; 2) having a hole, slit, trench, or furrow that is large enough to allow the roots to assume a position that is as nearly natural as possible; 3) covering the roots with moist soil; and 4) firming the soil to prevent air pockets around the roots and to conserve moisture.

Due to their small size, most Idaho farm tree plantings are hand planted. Hole planting, using a shovel or mattock, was used in 94% of the plantings. Slit planting with a planting bar, dibble, or narrow shovel was used in 4% of the cases. Mechanical planters were used on only 2% of the plantings, which were Christmas tree plantations of several thousand trees each.

Care Given Farm Tree Plantings.

Weed Control: a. Cultivation--Though it is recommended that young tree plantings in particular be kept cleanly cultivated, the

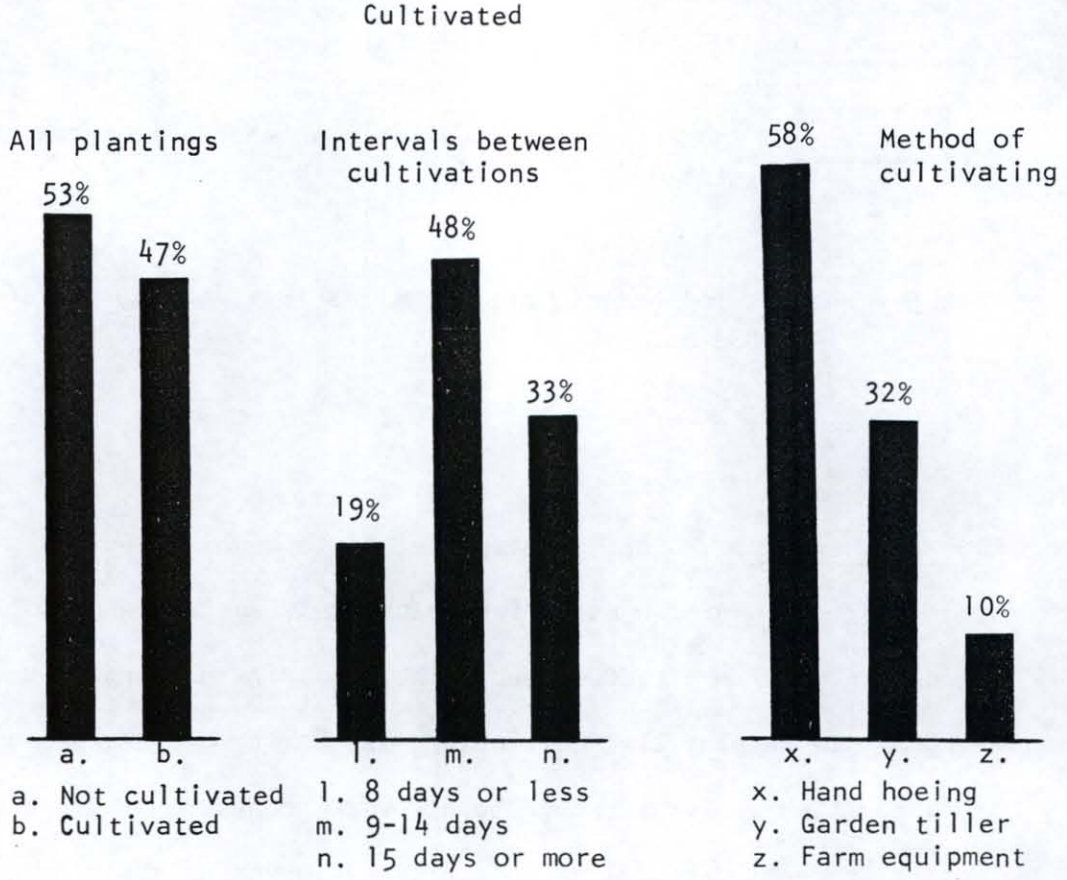

Fig. 10 - A majority of plantings received no cultivation. Nearly three-fifths of the cultivated plantings were hoed by hand. One-third of the cultivated plantings had intervals between cultivations that were too long.

study found that more than one-half of the sample plantings had never been cultivated (Fig. 10). Of those plantings that were cultivated, the intervals between cultivations (9 days or longer in 81% of the cases) were too long for good weed control in normal situations.

Shallow cultivation has been the recommendation and it was practiced by most of those who cultivated. In two-thirds of the cases, cultivation depth was no greater than three inches. The depth range was three to five inches for another 30% of the plantings. Farm machinery was little used in cultivating tree plantings. Fifty-eight percent of the cultivation was by hand hoeing, 32% by garden tiller, leaving only 10% by farm machinery, such as disk, harrow, or row cultivator.

b. Use of herbicides -- There are no statewide recommendations on the use of herbicides in farm tree plantings; however, growers' experience has shown that carefully selected herbicides correctly applied can effectively supplement cultivation. Due to great variation in soils, precipitation, and soil moisture levels within Idaho, specific herbicide recommendations must be for limited areas.

Herbicides had been used in only 8% of the plantings inspected. Attrex (Atrazine) was used in 50% of these cases; 2,4-D in 30%; Simazine in 10% and fuel oil in 10%. In one-third of the cases, the herbicides used gave good to excellent weed control. Fair control was obtained in another one-third, and the remainder got poor control or no effect at all. Approximately one-fifth of those who used herbicides reported some damage to their trees from the practice.

Irrigation: Specific recommendations for irrigation of farm

tree plantings depend upon soil types and weather conditions, but general recommendations are that plantings in irrigated areas be watered weekly during their first growing season and at intervals of 10 to 14 days after the trees have become established. The survey indicated that these recommendations are rather well accepted. Of the irrigated plantings, 70% were on schedules with intervals of 8 days or less between waterings. Only 12% had intervals of 15 days or longer between waterings (Fig. 11).

