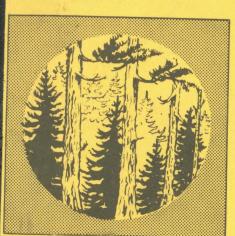
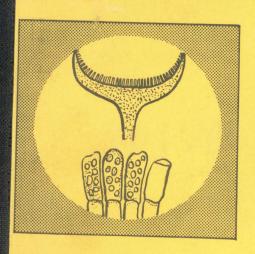


FOREST INSECT AND DISEASE SURVEY



DATA RECORDING AND RETRIEVAL MANUAL



(1968 REVISION)

C. E. BROWN and A. G. Davidson

FORESTRY BRANCH
DEPARTMENT OF FISHERIES AND FORESTRY
OTTAWA, 1968

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FOREST INSECT AND DISEASE SURVEY DATA RECORDING AND RETRIEVAL MANUAL

INTRODUCTION

The Forest Insect and Disease Survey Sampling Form is designed as a field record sheet and a source document for machine punching. Wherever possible we have developed or adopted standard codes and classifications compatible with other disciplines and data processing activities of the Department.

The front of the form (see sample next page) is designed so that all figures appearing in heavily outlined boxes or as circled bold numbers are punched, while figures in lighter font or in lightly outlined boxes are ignored by the punch operators. Most of the numbers to be punched on the front of the slip are entered or circled at the time the slip is filled in. Slips sent in by cooperators may require some coding by laboratory personnel.

In order to save space and to eliminate the need to use alphabetical characters we have excluded the "no information" or N.A. category from many fields. Where a collector has considered an item and has decided that none of the categories are applicable he should cross out the field title. This cannot be recorded in the tape system but may be useful to regional survey officers for management or reference purposes.

Entries on the back of the sampling form are made by laboratory personnel upon receipt, or following identification and processing of the collection. Figures pertaining to a species are entered, in the appropriate columns, along a single line. Figures entered on the back of the form for local recording purposes (notations about the collection such as "same as 66-3-0475-01", or photo 786) should be placed to the right of column 78 so they will not be punched. Where only a few species are present in a collection enter information on every second line.

	FOREST INSECT & DISEASE SURVEY SAMPLING FORM TILINSECT 2. DISEASE
	COLLECTION POINT (be specific) NEAREST POST OFFICE
LOCATION	LOCALITY (use Forest Dist. or Div. or Drainage Div. or Political Sub-Div. or FIDS Dist.)
	UTM GRID SAMPLE SAMPLE 12 ELEVATION 14 DESIGNATION
STAND EXAMINED	DESCRIPTION 1. Nursery 2. Ornamentals 3. Plantation (Nat. Sp.) 4. Plantation (Exot. Sp.) 5. Shelterbelt 6. Hedgerow 7. Woodlot 8. Natural forest 9. Treed swamp 9. Treed swamp 9. Scattered individuals 17 HISTORY 1. Undisturbed 12. Clear cut 22. Northeast 33. East 44. Southeast 45. South 65. South 66. Southwest 77. West 88. Climate damaged 99. Flat 19 MATURITY 1. Seedling (nursery) 20. Scattered individuals 21. Transplant (nursery) 22. Transplant (nursery) 23. Seedling (forest) 44. Sapling 55. Young growth 66. Southwest 77. West 88. Northwest 79. Flat 10 OAGE STRUCTURE 10 OAGE STRUCTURE 11. North 12. Seedling (nursery) 13. Seedling (nursery) 14. Seedling (nursery) 15. Seedling (nursery) 16. Southeast 16. Southeast 17. West 18. ASPECT 18. North 19 MATURITY 19. Seedling (nursery) 18. ASPECT 19. MATURITY 19. Seedling (nursery) 18. ASPECT 19. MATURITY 19. Seedling (nursery) 19. West-samplant (nursery) 19. Seedling (nursery) 19. Seedling (nursery) 19. MATURITY 19. Seedling (nursery) 19. West-samplant (nursery) 19. MATURITY 19. Seedling (nursery) 19. West-samplant (nursery) 19. West-samplant (nursery) 19. Seedling (nursery) 19. MATURITY 19. Seedling (nursery) 19. West-samplant (nursery) 19. MATURITY 19. Seedling (nursery) 19. MATURITY 19. Seedling (nursery) 1
ND EXA	71 BASAL AREA (Circle code of nearest no. of sq. ft.) 1. (33) 2. (66) 3. (99) 4. (132)
STAI	5.(165) 6.(198) 7.(221) 8.(254) 9.(287) 0.(320)(353) +.(386)
	FOREST SECT. COVER OR SUB-TYPE ON HEIGHT OF DOMINANT TREES (Circle code of nearest ht. in ft.) 100 5) 2 (1.5) 3 (3)
	4 (7) 5 (15) 6 (30) 7 (45) 8 (70) 9 (100) 0 (140) - (180) + (210)
APLED	TREE SPECIES NO. OF TREES SAMPLED 36 STATUS 37 TREE CLASS
TREES SAMPLED	1. Living 7. Old dead stndg. 4. Rec. dead stndg. 8. Old dead fallen 5. Rec. dead cut 9. Manufactured 7. Fringe 3. Intermediate 6. Understory tree 9. Old vet.
ON INSECT(S) OR DISEASE(S)	38 SAMPLING TECHNIQUE Qualitative Quantitative 1. Beating 2. 1. Negative 1. Negative 2. Trace 2. Fruit 3. Hand picked 4. 2. Trace 5. Traps 6. 3. Low 3. Buds 9. Butt
5) 08	7. Ground observation 8. 4. Moderate 4. Old foliage O. Root 9. Acrial observation O. 5. High 5. New foliage - Duff or soil
ISECT(Photography +. 6. N.A. 6. New shoot +. N.A.
	SAMPLE NUMBER OF UNITS DAMAGE & HAZARD INDEX
DATA	COUNT AV. 43 COUNT COUNT 46
	TIDS NO. (See codes on cover) LAND OWNERSHIP 49 DAY 50 MO. 52 COLLECTOR
Geweral	ADDRESS
9	REMARKS & SYMPTOMS
	0

