

JACK PINE AS A CHRISTMAS TREE:
A CONSUMER PREFERENCE SURVEY

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REPORT O-X-291

CANADIAN FORESTRY SERVICE
DEPARTMENT OF THE ENVIRONMENT

APRIL 1979

*Copies of this report may be obtained
from*

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ABSTRACT

Over 2,000 people passing a display of Scots pine (*Pinus sylvestris* L.) and jack pine (*Pinus banksiana* Lamb.) Christmas trees at the Royal Winter Fair in Toronto were interviewed and asked to rank the trees in order of preference. A significant three to one preference was found for Scots pine over jack pine as a Christmas tree.

RÉSUMÉ

Plus de 2,000 personnes qui visitaient une exposition d'arbres de Noël, en l'occurrence des Pins sylvestres (*Pinus sylvestris* Lamb.) et des Pins gris (*Pinus banksiana* Lamb.), au Royal Winter Fair de Toronto furent interviewées et interrogées sur leur préférence entre les deux. Une réponse significative de trois à un en faveur du Pin sylvestre comme arbre de Noël fut enregistrée.

ACKNOWLEDGMENTS

The authors are indebted to Dr. Al Douglas and his staff of the Computing and Applied Statistics Directorate of Environment Canada for their valuable assistance in designing and commenting on the results of the survey, and to the Christmas Tree Growers' Association of Ontario Inc. for the provision of space at the Royal Winter Fair where the survey was conducted.

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INTRODUCTION

Christmas tree growing in Ontario began as a farming enterprise some 30 years ago. About this time the supply of balsam fir (*Abies balsamea* [L.] Mill.), white spruce (*Picea glauca* [Moench] Voss) and black spruce (*P. mariana* [Mill.] B.S.P.) trees cut from natural stands was insufficient to meet the increasing demand of the market. The first pine Christmas trees harvested were thinnings from young plantations of Scots pine (*P. sylvestris* L.), red pine (*P. resinosa* Ait.), white pine (*P. strobus* L.), and Austrian pine (*P. nigra* Arnold). Their initial acceptance was related to the scarcity of the traditional fir and spruce, and the discovery by the consumer that pine trees retained their needles indoors for a longer time.

Scots pine quickly gained prominence because it responded well to pruning and shearing, which improved the form or shape of the trees and increased foliage density. The trees could be harvested early without loss of color or needles, and this made it possible to ship them to distant markets. Millions of Scots pine trees were planted on abandoned farmland in Ontario in the 1950s (Anon. 1955). Many of the tree farms were established by absentee owners who did not foresee the costs and labor involved in bringing the plantations up to market quality. As a result, a high percentage of the trees planted during this period were not pruned or sheared and were never harvested as Christmas trees.

As the grade and quality of Scots pine Christmas trees reaching the market improved, consumers became correspondingly discriminating. The emphasis therefore throughout the 1960s was on quality rather than quantity, both to satisfy consumer demand and to meet the challenge of the artificial tree which appeared on the market at that time. The vast areas of Scots pine plantations established in Ontario between 1950 and 1970 created favorable conditions for outbreaks of insects, diseases and damage by birds and mammals. Any one of these factors or any combination of them contributed to delayed production and reduced grades. Production costs rose sharply during the same period and were not paralleled by similar increases in returns. These factors all contributed to a decline in production, which resulted in a shortage of quality trees for the market by 1970.

In view of the decline in production and the increasing demand for natural trees, it appeared to be an appropriate time to experiment with other species of pine which might be produced more quickly and economically without loss of grade or consumer appeal. Scots pine, jack pine, lodgepole pine (*Pinus contorta* Dougl. var. *latifolia* Engelm.) and white pine were selected for a production comparison trial. Five hundred trees of each species were hand-planted in furrows at 1.8 m x 1.8 m spacing on a sandy, well drained site in Kirkwood Township, Algoma District in May, 1970.