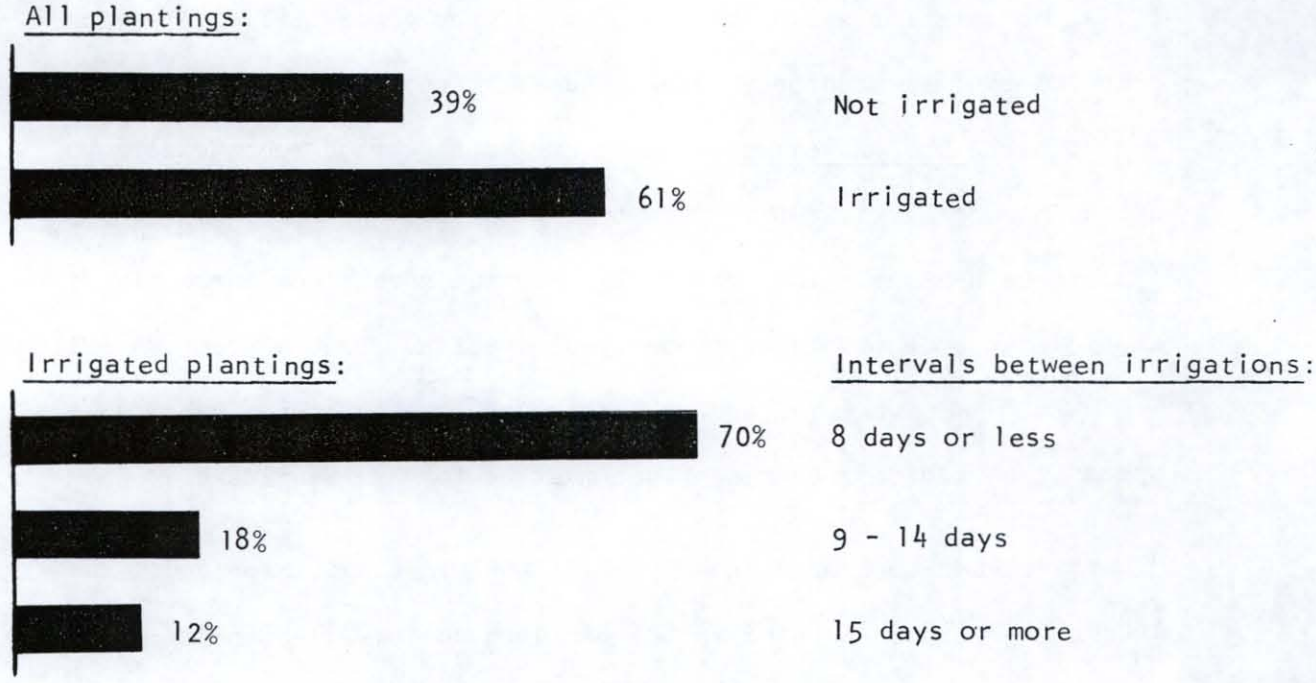

Fig. 11 - Percent of farm tree plantings that were irrigated and schedules of irrigated plantings.

Approximately two-fifths of the plantings in the survey were not irrigated. Eighty-four percent of these nonirrigated plantings were in northern and southeastern areas of the state where farming depends upon natural precipitation. The other 16% mostly were well

established plantings that were irrigated during their early years but whose owners had found they could live without irrigation.

Protection: It is recommended that farm tree plantings be fenced to protect them from livestock damage. The survey showed that 47% of the plantings were fenced, but it did not show what portion of the unfenced plantings had no need for fencing because there was no livestock risk.

Owners of farm tree plantings have been encouraged to observe their trees regularly for any unusual sign, such as unhealthy appearance of foliage or bark. In this way they can make early detection of any insect, disease, or rodent damage and take action before the pest does serious harm. The survey revealed no important special problems related to the care of plantings. Only 7% of the plantings had disease problems, (Fig. 12) and 70% of these were soil-induced chlorosis due to low iron levels. Russian-olive dieback[1/] and Cytospora canker (on golden willow and hybrid poplar) each accounted for 15% of the disease problems.

Insect attacks had caused some damage in 14% of the plantings. In no instance was the damage judged to be severe enough to reduce tree vigor. Insect damage was divided almost equally between that caused by spider mites and that caused by leaf-chewing insects,

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1/ A malady for which the causal agent has not been determined. Its attack on well-established Russian-olive trees usually results only in some dieback in the top of the crown. Trees under three years old are sometimes killed. Those that succumb frequently do so during the first growing season in which it is evident they have the disease.

primarily cutter bees. Though clean cultivation of a tree planting is relatively good insurance against the build-up of a really damaging rodent population, all owners of farm tree plantings are cautioned repeatedly to be alert for rodent activity. The survey showed that rodents had caused damage to 11% of the plantings (Fig. 12). Pocket gophers were the cause of the damage in more than one-half of the cases. Since pocket gophers work on the tree roots, it is difficult to detect a light attack. That probably accounts for the fact that slightly over 60% of the trees that were detected as having been attacked by gophers were damaged severly enough to cause serious growth impairment or death. No pocket gopher activity was detected in plantings that were over five years old.

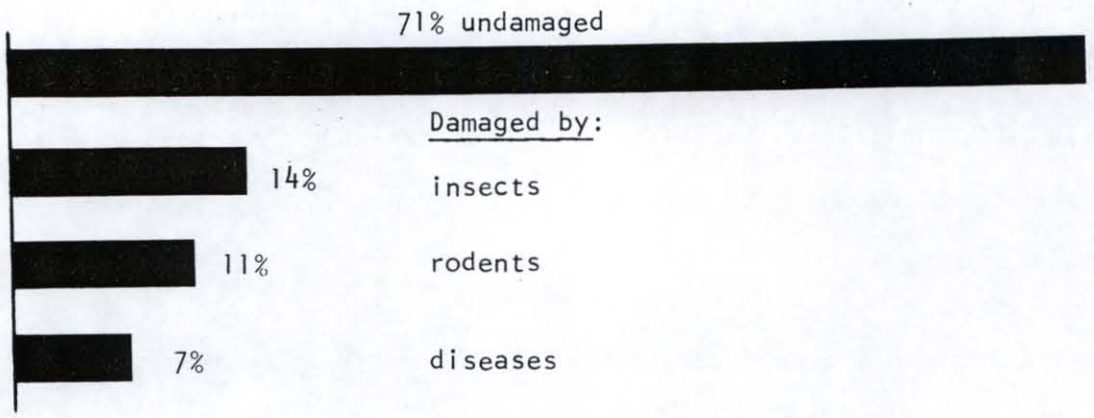

Fig. 12 - Pest damage noted in Idaho farm tree plantings. Because some plantings had more than one type of damage, the sum of the percentages is greater than 100.