Two sets of headings have been provided. Alignment one way places the headings for disease collections uppermost, while alignment the other way places the insect headings in position for entry of insect information.

The definitions used in this manual have come from a variety of sources. Forestry terms are in the process of being revised and standardized, and their definitions may change. Wherever possible we have used the definitions contained in "Forestry Terminology", Society of American Foresters, 1964, or "British Commonwealth Forest Terminology", Empire Forestry Association, 1957. Where the definition of a term was not contained in published references it has been necessary to construct one.

EDITING OF FORMS FOR CENTRALIZED DATA PROCESSING

A final scrutiny of sampling forms by a responsible and knowledge-able individual has always been necessary before the forms were sent to the punch operator. This scrutiny is particularly important when the punching is done outside the region, as it is very time-consuming if punch operators must stop punching to decipher figures or categories. Some of the items to be watched for are: right justification, legibility of numbers, wrong codes, omissions, and neatness. Zeros should be used to fill all unrecorded spaces except in columns 14, 15, 16, 17, 21, 30, 38, and 40 (where zero has a definite meaning) or where the blank spaces are useful to indicate records which will be completed at a later date.

CODING AND MACHINE RECOGNITION OF INSECT COLLECTIONS AND REPORTS

Six types of insect collections or reports are in use in the Forest Insect Survey. In order that these can be identified in an EDP system, coding must follow a prescribed pattern. Identification of each of these collections or reports is accomplished by a comparison of the information contained in columns 63-78 and any deviation from the patterns outlined below will result in rejection or misinterpretation of the record by the computer programme. A brief description and examples of the six kinds of records acceptable in our system are given below.

- 1. <u>Species Collection</u>: This is the normal insect collection in which a number of insects are received at the laboratory, identified and processed in the usual way. Identification of these records is accomplished by the recognition of at least one digit other than zero in columns 63-69, 70-73, 74-76, 77 and 78. See example "A".
- 2. <u>Negative Report</u>: A collection indicated as negative by a field technician who has applied a quantitative sampling technique and found no insects, or some one in the laboratory has examined a collection and been unable to find any insects. Identification is accomplished by the presence of zero in columns 63-69. Column 77 can contain "2", "3", or "4" but only a "1" is valid in column 78. See example "B".
- 3. <u>Negative Species Report</u>: A sampling form used to record a search (by some prescribed method) for a particular species of insect, the results of which were negative. Identification is accomplished by the presence of digits other than zero in columns 63-69, zeros in columns 70-76, a "2" in column 77, and "1" in 78. See example "C".
- 4. <u>Species Damage Report</u>: This is a record of a sample containing damage which can be definitely attributed to a species of insect, although there were no live insects present at the time of examination. Identification is accomplished by the presence of digits other than zero in columns 63-69, zeros in 70-76, a "3" in column 77, and a "2" in column 78. No other digits in columns 77 or 78 are valid. See example "D".
- 5. <u>Species Report</u>: This report is used to record the occurrence of an insect in the field when no specimens accompany the sampling form. The coding is treated as though the field technician collects the insects, identifies them, and discards them. In practice he completes the front of the form and writes the identity of the insect under "Remarks and Symptoms". Identification is accomplished by the presence of digits other than zero in columns 63-69, zeros in 70-76, a "2" in column 77, and a "2" or "3" in column 78. See example "E".

<u>NOTE</u>: If the stage and number of insects are inserted the record will be identified as a "Species Collection". This is perfectly acceptable in the system provided the Survey Head has delegated the authority to identify the insect to the field technician making the collection.