Management of the plots over seven growing seasons in the field from 1970 to 1977 followed as closely as possible the usual procedures required in Christmas tree production. The known methods of pruning and shearing were followed for Scots pine. Cultural treatments for the other species were necessarily experimental in nature, designed to determine the optimum time and method of shearing for achieving optimum form and density. All trees in the plots were assessed in September, 1977 to determine the percentage that were over 1.8 m in height and of good marketable grade. Thirty-five percent of the jack pine trees met the required standards at this time, an indication of the potential of the species as a Christmas tree. At the same time none of the Scots pine met the standards, although 40% were of marketable grade. None of the white pine or lodgepole pine had reached the grade or height to qualify at the assessment date. Since good quality trees were available from the experimental plots, it was an opportune time to sample consumer response to jack pine Christmas trees in comparison with the already popular Scots pine.

CONSUMER PREFERENCE SURVEY

Jack pine is similar in many respects to Scots pine. It has a shorter rotation period, however, as was evidenced in the experimental results, and as a native species it is not plagued by insects and diseases to the same degree as Scots pine. It shows every promise of being an alternative to Scots pine as an acceptable Christmas tree.

A questionnaire was designed to establish whether or not the Christmas tree consumer could detect any difference between jack pine and Scots pine Christmas trees. If he could not, then jack pine, the native tree species, could be recommended as an alternative to Scots pine for Ontario Christmas tree growers in particular and for outside growers in general.

To test the hypothesis that the consumer was unable to detect any difference between the two species, we conducted a Christmas tree consumer preference survey at the 1977 Royal Winter Fair in Toronto, Ontario. It was decided that eight trees (four Scots pine and four jack pine), arranged in a semicircle, would be needed to obtain the information required on consumer preferences. Four marketable jack pine, each 2.1 m high, were chosen from our study plots for the survey. Since the Scots pine grown in the plots had not yet reached this size, four marketable Scots pine Christmas trees, each 2.1 m high, were chosen from an adjacent older plantation. They were arranged in a semicircle at the Ontario Christmas Tree Growers' booth and their order was randomized to eliminate bias (Fig. 1). While on display, the trees were identified only as natural Christmas trees, and each was given a number. All were the same height. Three Scots pine and one jack pine were comparatively denser than the other four trees, and

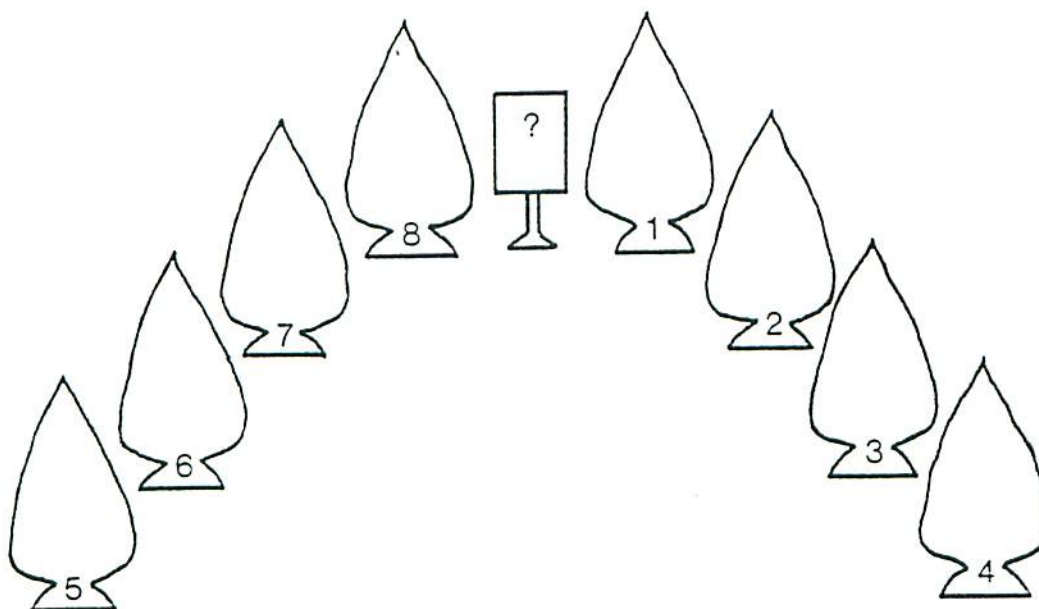


Fig. 1. Diagram of Christmas tree display at 1977 Royal Winter Fair. Trees identified only by number and viewed from inside the semicircle.