Rabbits and mice each accounted for the damage done in approximately 20% of the cases of rodent attacks. Their feeding on plantings

occurred in the winter and early spring. Excepting Russian-olive, deciduous species were preferred to conifers. No trees that were over two inches d.b.h.[1/] had been attacked by rabbits or mice.

Ten percent of the rodent-caused damage to trees was done by porcupines which attacked coniferous species in 80% of the instances. Their damage was all done during winter or early spring months. Porcupines did not confine their attacks to any one age group or size class. In contrast to the damage done by other rodents, porcupine damage usually occurred in the upper crowns of all trees large enough to climb.

Conditions Observed in Plantings:

Ground Cover -- Approximately two-thirds of the plantings inspected had a medium to heavy cover of weeds and/or grass. Nineteen percent had a light grass and/or weed cover, and 15% were clean cultivated.

Grazing -- Only one planting in 20 was being grazed. In all instances of grazing, the use was light to moderate. Two-fifths of the grazed plantings were used by calves, sheep, or goats. The remainder was used by mature cattle.

Recreation Use -- Only 0.5% of the plantings were actually being used for recreation. The uses were family picnicking and a play area for children. It was observed that many farmstead windbreaks provided protection for outdoor living areas, but no count was kept of the number.

1/ Diameter at 4.5 feet above groundline.

Tree Vigor -- Trees had good vigor and were growing satisfactorily in 25% of the plantings. Vigor was poor in 22% of the plantings, and the remainder had moderate vigor. In some young plantings, poor tree vigor seemed due to competition of a heavy cover of grass and weeds. In all older plantings the loss of vigor definitely appeared to be mainly the result of too close spacing of trees.

Thinning and Pruning Needs -- Approximately one-half of the plantings needed no thinning or pruning. In another 23% the trees were in such poor condition that no real benefits would result from such care. Fifteen percent of the plantings would benefit by thinning, the need ranging from light to heavy thinning. Pruning was needed in 12% of the plantings to eliminate dead or damaged branches, multiple leaders, and limbs that were overtopping evergreens.

Performance of Plantings. With consideration being given for its age, each planting was rated by the inspector from the standpoint of how well it was functioning for the purpose for which it was planted (Fig. 13). On this basis a little more than half the plantings were giving fair or

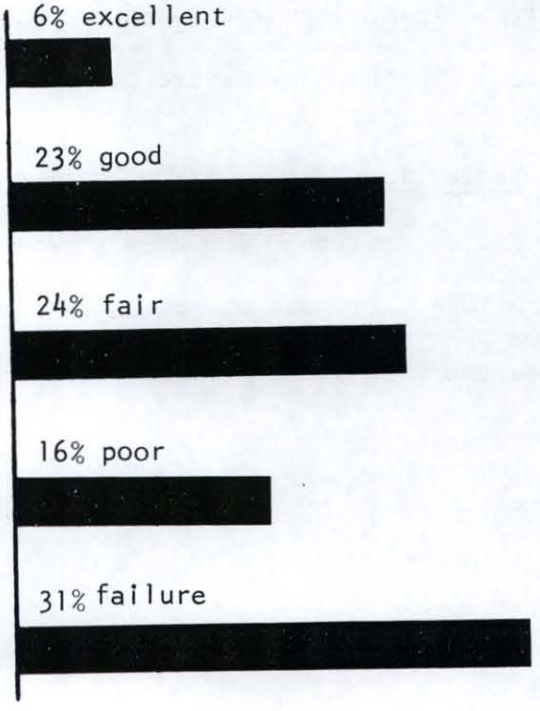

Fig. 13 - Performance of Idaho farm tree plantings on the basis of how well they were functioning in relation to the purposes for which they were planted.

better performance. Almost half were failures because those rated "poor" for performance were remnants of plantings that were actually failures for practical purposes.

Reasons for Poor Performance or Failure -- More than half of the planting failures were due to inadequate moisture (34% too little irrigation and 4% natural drowth) and lack of cultivation (Fig. 14).