	25	56 57	INSECT CO	COLLECTIONS	(Office use only)	
	SPE NO NO		63 SPECIES CODE E L	72 74 78 78 78 78 78 78 78 78 78 78 78 78 78		
A.	0	MALACOSOMA				
		DISSTRIA	627020204000117	100011735		
B	0:0	NEGATIVE	0000000000	0000021		
ပံ	0					
	<u> </u>	DISSTRIA	627020200	000000		
						_ -
D.	0.0	MALACOSOMA				
		DISSTRIA	627020200	0000032		
ъ,	0	MALACOSOMA				
		DISSTRIA	627020200	0000033		
Ţ z .	0	SAPERDA				
I		CALCARATA	111520100	0000535		
			STAGE SYM SYM BI Id D	63 SPECIES CODE	DISEASE	SPEC.
		(Office use only)	COLLECTIONS	DISEASE	56 57	8

Care should be taken that coding on the front of the sampling form does not contradict that on the back. Coding for the following areas is:

Pop. Level or Incd. Coll'n Source Remarks and Symptoms	No insects found.	M. disstria, 3 tree count. No current year egg bands.	M. disstria.	Report. M. disstria larvae present. None collected.
Coll'n Source	+	+	5	+
Pop. Level or Incd.	1 or 6	-	9	2 - 6
Sampling Technique	Any of 2, 4, 6, 8, 0, or +		Any of 1 to + but probably 7	E
Type	Negative Report	Negative Species Report	Species Damage Report	Species Report

6. <u>Substrate Collection</u>: - This is the record of a collection of material containing insects e.g., a log containing borers, cones or seeds containing insects, etc., where it is impossible to determine the stage or number of insects present and when the identity of the insect may or may not be known. This type of collection is identified by the presence of at least one digit other than a zero in columns 63-69, zeros in 70-73, and at least one digit other than zero in 74-76. The digit or digits in columns 74-76 indicate the number of pieces of substrate put in rearing, i.e., the number of logs, cones, etc. See example "F".

NOTE: Upon completion of rearing, the updating of this record would automatically convert it to a "Species Collection".

CODING AND MACHINE RECOGNITION OF DISEASE COLLECTIONS AND REPORTS

Six types of disease collections or reports are in use in the Forest Disease Survey. In order that these can be identified in an EDP system, coding must follow a prescribed pattern. Identification of each of these collections or reports is accomplished by a comparison of the information contained in columns 63-78, and any deviation from the patterns outlined will result in rejection or misinterpretation of the records by the computer programme. A brief description and examples of the six kinds of records acceptable in our system are given below:

- 1. <u>Species Collection</u>: This is the normal disease collection in which a specimen is received at the laboratory, identified and processed in the usual way. Identification of these records is accomplished by the recognition of characters other than zero (a blank is considered a character in this context) in columns 63-69, at least one character other than zero in 70-75; a 2, 3, 4, 5, or 6 in column 76; a 1, 3, 4, 5, or 6 in column 77; and a 3, 4, 5, or 6 in column 78. See example "G".
- 2. <u>Negative Report</u>: A collection indicated as negative by a field technician who has applied a quantitative sampling technique and found no evidence of damage, or laboratory examination of a collection reveals no damage. Identification is accomplished by the presence of zeros in column 63-75; a zero or "1" in column 76; a 2, 3, 4, or 5 in column 77, and a "1" in column 78. See example "H".

	3	56 57	DISEASE COLLECTIONS	(Office use only)	
	SPEC.	DISEASE	63 SPECIES CODE STAGE SYM SYM BI Id D		
ů	0	ATROPELLIS			
		BIHMINID	2025002201590344		
H.	0	NEGATIVE	000000000000000000000000000000000000000		+
		- 1			_
٠٦٠	0	MIKOPELLIS			_
		PIKIPHILA	200000000000000000000000000000000000000		
٦,	0	ATROPELLIS			
		PINIPHILA	20025002001500232		
K.	0	ATROPELLIS			
		PINIPHILA	2025002000000121		
L°.	00	DIEBACK	0503		
			63 SPECIES CODE E L P A NO. INS. 14 D	INSECT	SPEC.
		(Office use only)	INSECT COLLECTIONS	56 57	54
					1

Care should be taken that coding on the front of the sampling form does not contradict that on the back. See examples for insect collections.