taper varied between 55% and 78% (see Appendices V and VI). According to USDA grading standards (Anon. 1973), all trees were in the highest density class (medium) and had normal tapers (40-90%). People passing the display were asked if they would like to participate in the survey. The participants were requested to rank the trees in order of their first three preferences as they viewed them from inside the semicircle.

Ideally, in any sample survey where reliable information is needed, the probability of being included in the sample should be known for all population members. With an item such as a Christmas tree on which opinions are solicited, the logistics of any plan including this feature would be extremely complicated and costly. Therefore, because our population was not under control, we asked questions that would allow us to determine whether we had obtained an unusual sample as far as the general population of Christmas tree buyers is concerned. Variables such as age, occupation, and place of residence were obvious choices for a questionnaire and the respondents were asked to provide this information.

The consumer preference survey was conducted for a period of 10 days from 11 to 20 November, 1977 during the Royal Winter Fair. A

team of trained interviewers collected information from 2,269 people who were passing the display and were willing to be interviewed.

RESULTS

Appendix I contains the basic information collected from the survey. Of the 2,279 people interviewed, 1,662 fell within our eligible category of those preferring and using a natural Christmas tree. People of all ages from 15 to 65+ were sampled and the major occupational categories were represented in the survey. Both rural and urban dwellers were sampled and the majority of respondents were from Ontario. Over half of those in the eligible category indicated that they would purchase their natural tree from a commercial Christmas tree lot.

Appendix II is a breakdown of respondent characteristics by age, sex, occupation, and location (both from a demographic and from a geographic point of view). Included in the table is the corresponding breakdown of population characteristics according to the 1971 Census of Canada (the last census available) (Anon. 1971). Comparison with the census shows how our sample relates to the total population.

In the sample of eligible respondents, the sex ratio of 50.1 to 49.9, male to female, was the same as the census ratio. Of the age group represented, the percentages for the middle age groups (25-34, 35-44, 45-54--the major consumers) were greater than for the census figures. The percentages for the youngest and oldest age groups 15-24 (many students) and 55-64 and 65+ (many retired) were lower than the census percentages.

Of the occupations represented, the professions and farming ranked high while all others were low. The labor force was well represented in the sample while the percentages of those who were unemployed or not in the labor force were lower than the 1971 census percentages.

On a demographic basis, the percentage of rural dwellers was almost double that of the census, and there was a corresponding decrease in urban respondents sampled. As noted elsewhere in the report, this was due to the fact that the Royal Winter Fair is agriculturally oriented, and of direct interest to this particular segment of the population.

On a geographic basis, respondents from all parts of Canada except Prince Edward Island, the Yukon and the Northwest Territories were interviewed during the survey. Visitors from the United States, England, Scotland, Italy and Australia were also interviewed. Ontario provided by far the greatest proportion of eligible respondents, 96.8%. The population sampled represented 0.02% of the population of Ontario as shown in the 1971 census.

The eligible respondents were asked to make a first, second and third choice from the eight trees on display. Table 1 was constructed on the basis of their replies; in it the trees are ranked by species, tree number and choice.

Table 1. Overall species breakdown by choice.

Species	Tree No.	Choice			Total %
		First %	Second %	Third %	
Scots pine	7	32	25	15	24
	1	21	16	20	19
	5	19	20	16	19
	4	8	12	18	13
Subtotal Scots pine		81	73	70	75
Jack pine	8	8	10	12	10
	3	6	7	8	7
	6	4	6	5	5
	2	2	4	5	4
Subtotal jack pine		19	27	30	25
TOTAL		100 ^a	100 ^a	100 ^a	100

^a Based on 1,662 observations.