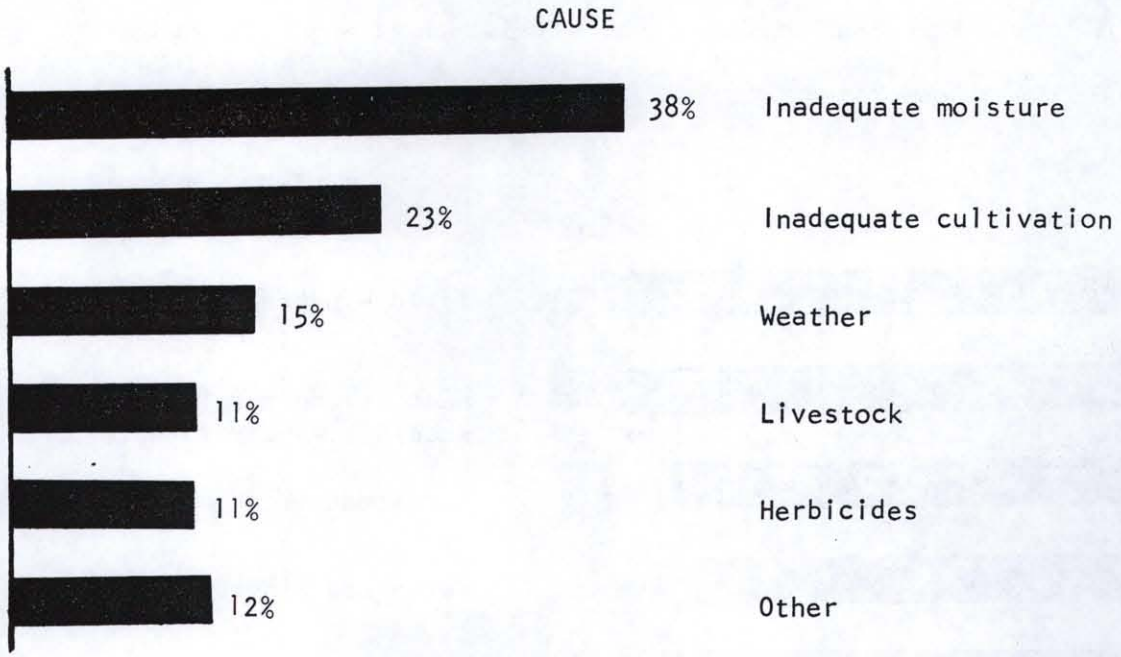

Fig. 14 - Causes of poor performance or failure in Idaho farm tree plantings. The sum of the percentages exceeds 100 because some plantings had more than one important cause for its lack of success.

Additional contributing factors in the order of their importance were: Weather, which included winter dessication of foliage, frost heaving of young plants, and frost kill of new foliage; livestock trampling, rubbing, and browsing; herbicides, both from crop spray

drift and from weed control applications within tree plantings; and other including fire, improper planting, poor condition of planting stock, too much delay between the time the planting stock was received and the date of planting, rodents and diseases.

In relation to the number of plantings of each kind that was made, field windbreaks had the highest losses (Fig. 15), closely followed by woodlots, reforestation and rural non-farm windbreaks, each with 50% loss. Farmstead windbreaks and Christmas tree plantings had the lowest loss rate.

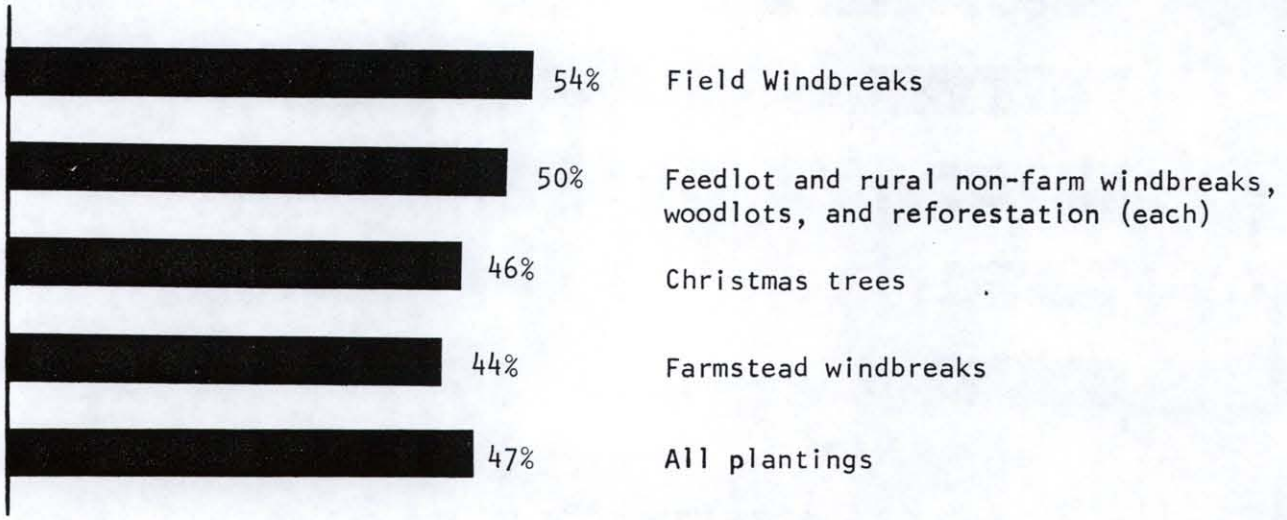

Fig. 15 - Farm tree planting failures in percent of the number of plantings inspected in each category.

The success rate for all plantings was approximately the same for each of the three years sampled, indicating that most failures occur during the first two years after planting. There were differences

between the areas of the state (Fig. 16). Plantings in northern area had the highest rate of success. Those in southwestern area had the lowest rate.

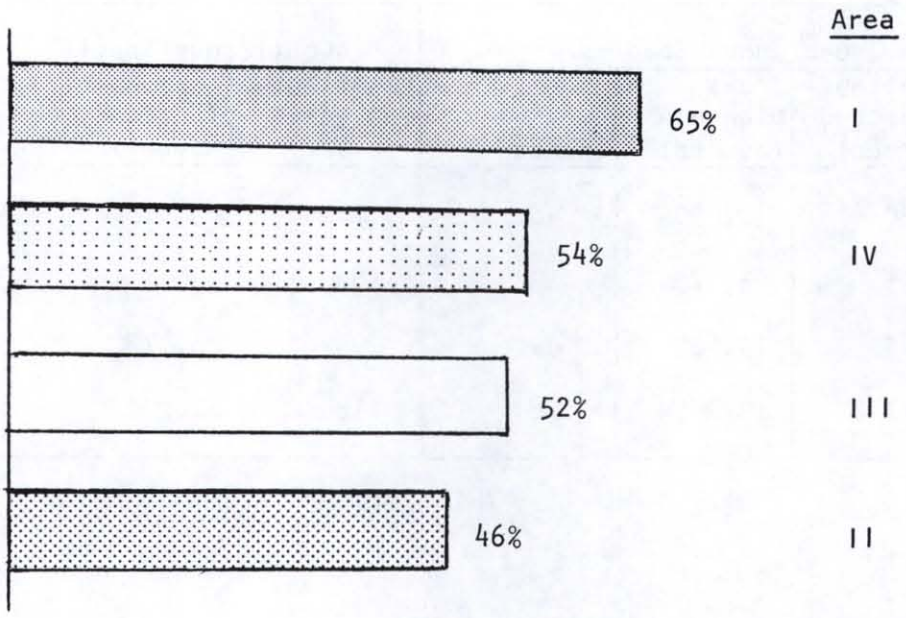

Fig. 16 - The success level by areas for all plantings inspected.