- 3. <u>Negative Species Report</u>: A sampling form used to record a search (by some prescribed method) for a specific disease or organism, the results of which were negative. Identification is accomplished by the presence of characters other than zero in columns 63-69. The presence of zero in columns 70-76, a "2" in 77 and a "1" in 78. See example "I".
- 4. <u>Species Damage Report</u>: This is a record of a sample containing damage which can be definitely attributed to an organism or physical agent although no organism or agent is present at the time of examination. Identification is accomplished by the presence of digits other than zero in 63-69 and 70-75, and a 1 or 2 in 76, a 2, 3, 4, or 5 in column 77 and a 2 in column 78. See example "J".
- 5. Species Report: This report is used to record the occurrence of a disease in the field when no specimens accompany the sampling form. The coding is treated as though the field technician makes the collection, identifies it, and discards it. In practice, he completes the front of the form and writes the identity of the organism under "Remarks and Symptoms". Identification is accomplished by the presence of characters other than zero in columns 63-69, zeros in 70-75, a "1" in column 76, a "2" in column 77, and a "1" in column 78. See example "K".
- 6. <u>Substrate Collection</u>: This is the record of a collection of material from a plant which is obviously unhealthy but the cause of the disorder cannot be determined without extensive culturing or other procedures. When the results of these cultures are known, it is possible that an updating will convert this record or records to a "species collection". Identification is accomplished by blanks in 63-69. Blanks in 70-71, digits other than zero in 72-75, a blank in 76, a 3, 4, or 5 in 77 and 3, 4, 5, or 6 in 78. See example "L".

INTERPRETATION OF SAMPLING FORM INFORMATION

Ideally each field of a document such as the Forest Insect and Disease Sampling Form should be totally independent of other fields in the record. This would prevent the possibility of misinterpretation on the

part of those extracting information from these records. We have attempted to make each field as independent as possible but total independence would so greatly increase the categories in each field that the form would be virtually useless as a field recording document. As a result, sections of the form are interdependent and information drawn from one section must be interpreted in the light of information contained in other sections. For example, the confidence which can be placed in information on the number of trees sampled is dependent upon the category checked in column 38.

If a quantitative category has been checked in column 38 we can be confident that the figures entered in columns 34 and 35 are accurate, but if a qualitative category has been checked in column 38 the figures entered in columns 34 and 35 are probably correct but data taken from such records should not be assumed to be absolutely accurate. Similarly the accuracy of a category checked in column 40 may depend upon the category checked in column 38. If it is a beating sample, either qualitative or quantitative, and "NA" has been checked in column 40 our knowledge of how beating samples are made is the only information we have on collection source. Outsiders using this data must either assume no information in this category or inquire from a subject matter specialist how beating is done. On the other hand, if "hand picked" has been checked in column 38 we should be able to place a great deal of confidence in the category checked in column 40.

It cannot be too strongly emphasized that automatic data processing is a partnership between man and machine and man's part in this particular partnership is to apply subject matter knowledge and intuition to the results obtained from the machine.

DESCRIPTION AND DEFINITIONS

<u>USE OF FORM (Col. 1).</u> (Circle appropriate category)

- 1. Insect
- 2. Disease

This field indicates the kind of collection for which a particular form has been used.

REGIONAL SUB-DIVISION CODE (Col. 2-4). (Enter the appropriate code number)

These are local codes, the details of which have been worked out by each region. They enable the quick selection of a particular ecological, or administrative unit.

U.T.M. GRID (Col. 5-11). (Enter the appropriate code number)

The Universal Transverse Mercator Grid System has been selected to designate locality (see example next page). The area defined by each set of grid figures is 10,000 meters or 6.2 miles square. The seven digits making up the code are used as follows: Col. 5 & 6 - the zone, Col. 7 & 8 - the easting and Col. 9, 10 & 11 - the northing. For details of the system see "An Explanation of the Universal Transverse Mercator Grid", published by the Surveys and Mapping Branch of the Department of Mines and Technical Surveys, copies of which have been distributed to each region.

PLOT OR SAMPLE AREA NUMBER (Col. 12 & 13). (Enter the plot number)

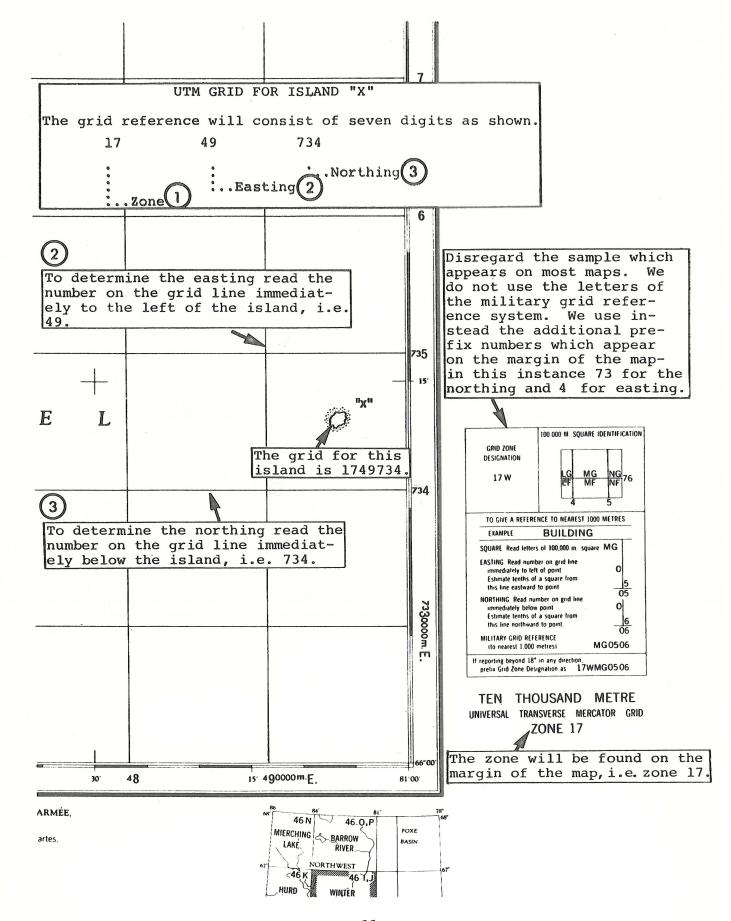
Only 99 plots can be recorded in any 6.2 mile square area, so that when sorting for plots the plot number will always consist of the U.T.M. Grid, plus two digits assigned in sequence as the plots are established, i.e., in grid 16-44-568 the first plot will be designated 16-44-568-01.