Over all, 32% of the respondents named tree No. 7 (Scots pine) as their first choice, and it accounted for 24% of the votes cast in making the three choices. Scots pine held the first four positions in the ranking while jack pine (trees 8, 3, 6, and 2) ranked fifth to eighth. In general, the preference for Scots pine over jack pine was found to be 75% to 25%, or 3 to 1, on the basis of first, second and third choice (Fig. 2).

Chi-square tests were performed on the data throughout the survey to test the significance (at .01) of the relationships between and among the individual trees and the species (Freese 1967). They revealed that there was a significant difference in preference for Scots pine over jack pine in the order of first, second and third ranking. There was also a significant difference in preference for Scots pine over jack pine in first choice and in overall ranking for the first three choices. By individual tree, there was a significant difference in preference for trees 7, 4, and 2 (two Scots pine, one

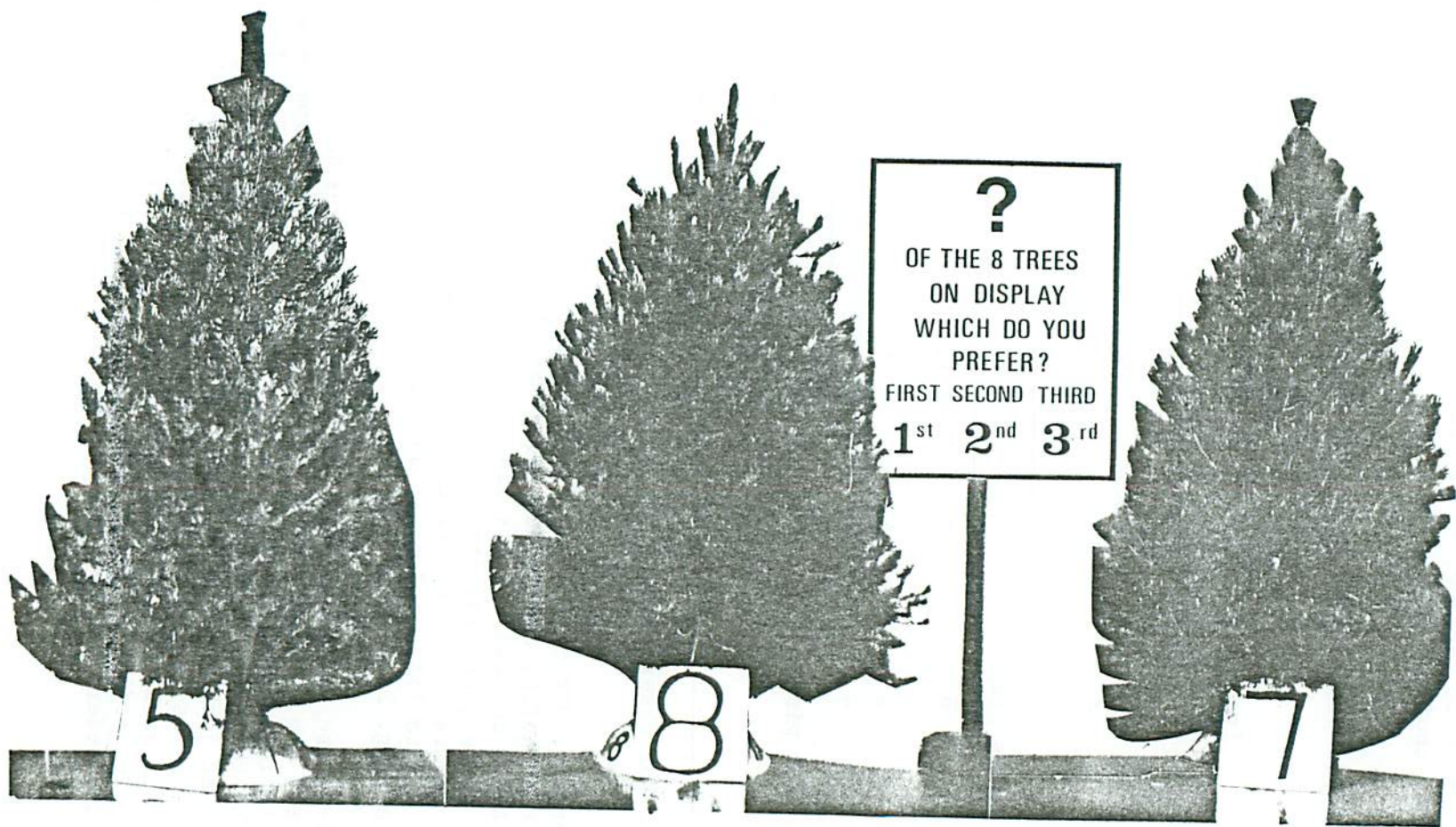


Fig. 2. Tree No. 8 is jack pine; the other two are Scots pine. Which do you prefer?

jack pine) for first choice and for overall ranking for three choices. At the .01 level of significance there was a decline in preference for Scots pine in the second and third rankings. The preference for tree No. 7 (Scots pine) declined most rapidly in ranking from first to third.

Because the respondents were asked for information other than that needed to determine if they would be using a natural Christmas tree, we were able to note certain differences in preference for the two species and in the order of ranking. Variables such as the sex, age and occupation of the respondent have figured in the differences in preferences for specific trees.

Appendix III summarizes the significant differences in tree preference by the different characteristics of the respondent. The male respondents showed a significant preference over females for tree No. 7 (Scots pine) as first choice. Female respondents, on the other hand, showed a significant preference over males for tree No. 1 (Scots pine) as first choice. Tree No. 5 (Scots pine) was preferred by males over females as a second choice.

No significant differences in preference for tree species or in ranking were found between rural and urban respondents.

Respondents in the four older age groups had a significant preference over those in the two younger age groups for tree No. 4 (Scots pine) as a first choice.

As Ontario made up 97% of the eligible respondent sample, no chi-square tests were performed to detect geographic differences in preference.