Performance of Species. The tree and shrub species used in farm plantings could be evaluated only in relation to how well they survived and performed with the care they received. Care varied from none to excellent. Since success of farm plantings depends greatly on the care they get, the performance of individual species varied from failure to excellent.

The survival of the deciduous and coniferous species as groups was compared by years and was found to vary but little between years. However, when years were combined and the survival of the species groups was compared by areas (Table 1), there were some differences.

TABLE 1 - SURVIVAL OF DECIDUOUS AND CONIFEROUS TREE AND SHRUB SPECIES IN FARM TREE PLANTINGS BY AREAS.

Area	Deciduous Species			Coniferous Species		
	Plantings inspected (number)	Trees planted (number)	Survival (percent)	Plantings inspected (number)	Trees planted (number)	Survival (percent)
I, northern	30	2,050	48	71	65,575	45
II, s. western	25	3,375	13	83	6,125	30
III, s. central	65	10,625	39	95	6,475	38
IV, s. eastern	111	13,275	38	118	11,200	23

In the southwestern area the conifer survival rate was more than twice the rate for deciduous, while in the southeastern area deciduous species survived markedly better than conifers. Weather damage to conifers was high in the southeastern area and would account in large measure for the losses being higher in that area, but the reason for the low survival of deciduous species in the southwestern area was not certain. There was little difference between survival of deciduous and conifers in the northern and southcentral areas.

Table 2 shows the survival and performance by species for all plantings in the survey. From the standpoints of survival and performance, the survey results shows the following best species for different areas of the state, arranged in descending order with the best performing species at the head of each list:

Deciduous Species

Area I	Area II	Area III	Area IV
Siberian elm	Siberian elm	black locust	hybrid poplar
Siberian pea	hybrid poplar	honeylocust	Siberian elm
black locust	honeysuckle	golden willow	Russian-olive
green ash	Siberian pea	green ash	green ash
golden willow	golden willow	Russian-olive	Siberian pea
multiflora rose	honeylocust	multiflora rose	golden willow
honeylocust	green ash	Siberian elm	honeysuckle

Coniferous Species

Area I	Area II	Area III	Area IV
Scotch pine	Austrian pine	Rocky Mt. juniper	Scotch pine
blue spruce	Scotch pine	Austrian pine	Austrian pine
Norway spruce	Rocky Mt. juniper	blue spruce	blue spruce
Douglas-fir	blue spruce	Scotch pine	lodgepole pine
Ponderosa pine	lodgepole pine	Norway spruce	ponderosa pine
Austrian pine	ponderosa pine	ponderosa pine	Rocky Mt. juniper
Rocky Mt. juniper	Norway spruce	lodgepole pine	Norway spruce

The reader must keep in mind that these lists are based on survey results. They indicate what to expect in relative performance of the various species in the different areas, unless landowners can be influenced to give plantings better care. The results might have been different if an equal number of plantings of each species had been inspected and if all plantings within any area had similar growing conditions and similar cultural treatment.

Information About the Cooperators. A large majority (95%) of the cooperators owned the land whereon they had planted trees. Only 8% purchased their lands since the trees were planted. Ten out of each 11 owners were the ones who had planted the trees in the plantings inspected on their farms. In only 5% of the cases the cooperators were lessees or hired operators.

TABLE 2 - FREQUENCY, SURVIVAL, AND PERFORMANCE OF TREE AND SHRUB SPECIES IN IDAHO FARM PLANTINGS, ARRANGED IN ORDER BY THE TOTAL NUMBER OF PLANTINGS IN WHICH EACH APPEARED.

Species	Total plantings inspected	Area I				Area II				Area III				Area IV			
		Plantings	Trees planted	survival	Species performance*	Plantings	Trees planted	survival	Species performance*	Plantings	Trees planted	survival	Species performance*	Plantings	Trees planted	survival	Species performance*
Deciduous:	(no.)	(no.)	(no.)	(%)		(no.)	(no.)	(%)		(no.)	(no.)	(%)		(no.)	(no.)	(%)	
Russian-olive *(Eleagnus angustifolia)*	55	2	100	10	F	2	225	0	F	17	3500	29	G E-F	34	3450	51	P E-F
Golden willow *(Salix alba vitellina)*	37	5	225	28	F G-F	4	350	10	F G-F	8	500	42	F E-F	20	1150	29	F E-F
green ash *(Fraxinus pennsylvanica lanceolata)*	35	5	150	38	F E-F	3	100	8	F P-F	11	1550	40	G E-F	16	850	41	F E-F
Siberian peashrub *(Caragana arborescens)*	30	4	550	85	G E-F	2	75	13	F P-F	5	250	18	F P-F	19	3450	32	F E-F
Siberian elm *(Ulmus pumila)*	21	5	200	88	G G-F	2	50	90	G	6	200	28	M M-F	8	875	73	G E-F
black locust *(Robinia pseudoacacia)*	16	3	150	47	F G-F	3	550	5	F	8	1975	71	G G-F	2	250	0	F
honeylocust *(Gleditsia triacanthos)*	15	1	25	10	F	4	1025	10	F G-F	4	275	44	M G-F	6	200	11	F P-F
multiflora rose *(Rosa multiflora)*	13	5	525	23	F E-F	1	525	0	F	5	2250	28	F P-F	2	2100	9	F
Tartarian honeysuckle *(Lonicera tartarica)*	9	0				4	350	39	F E-F	1	25	90	E	4	150	21	F M-F
hybrid poplar *(Populus sp.)*	6	0				1	100	60	G	0				5	450	75	G E-F

* Performance ratings were made by the field inspector: E= excellent; G= good; M= medium; P= poor; and F= failure. Each rating that appears in the table is the one that characterizes the most plantings in that category. If there was a performance range, it appears under the rating.