ELEVATION (Col. 14 & 15). (Enter the appropriate digits)

Elevation is recorded to the nearest 100 feet, i.e. 00 = an elevation closer to sea level than 100 feet, 01 = an elevation closer to 100 than 200 feet, 02 = an elevation closer to 200 than to 100 or 300 feet and 99 = an elevation closer to 9900 than to 9800 feet or any elevation greater than 9900 feet.

DESCRIPTION (Col. 16). (Circle appropriate category)

- 1. Nursery
- 2. Ornamental
- 3. Plantation (natural species)
- 4. Plantation (exotic species)
- Shelterbelt



- 6. Hedgerow
- 7. Woodlot
- 8. Natural forest
- 9. Treed swamp
- 0. Scattered individuals

DEFINITIONS

Nursery. An area of young trees in a seedbed or transplant plot. This category should not be used for other trees located on nursery grounds.

Ornamental. Single trees or groups of trees of planted or natural origin maintained for aesthetic purposes.

<u>Plantation (natural species).</u> An area artificially reforested with native tree species. It may have been established by planting or by direct seeding with no limitations in arrangement, size, shape, or habitat.

<u>Plantation (exotic species).</u> As above with the exception that it has been planted or seeded with exotic species.

<u>Shelterbelt.</u> A row or rows of planted trees whose primary purpose is the reduction of wind velocity or the protection of homesites. It may be composed of either native or exotic species.

<u>Hedgerow.</u> Narrow bands of naturally regenerated trees encouraged or allowed to grow to provide shelter or to occupy unusable land.

<u>Woodlot.</u> This is a relatively small, delimited stand, originally part of a forest, now surrounded by agricultural or urban areas.

<u>Natural forest.</u> An area in which reforestation has been accomplished by natural processes. A history of cultivation (old field), scarification or burning may be disregarded.

Treed swamp. A poorly drained area in which the water table is above ground or within a few inches of the surface for most of the year. Predominantly open and characteristically forested by scattered black spruce, tamarack or red maple.

<u>Scattered individuals.</u> Trees growing in predominantly open areas. May be used for savannah type natural areas or for urban or rural areas where most of the trees have been removed.

STAND HISTORY (Col. 17). (Circle appropriate category)

- 1. Undisturbed
- 2. Clear cut
- 3. Selective cut
- 4. Burned
- 5. Insect damaged
- 6. Disease damaged
- 7. Animal damaged
- 8. Climate damaged
- 9. Wind damaged
- 0. Water damaged
- -. Agriculture

DEFINITIONS

In most instances this will not include damage by the organism being sampled but some other factor likely to have influenced the stand in such a way that it was predisposed to the attack of the organism.

<u>Undisturbed</u>. A stand in which no apparent disturbance has occurred to the existing trees during recent (up to 15 or 20) years.

<u>Clear cut.</u> A stand in which virtually all trees have been removed by cutting.

<u>Selective cut.</u> A stand in which a portion of the trees has been systematically removed.

<u>Burned</u>. A stand in which a burn occurred in recent years and its effects are still obvious.

<u>Insect damaged</u>. A stand in which insect damage has occurred within recent years and the effects are still obvious.

<u>Disease damaged.</u> A stand in which damage from a disease has occurred within recent years and the effects are still obvious.

<u>Animal damaged</u>. A stand showing signs of decadence as the result of feeding, compaction of the soil, or other damage by animals.

<u>Climate damaged.</u> A stand in which sufficient trees have been damaged by a climatic factor other than wind force or flood waters to seriously alter conditions within the stand.

<u>Wind damaged</u>. A stand in which sufficient trees have been damaged by the force of the wind to seriously alter the conditions within the stand.