A significant difference in preference was found for tree No. 8 (jack pine) as a second choice among respondents in the various occupations. Generally, those in the major (in terms of numbers) occupations (the social sciences, clerical, sales, and service occupations) selected tree No. 8 (jack pine) as their second choice more often than did those in the other occupations.

DISCUSSION

The survey sampled 1,662 people who preferred, and would be using, a natural Christmas tree in 1977. These were the people who were going to be directly affected by changes in the natural Christmas tree market and therefore it was their opinions which were sought in order to determine the type of tree that growers should be providing. About 55% of these people stated that they would be buying their Christmas trees from a commercial lot.

We had established that we were sampling consumers of natural Christmas trees, but to ensure that the broad range of the population into which these consumers might fall was adequately sampled, the 1971 Census of Canada figures were used for comparison. These figures represented the last complete enumeration available and although changes had occurred in the intervening years between June 1971, and November 1977 (Anon. 1977), the census figures did give some perspective, as they confirmed that the sample characteristics of age, sex, occupation, and demography were generally representative of the total population.

The assumption that families were the major Christmas tree users would require an even sampling of males and females. The nearly one to one male to female ratio was therefore appropriate for the sample and compares favorably with the census so that, on a simple sex ratio basis, the sample was a fair representation of the total population. The abundance of middle age groups (25-54) sampled supported our belief that the survey had reached that part of the public considered to be in both the peak buying years and the family years.

As might be expected at the Royal Winter Fair, a large proportion of the sample was composed of farmers, and indeed the percentage of rural respondents was much greater than that shown in the 1971 census. Although it is unlikely in most instances that farmers will purchase Christmas trees, they could conceivably become growers as they have the necessary land and resources.

The professions were well represented in the sample. At first it was assumed that these people would be major purchasers of Christmas trees. There were significant differences in buying habit among occupations (i.e., with respect to whether or not those represented would purchase trees from commercial lots) (Appendix IV). Generally, professional people showed little inclination to purchase trees from commercial lots, whereas those in certain groups, specifically the clerical, service, machining, transport, unemployed and retired, were significantly more inclined (66% as a group) to buy their trees from commercial lots than were the "general eligible consumers" (55%).