Species which were encountered less than 5 times statewide were omitted.

TABLE 2 - CONTINUED

Species	Total plantings inspected	Area I				Area II				Area III				Area IV			
		Plantings	Trees planted	survival	Species performance*	Plantings	Trees planted	survival	Species performance*	Plantings	Trees planted	survival	Species performance*	Plantings	Trees planted	survival	Species performance*
Coniferous:	(no.)	(no.)	(no.)	(%)		(no.)	(no.)	(%)		(no.)	(no.)	(%)		(no.)	(no.)	(%)	
blue spruce (*Picea pungens*)	89	17	4925	58	F E-F	20	1200	29	F E-F	22	2025	39	F E-F	30	2375	33	F E-F
Norway spruce (*Picea abies*)	70	11	6950	47	G E-F	12	1125	10	F G-F	23	1675	25	F E-F	24	1750	28	F E-F
Scotch pine (*Pinus sylvestris*)	56	17	19500	67	G E-F	17	1250	35	F E-F	11	925	34	F E-F	11	575	47	F E-F
Rocky Mountain juniper (*Juniperus scopulorum*)	44	3	125	50	G G-F	10	975	33	F G-F	17	1150	58	F G-F	14	625	30	F E-F
Douglas-fir (Rocky Mt.) (*Pseudotsuga menziesii glauca*)	35	13	17175	45	G G-F	7	425	7	F	4	300	2	F P-F	11	4575	9	F G-F
ponderosa pine (*Pinus ponderosa*)	30	5	11450	18	G E-F	4	275	19	F M-F	7	450	16	F M-F	14	750	31	F E-F
Austrian pine (*Pinus nigra*)	25	4	5150	11	M M-F	7	725	68	M G-F	5	275	57	E E-F	9	325	36	F G-F
lodgepole pine (*Pinus contorta latifolia*)	13	0				4	100	46	M G-F	5	475	11	F M-F	4	175	34	F G-F
grand fir (*Abies grandis*)	5	1	300	10	F	2	50	15	F	1	200	0	F	1	50	60	G

(NOTE: Species which were encountered less than 5 times each in the survey were omitted from this tabulation. Included in this group were western mountain-ash, sand cherry, Hopa crab, Russian mulberry, white fir, mugo pine, and Engelmann spruce.)

Motivation to plant -- The Clarke-McNary Tree Nursery is administered by the College of Forestry, Wildlife and Range Sciences on the University of Idaho campus. For many years the main promotion for the sale of the Clarke-McNary trees has been through the Extension Agricultural Agents in the county offices of the Cooperative Extension Service. It is then not surprising that County Extension Agents were the strongest source of motivation for landowners to plant trees (Fig. 17). Other important sources of motivation were newspaper items, successful plantings on neighboring farms, and

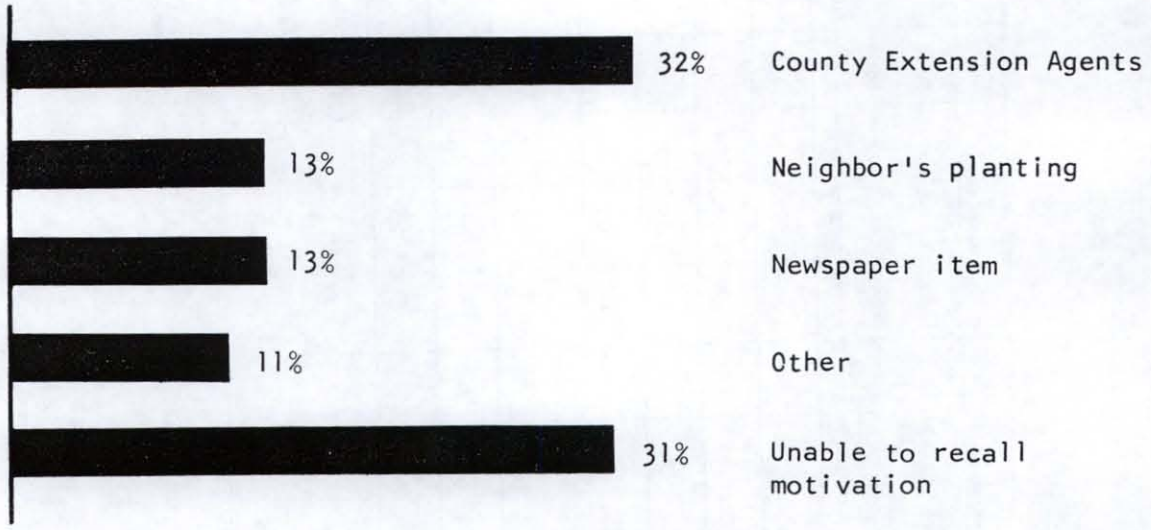

Fig. 17 - Sources of landowner's motivations to establish farm tree plantings.

professionals of the Soil Conservation Service and the Idaho Department of Lands. Almost one-third of the cooperators could not recall what motivated them to plant trees. There were significant

differences between areas (Fig. 18) in regard to the importance of County Extension Agents as motivators of farm tree planting.