<u>Water damaged.</u> A stand in which flooding has occurred; this may be an abnormal condition caused by the damming of a stream, or a higher than usual water table produced by one of many causes. It may also be the normal condition found in a swamp or muskeg.

Agriculture. A stand located on an area which previously had been used for agricultural purposes.

ASPECT (Col. 18). (Circle the appropriate category).

- 1. North
- 2. Northeast
- 3. East
- 4. Southeast
- 5. South
- 6. Southwest
- 7. West
- 8. Northwest
- 9. Flat

The aspect is the direction toward which a slope faces. Provision has been made for recording essentially flat terrain with no significant slope, or an appreciable slope in any direction as indicated by the cardinal points of the compass.

MATURITY (Col. 19). (Circle appropriate category)

- 1. Seedling (nursery)
- Transplant (nursery)
- Seedling (forest)
- 4. Sapling
- 5. Young growth
- 6. Semi-mature
- 7. Mature
- 8. Over-mature

DEFINITIONS *

<u>Seedling (nursery).</u> A stand of young trees that have not been removed from the seed bed.

<u>Transplant (nursery).</u> A stand of young trees that have been removed from the seed bed to the transplant plots.

<u>Seedling (forest)</u>. A stand of young trees growing in the forest; generally used for young trees that have not reached the sapling stage; they may be planted or naturally regenerated.

<u>Sapling (forest)</u>. A young tree greater than $4\frac{1}{2}$ feet tall with a DBH of at least $\frac{1}{2}$ inch.

Young growth. Young vigorously growing trees below the minimum merchantable size for the species in the area in which they are growing.

<u>Semi-mature</u>. Trees which are at least minimum merchantable size for the species and area, and whose annual increment has not been slowed by maturity.

<u>Mature.</u> Stands which have reached or are approaching their maximum growth and development. They have a vigorous healthy appearance with no indications of decadence.

<u>Over-mature</u>. This refers to a stand which has passed maturity and is beginning to show signs of decadence in the form of dead limbs or tops, reduced shoot growth, foliage size or colour, etc.

*NOTE: Regions may set their own size limits for categories 4 to 8.

AGE STRUCTURE (Col. 20). (Circle the appropriate category)

- 1. Even-aged
- 2. Two-aged
- 3. Uneven-aged

DEFINITIONS

Even. Applied to a stand in which relatively small age differences exist between individual trees. The maximum difference in age permitted in an even-aged stand is usually 10 to 20 years, although when the stand will not be harvested until it is 100 to 200 years old, larger differences of up to 25 per cent of the rotation age will be allowed.

<u>Two.</u> Applied to a stand in which two distinct age groups are present, each of which would be described as an even-aged stand if the other age group was not present.

<u>Uneven.</u> Applied to a stand in which there are considerable differences in the ages of the trees and in which three or more age classes are well represented. Stands sometimes classified as all-aged are included here.

BASAL AREA (Col. 21). (Circle appropriate category)

The species composition of a stand may be defined on the basis of total number of trees, dominant trees, basal area, volume or crown cover. Basal area which takes into consideration the size of the trees as well as their number, is the most suitable and has been chosen for use in these records. Basal area can be defined as "the area, usually expressed in square feet, of the cross section at breast height of a single tree or all the trees in a stand".

A prism or relascope is a simple and satisfactory way of finding basal area. For general collecting purposes a single sweep is satisfactory.

FOREST SECTION (AND REGIONS) (Col. 22). (Enter the appropriate code number)

The forest regions and sections are those first described by Halliday and are based on the revision contained in the publication "Forest Regions of Canada" by J.S. Rowe, Forestry Branch, Department of Northern

No. of Trees of a Given Species

								w Ke								H	17	18	19	20
!	7	2	3	4	2	9	7	∞	6	0	111	7	ر	7	15	16	7	∞	6	0
	100	50	33	25	20	17	14	12	11	10	6	_∞	∞	7	7	9	9	5	2	5
2		100	29	20	40	33	29	25	22	20	18	17	15	14	13	12	12	11	11	10
3			100	75	09	50	43	37	33	30	27	25	23	21	20	19	18	17	16	15
4				100	80	99	57	50	44	40	36	33	31	28	27	25	23	22	21	20
5					100	83	71	62	55	20	45	41	38	35	33	31	29	28	26	25
9						100	98	75	19	09	54	20	94	43	40	37	35	33	32	30
7							100	87	78	70	99	28	54	20	47	44	41	39	37	35
∞								100	89	80	73	29	61	57	52	50	47	44	42	40
6								പ	100	90	82	75	69	9	09	56	53	50	47	45
10									四	100	91	83	77	71	29	63	59	26	53	20
11											100	91	84	78	73	69	65	61	58	55
12										ĸ		100	92	85	80	75	71	67	63	09
13													100	92	87	81	92	72	89	65
14												O		100	93	88	82	78	74	70
15													!	田	100	96	88	83	79	75
16																100	96	88	84	80
17															Z		100	94	88	85
18																	H	100	95	90
19																			100	95
20																				100

A quick-reference chart for determining the percentage basal area of each species in a stand surveyed by the prism method is included for the convenience of field personnel.