The percentage of unemployed respondents was low. There could be several reasons for this. It might be that the unemployed would not use scarce funds to attend the Royal Winter Fair, or perhaps there were more unemployed than was revealed in the survey, some simply stating their former occupation.

Because the majority of eligible respondents were from Ontario (97%), and most from metropolitan Toronto and its environs, it is only speculation that their preferences are similar to those of people in other parts of Canada.

It is quite obvious that there is a 3 to 1 preference for Scots pine over jack pine. This comparison holds true on the basis of sex, age, occupation and demographic location. Of a total of 24 rankings of individual trees (eight trees, three choices), only five significant differences could be detected in ranking. Males named tree No. 7 (Scots pine) as their first choice and tree No. 5 (Scots pine) as their second choice significantly more often than females, while females named tree No. 1 (Scots pine) significantly more often than males as a first choice. Those in the 35-65+ age groups named tree No. 4 (Scots pine) as their first choice significantly more often than did those in the 15-34 age groups. These differences in choice have all been within a single species so that the basic 3 to 1 ratio, Scots pine to jack pine, has remained undisturbed.

On the basis of occupation, the fifth difference in ranking is noted. Tree No. 8 (jack pine) as a second choice was ranked significantly higher by those in the social sciences, clerical, sales, and service occupations than by those in other occupations. The fact that there were few differences in individual ranking suggests that the 3 to 1 ratio is reasonable for the trees displayed. The selection of specific occupational groups for a larger individual sample should not alter the results to any degree.

Although this ratio will hold true for the trees displayed there may be other subtle factors at work. Density, in particular, and taper seem to be the most likely factors. There were difficulties in choosing the species in two distinct density classes. According to USDA standards for grading Christmas trees (Anon. 1973), all fell into the upper classification for density (i.e., medium) and all were in the normal taper class (40-90%). However, three Scots pine and one jack pine were comparatively denser than the other Scots pine and three jack pine. Two of the four jack pine had 55% tapers, the third 65% and the fourth 78%. One Scots pine had a 55% taper and the other three had 70, 72 and 75% tapers, respectively. The generally lighter density and narrower taper of jack pine was the result of earlier shearing studies conducted on jack pine in the experimental plots. The Scots pine had to be chosen from an adjacent field which was pruned to meet local commercial requirements and therefore had heavier densities and wider tapers.

A significant difference in preference was found for denser over less dense trees at a 3 to 1 ratio (see Appendix V). No significant differences between taper and species choice were found. However, using our own judgment, we were able to isolate the trees in such a way that suggests that taper, not just species, is a likely explanation for the 3 to 1 ratio (see Appendix VI). We feel that the Christmas tree consumer was unable to detect a species difference but made his choices on the basis of density, primarily, and on form and subtle color differences.

Over all, Scots pine color could be described as blue-green, whereas jack pine could be described as green.

Tree No. 7, the most preferred tree, differed from the other trees in that it had a 'skirt' of lower branches which tended to hide the tree stand more than did any of the others. This factor may have deep psychological significance since it was found that males had a decided preference over females for this tree as a first choice.

The ultimate test was applied to jack pine as a Christmas tree in December 1977. Comparably priced Christmas trees, both jack pine and Scots pine, were sold in a busy tree lot in Sault Ste. Marie, Ontario. There was an abundance of Christmas trees in the city to choose from. All jack pine Christmas trees were sold. These trees came from the same plots as the survey specimens for the Royal Winter Fair.

CONCLUSIONS

On the basis of the results of our survey, natural Christmas tree consumers prefer Scots pine to jack pine Christmas trees in a ratio of 3 to 1. A grower could diversify his plantation setup by using jack pine in a ratio of one jack pine to three Scots pine without jeopardizing the potential marketability of his trees.