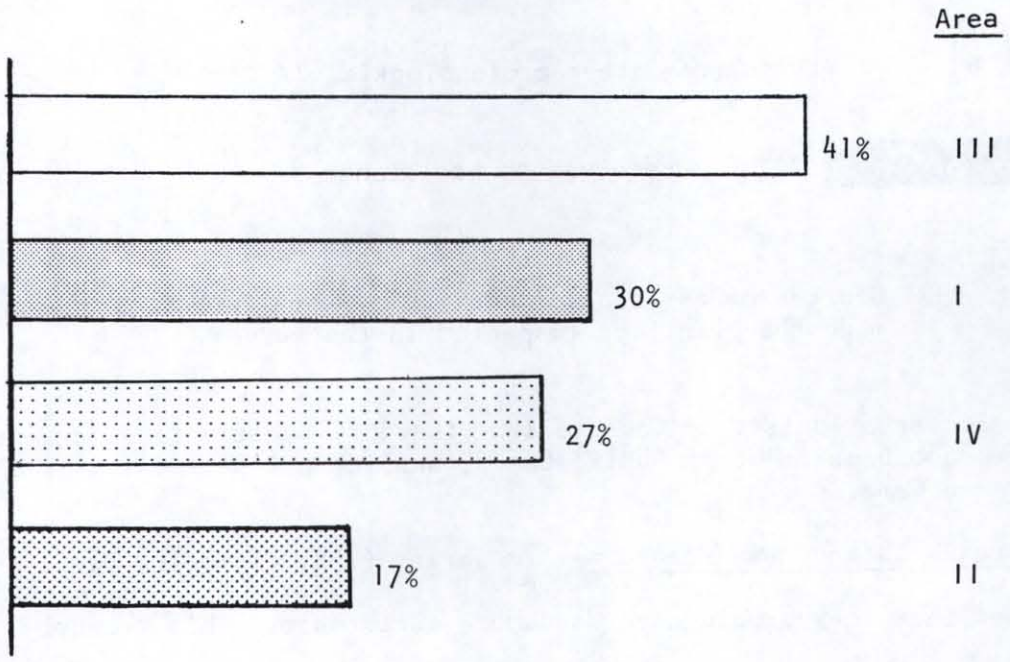

Fig. 18 - Percent of cooperators by area who were motivated by County Extension Agents to plant trees.

Where Cooperators obtained assistance -- Due to the fact that strong promotion of tree planting is made by the Cooperative Extension Service, it was predictable that County Extension Agents would be an important source of assistance to landowners making the plantings (Fig. 19). Approximately three-fifths of the cooperators received assistance from informational bulletins supplied by the Cooperative Extension Service. Others received assistance through personal visits from the Extension Agricultural Agents or technicians of other agencies, principally the Woodland Foresters of the Idaho Department of Lands.

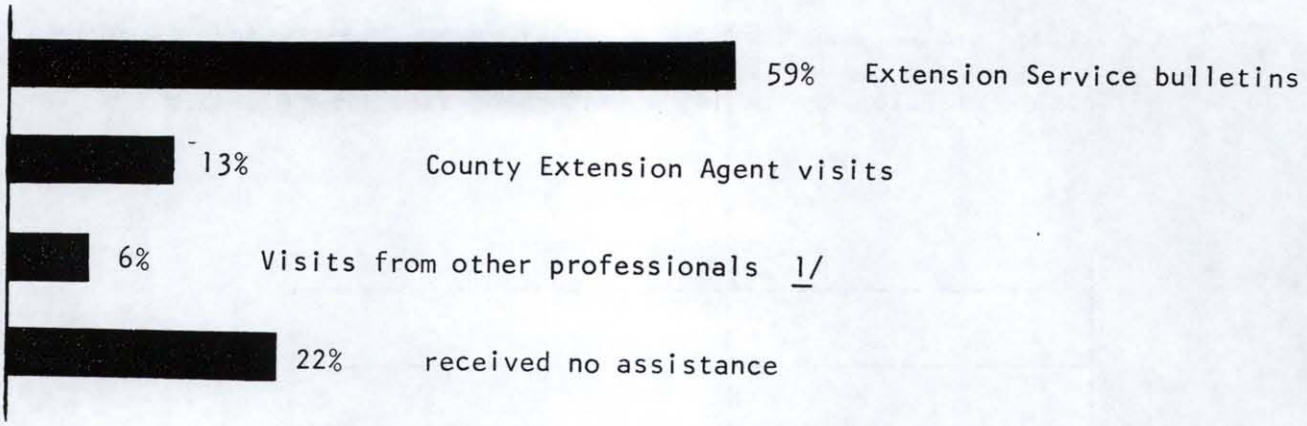

Fig. 19 - Sources of assistance received by the landowners who made the plantings inspected in the survey.

1/ Conservationists or foresters of the Soil Conservation Service, Idaho Department of Public Lands, and Idaho Department of Fish and Game.

More Assistance Was Needed -- A majority (75%) of the cooperators indicated that they should have used more assistance. This was not meant to imply that they asked for assistance they did not get. Instead, they went ahead on their own and later realized they would have done better if they had obtained more information and advice.

Three-fourths of those who needed more assistance felt that advice on care of their plantings (weed control, watering, and protection) was their greatest need (Fig. 20). Almost one-fifth needed advice on

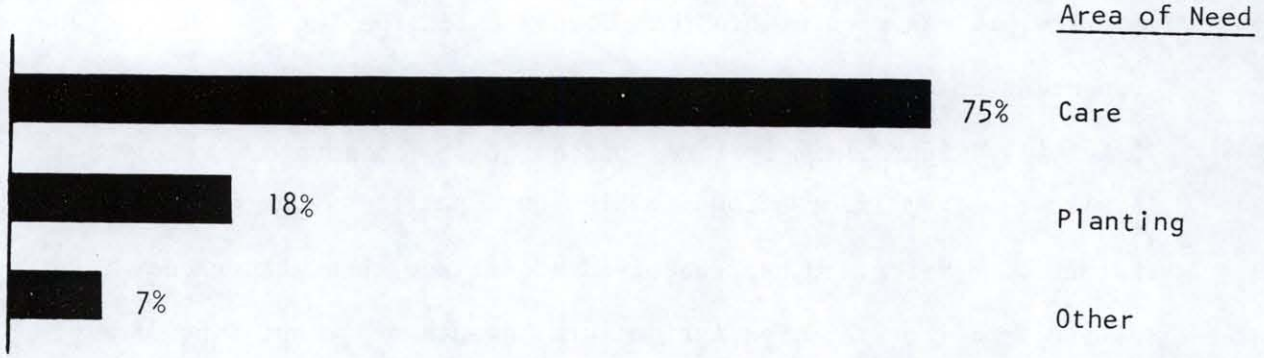

Fig. 20 - Areas of need as expressed by those cooperators who felt they should have used more assistance.

planting: arrangement of the species within the planting, spacings to use, and how to plant. Other needs were for advice on planning, selection of species, and site preparation.