Affairs and National Resources, Bull. 123, 1959. A three-digit code has been developed, the first digit representing forest regions, the second and third digits representing the forest sections. Because of the use of subletters (i.e. la, lb) for some forest sections, the numbers assigned in the code do not agree with the numbers used in Bulletin 123. The code numbers assigned to each section are as follows:

FOREST REGIONS OF CANADA

Code	Abbreviations in Bull. 123	Name
100	В	Boreal Forest Region
101	B.la	Laurentide-Onatchiway Section
102	B.1b	Chibougamau-Natasquan Section
103	B. 2	Gaspé Section
104	В.3	Gouin Section
105	B.4	Northern Clay Section
106	B.5	Hudson Bay Lowlands Section
107	В.6	East James Bay Section
108	B.7	Missinaibi-Cabonga Section
109	B.8	Central Plateau Section
110	B.9	Superior Section
111	B.10	Nipigon Section
112	B.11	Upper English River Section
113	B.12	Hamilton and Eagle Valleys Section
114	B.13a	Northeastern Transition Section
115	B.13b	Fort George Section
116	B. 14	Lower English River Section
117	B.15	Manitoba Lowlands Section
118	B.16	Aspen-Oak Section
119	B.17	Aspen Grove Section
120	B.18a	Mixedwood Section
121	B.18b	Hay River Section
122	B.19a	Lower Foothills Section
123	B.19b	Northern Foothills Section
124	B.19c	Upper Foothills Section

Code	Abbreviations in Bull. 123	Name
125	B.20	Upper Churchill Section
126	B.21	Nelson River Section
127	B.22a	Northern Coniferous Section
128	B.22b	Athabasca South Section
129	B.23a	Upper Mackenzie Sections
130	B.23b	Lower Mackenzie Section
131	B.24	Upper Liard Section
132	в. 25	Stikine Plateau Section
133	В. 26а	Dawson Section
134	в. 26ь	Central Yukon Section
135	В. 26с	Eastern Yukon Section
136	B.26d	Kluane Section
137	в. 27	Northwestern Transition Section
138	B. 28a	Grand Falls Section
139	B. 28b	Corner Brook Section
140	B. 28c	Anticosti Section
141	B.29	Northern Peninsula Section
142	B.30	Avalon Section
143	B.31	Newfoundland-Labrador Barrens Section
144	B.32	Forest-Tundra Section
145	в.33	Alpine Forest-Tundra Section
200	SA	Subalpine Forest Region
201	SA.1	East Slope Rockies Section
202	SA.2	Interior Subalpine Section
203	SA.3	Coastal Subalpine Section
300	М	Montane Forest Region
301	M. 1	Ponderosa Pine & Douglas Fir Section
302	M.2	Central Douglas Fir Section
303	м.3	Northern Aspen Section
304	M. 4	Montane Transition Section
305	M.5	Douglas Fir & Lodgepole Pine Section
400	С	Coast Forest Region
401	C.1	Strait of Georgia Section

Code	Abbreviations in Bull. 123	Name
402	C.2	Southern Pacific Coast Section
403	C.3	Northern Pacific Coast Section
404	C.4	Queen Charlotte Islands Section
500	CL	Columbia Forest Region
501	CL.1	Southern Columbia Section
502	CL.2	Northern Columbia Section
600	D	Deciduous Forest Region
601	D.1	Niagara Section
700	L	Great Lakes-St. Lawrence Forest Region
701	L.1	Huron-Ontario Section
702	L.2	Upper St. Lawrence Section
703	L.3	Middle St. Lawrence Section
704	L.4a	Laurentian Section
705	L.4b	Algonquin-Pontiac Section
706	L.4c	Middle Ottawa Section
707	L.4d	Georgian Bay Section
708	L.4e	Sudbury-North Bay Section
709	L.5	Eastern Townships Section
710	L.6	Temiscouata-Restigouche Section
711	L.7	Saguenay Section
712	L.8	Haileybury Clay Section
713	L.9	Timagami Section
714	L.10	Algoma Section
715	L.11	Quetico Section
716	L.12	Rainy River Section
800	A	Acadian Forest Region
801	A. 1	New Brunswick Uplands Section
802	A.2	Upper Miramichi-Tobique Section
803	A.3	Eastern Lowlands Section
804	A.4	Carleton Section
805	A.5a	South Atlantic Shore Section
806	A.5b	East Atlantic Shore Section
807	A.6	Cape Breton Plateau Section

Code	Abbreviations in Bull. 123	Name
808	A.7	Cape Breton-Antigonish Section
809	A.8	Prince Edward Island Section
810	A.9	Fundy Coast Section
811	A.10	Southern Uplands Section
812	A.11	Atlantic Uplands Section
813	A.12	Central Lowlands Section
814	A.13	Cobequid Section
900	G.	Grassland Region

COVER- OR SUB-TYPE (Col. 25-28). (Enter the appropriate code number)

Either the sub-type or cover-type should be entered on the sampling form. Sub-type is preferred as it is much more descriptive of the stand than cover-type. Cover-types can be deduced with reasonable accuracy from sub-types but sub-types cannot be deduced from cover-types.