Jack pine has a shorter growing period to a marketable 2.1 m tree: 9 years from seed versus 11 years for Scots pine from an adjacent plantation. This permits the realization of an earlier return on investment if jack pine is grown as a supplement to Scots pine. Added benefit would be derived at the time of plantation abandonment when jack pine has the potential to become a marketable pulp or lumber product if left to grow, whereas Scots pine generally does not.

This survey was a small attempt to determine the acceptability of jack pine as a Christmas tree to the consumer. As it was conducted at the Royal Winter Fair, the results may not be universally applicable. However, there is every indication that they would be similar in other areas where Scots pine enjoys a large share of the natural Christmas tree market as it does in Ontario.

In Sault Ste. Marie, all jack pine Christmas trees were sold at the same prices as Scots pine in a market where ample Scots pine were available.

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APPENDICES

APPENDIX I

Basic information collected from the survey.

Variable	Total sample	73% eligible sample
Sex		
Male	1154	833
Female	1125	829
Age Group		
15-24	418	311
25-34	517	440
35-44	434	315
45-54	434	326
55-64	251	171
65+	171	99
Occupation (27 categories) ^a	2279	1662
Demographic characteristics		
Rural	657	517
Urban	1622	1145
Geographic characteristics (total 96.5% Ontario)	2279	1662
Household using a Christmas tree this year		
Yes	2037	1662
No		
Don't know	242	
Only those using Christmas tree this year		
Type of Christmas tree		
Artificial	375	
Natural	1557	1557
Both	105	105
TOTAL		
2037		
Who decides which tree		
Respondent	1541	1260
Other	496	402
Respondent's preference		
Artificial	91	
Natural	1946	1662
Only those preferring natural tree		
Where natural tree obtained		
Commercial lot	916	916
Cut your own	667	667
TOTAL		
1662		
Respondent's choices		
Both	79	79
First	1662	1662
Second	1662	1662
Third	1662	1662

^a 1971 Census of Canada - Occupations - 23 major categories + student + housewife + unemployed + retired.

APPENDIX II

Characteristics of population sampled.

Variable	Total sample (No.)	Eligible sample		1971 Census ²	
		(No.)	(%)	('000)	(%)
Sex					
Male	1154	833	50.1	10795	50.1
Female	1125	329	49.9	10773	49.9
Age Group					
15-24	418	311	13.7	4004	26.4 ^b
25-34	517	440	26.5	2890	19.0
35-44	434	315	19.0	2526	16.6
45-54	434	326	19.6	2292	15.1
55-64	251	171	10.3	1732	11.4
65+	171	99	6.0	1744	11.5
Occupation					
Managerial, Admin. & Related	171	136	8.1	372	2.4 ^b
Nat. Sciences, Engineering & Math.	117	89	5.4	234	1.5
Social Sciences & Related	48	40	2.4	79	0.5
Religion	9	7	0.4	24	0.2
Teaching & Related	144	117	7.0	349	2.3
Medicine & Health	90	68	4.1	327	2.2
Artistic, Literary & Recreational	56	36	2.2	90	0.5
Clerical & Related	232	159	9.6	1374	9.0
Sales	129	93	5.6	816	5.4
Service	128	79	4.8	970	6.4
Farming, Horticulture & Animal Husbandry	169	138	8.3	512	3.4
Fishing & Trapping	1	0	0	27	0.2
Forestry & Logging	6	6	0.4	67	0.4
Mining & Quarrying	4	3	0.2	59	0.4
Processing	11	9	0.5	335	2.2
Machining & Related	21	13	0.8	241	1.6
Fabricating, Assembling & Repairing	47	32	1.9	634	4.2
Construction Trades	57	41	2.5	569	3.7
Transport Equipment Operating	43	25	1.5	338	2.2
Materials Handling & Related	1	1	0.1	206	1.4
Other Crafts & Equipment Operating	13	13	0.8	109	0.7
Occupations not elsewhere classified	11	6	0.4	168	1.1
Occupations not stated	0	0	0	737	4.8
Total Employed	1513	1111	66.8	8627	56.7
Unemployed	16	12	0.7	570	3.7^c
Total Labor Force	1529	1123	67.6	9197	60.5
Housewife	350	260	15.6		
Student	244	137	11.3	6009	39.5
Retired	156	92	5.5		
Total not in labor force	750	539	32.4	6009	39.5
Demographic					
Rural	657	317	31.1	9329	17.6
Urban	1622	1145	68.9	13663	32.4
Geographic					
Ontario	2199	1609		7703	
Quebec	24	12			
Prairie Provinces	10	6			
Maritimes	7	6			
Newfoundland	1	1			
British Columbia	1	1			
U.S.A.	23	20			
Other	9	7			

² 1971 Census - Canada - total population 21,568,315.