Cooperators Opinions on Wildlife Values of Plantings -- Four-fifths of the cooperators responded to questions concerning the values of their tree plantings for birds and other wildlife. Twenty-nine percent of these had noticed evidence of the use of their tree plantings by game birds, principally Chinese pheasants. More than half of the cooperators who had noted bird use of their plantings felt the level of this use was moderate to high.

Enthusiasm for the wildlife values of their plantings was moderate or higher with 37% of the responding cooperators; 54% rated the wildlife values of their tree plantings to be of little or no importance. Only 1% of the owners felt that the wildlife attracted to their tree plantings was a detriment.

Owners' Satisfaction with Plantings -- Cooperators were asked if they were satisfied with the performance of their plantings from the standpoint of the trees accomplishing the purpose for which they were planted. Less than three in ten expressed a low or very low level of satisfaction (Fig. 21). Over one-third were moderately satisfied. One-third were highly satisfied and 3% indicated very high satisfaction. In reply to a question regarding the monetary value of their tree plantings, a large majority of the cooperators felt they lacked an adequate base from which they could assess a valid dollar worth to their plantings.

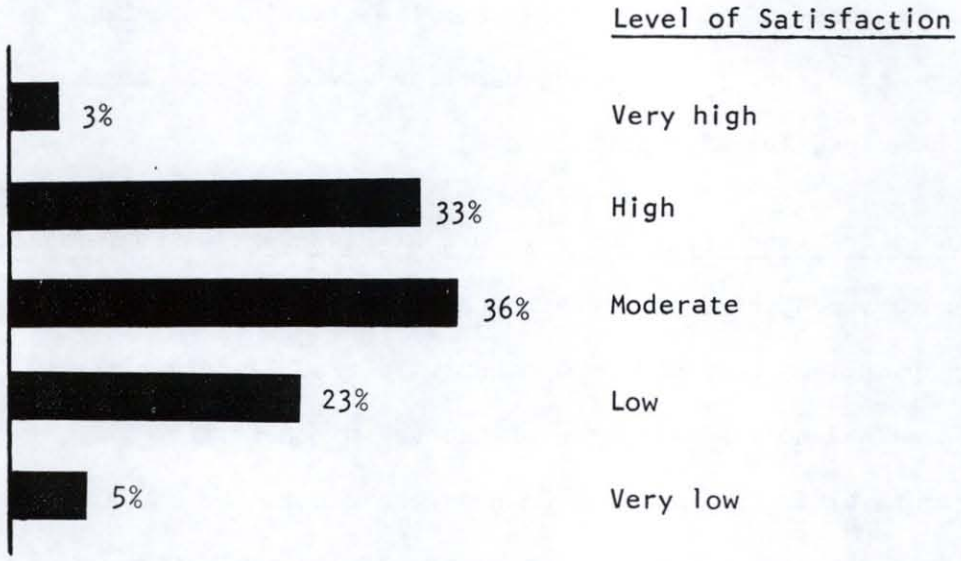

Fig. 21 - owners' satisfaction with the performance of their plantings.

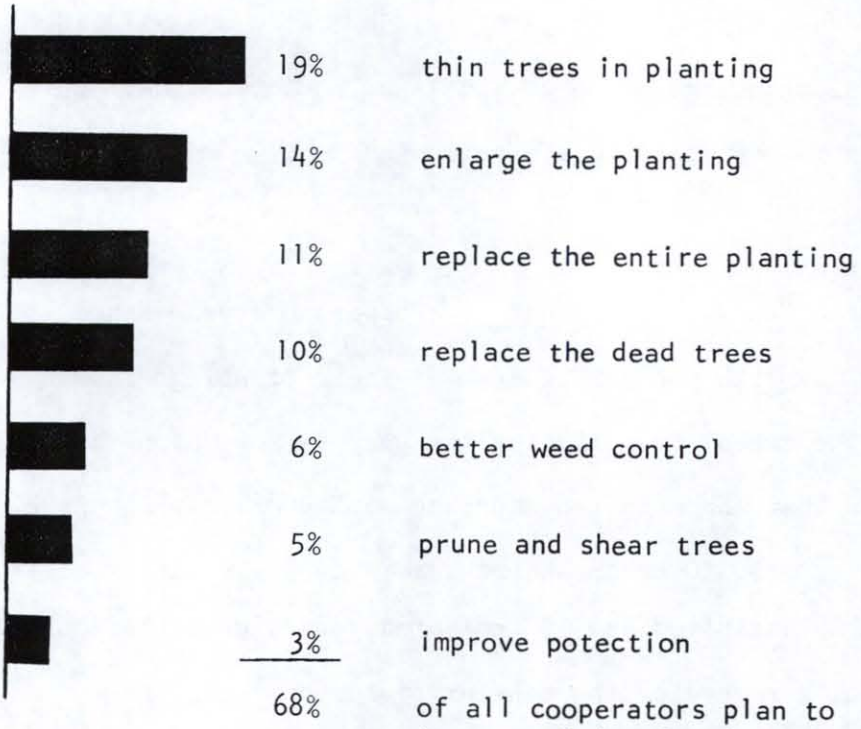

Fig. 22 - Cooperators' plans for improving their tree plantings.

Plans for Improvement of Plantings -- Over two-thirds (68%) of the cooperators were found to have plans for improving their plantings. Their plans ranged from improved care to complete replacement (Fig. 22). This fact is important to agency personnel who have responsibilities in the farm tree planting effort. It indicates an audience of more than 8,700 landowners who have plans for improving existing tree plantings. Perhaps the effort to help this group should be as strong as the effort to help landowners get tree plantings started.