^b Percentages based on 15 years +, 29.5% of population below 15 years old.

^c 1971 Unemployment 6.2% of total labor force.

APPENDIX III

Differences^a in choice related to population characteristics

	Species	Tree No.	Choice			
			No. choosing	No. not choosing	No. choosing	No. not choosing
<u>Sex differences</u>						
Male	Scots pine	7	299	534		
Female			235	594		
Male		1	154	679		
Female			200	629		
Male		5			192	641
Female					143	686
<u>Demographic differences</u>						
No significant differences between rural and urban dwellers for any trees in any choices.						
<u>Age differences</u>						
15-24	Scots pine	4	23	288		
25-34			23	417		
35-44			28	287		
45-54			27	299		
55-64			22	149		
65+			14	85		
<u>Geographic differences</u>						
As Ontario made up 96.8% of eligible sample, no Chi-square tests performed.						
<u>Occupational differences</u>						
Soc. Sciences	Jack pine	8			54	317
Clerical						
Sales						
Service						
All others					<u>113</u>	<u>1178</u>
Total					167	1495

^a All possible tests were made. Only those significant at .01 level have been listed.

APPENDIX IV

Eligible respondents intending to purchase their natural Christmas tree from a commercial lot or elsewhere

Occupation	Obtain tree elsewhere (No.)	Buy from lot	
		No.	(%)
Clerical Service Machining Construction Transport Unemployed Retired	128	251	66.3 ^a
All others	618	665	46.4
Total	746	916	55.1

^a A significantly (.01) greater proportion buy from a commercial lot.

APPENDIX V

Effect of density^a on choice of natural Christmas tree

Species	Tree No.	Density	Choice			Total
			First	Second	Third	
Scots pine	7	Heavy	534	410	254	1198
Scots pine	1	Heavy	354	268	338	960
Scots pine	5	Heavy	320	335	267	922
Jack pine	8	Heavy	129	167	193	489
Subtotal heavy density			1337	1180	1052	3569
Scots pine	4	Medium	137	206	306	649
Jack pine	3	Medium	91	118	133	342
Jack pine	6	Medium	66	95	84	245
Jack pine	2	Medium	31	63	87	181
Subtotal medium density			325	482	610	1417
Total			1662	1662	1662	4986

^a Although all trees would fall into the highest density class according to the USDA standards for grades of Christmas trees (Anon. 1973), three Scots pine and one jack pine were comparatively denser than the others.

There is a significant preference (.01) in the ratio of 70 to 30 for heavy over medium density trees.

APPENDIX VI

Effect of taper on choice of natural Christmas tree^a

Species	Tree No.	Taper	Choice			Total
			First	Second	Third	
Scots pine	1	70%	354	268	338	960
Scots pine	4	72%	137	206	306	649
Jack pine	3	78%	91	118	133	342
Subtotal wide taper			582	592	777	1951
Scots pine	5	55%	320	335	267	922
Jack pine	6	55%	66	95	84	245
Jack pine	2	55%	31	63	87	181
Subtotal narrow taper			417	493	438	1348
Total			999	1085	1215	3299

^a Tree No. 7, Scots pine, with 75% taper, was removed because it had a 'skirt' of branches covering its tree stand which may have influenced choice. Tree No. 8, jack pine, with 65% taper, was removed because its taper was halfway between the wide and the narrow tapers shown.

There is a significant preference (.01) in the ratio of 60 to 40 for wide over narrow tapers.