The codes for sub-types are listed below. Note that two numbers have been assigned to what appears to be the genus of many tree species: i.e., "01" is "pines general" and "09" is "miscellaneous pines". These are interpreted as follows "01" pine general to be used where the species of pine are not to be, or cannot be differentiated. "09" miscellaneous pines to be used when the species of pine involved has not been assigned a sub-type code number. Single species stands are coded by entering the appropriate digits in columns 25 and 26 and 00 in columns 27 and 28. Mixed stands are coded as follows:

1. If two species constitute 80% or more of a stand, enter the appropriate codes in columns 25-28. The species whose code appears in columns 25 and 26 will have the greater basal area and will be assumed to constitute at least 40% of the basal area of the stand, and that whose code appears in columns 27 and 28 at least 20% of the basal area of the stand.

Individual species comprising 40% or more of the stand must be named and those comprising less than 20% must not be named.

2. If a mixed stand cannot be described by two species codes a standard species group code may be substituted for one or both species codes.

3. If sub-type codes cannot be used cover-type codes determined from cover-type maps or the following rules should be used. The softwood cover-type consists of stands whose composition is at least 81 per cent softwood by basal area or volume and the hardwood cover-type includes stands which are at least 81 per cent hardwood. Mixedwood stands are all others. The composition of a softwood-hardwood stand is 51-80 per cent softwood and that of a hardwood-softwood stand 51-80 per cent hardwood. The codes for cover-type consist of a + in each of the first three boxes and the appropriate digit in the fourth box.

+ + + 1. Softwood
+ + + 3. Softwood - hardwood
+ + + 7. Hardwood - softwood

+++ 9. Hardwood

Rules for designating sub-types appear on page 26. For more complete information refer to "Standard Codes" by A. Bickerstaff and T.G. Honer, Department of Forestry and Rural Development.

SUB-TYPES

Individual Species

Code	Abbreviation	Common Name
00	-	Non-forest type
01	P	Pine - general
02	wP	Eastern white pine
03	rP	Red pine
04	jР	Jack pine
05	1P	Lodgepole pine
06	sP	Shore pine
07	pP	Ponderosa pine
08	wwP	Western white pine
09	- P	Miscellaneous pines
10	S	Spruce - general
11	bS	Black spruce
12	rS	Red spruce
13	wS	White spruce

Code	Abbreviation	Common Name
14	eS	Engelmann spruce
15	sS	Sitka spruce
-		
19	-s	Miscellaneous spruce
20	F	Fir - general
21	bF	Balsam fir
22	alF	Alpine fir
23	gF	Grand fir
24	aF	Amabilis fir
25	D	Douglas-fir
-		
30	L	Larch - general
31	tL	Tamarack
32	aL	Alpine larch
33	wL	Western larch

39	-L	Miscellaneous larch
40	С	Cedar - general
41	eC	Eastern white cedar
42	wC	Western red cedar
43	уC	Yellow cedar
44	rJ	Red juniper
45	roJ	Rocky Mt. juniper
50	Н	Hemlock - general
51	еН	Eastern hemlock
52	wH	Western hemlock
53	mH	Mountain hemlock
60	A or Po	Aspen or Poplar - general
61	tA	Trembling aspen
62	1A	Largetooth aspen
63	bPo	Balsam poplar
64	eCo	Eastern cottonwood
65	pCo	Plains cottonwood

1Co Lanceleaf cottonwood 1Co Narrowleaf cott
68 bCo Black cottonwood 69 -Po Miscellaneous poplars 70 B Birch - general 71 wB White birch 72 yB Yellow birch 73 wiB Wire birch - 79 -B Miscellaneous birches 80 M Maple - general 81 sM Sugar maple 82 rM Red maple 83 bM Black maple 84 siM Silver maple 85 mM Manitoba maple 86 bM Broadleaf maple - 89 -M Miscellaneous maple 90 Al Alder 91 As Ash
69 -Po Miscellaneous poplars 70 B Birch - general 71 wB White birch 72 yB Yellow birch 73 wiB Wire birch - - Wiscellaneous birches 80 M Maple - general 81 sM Sugar maple 82 rM Red maple 83 bM Black maple 84 siM Silver maple 85 mM Manitoba maple 86 bM Broadleaf maple - - Miscellaneous maple 90 Al Alder 91 As Ash
70 B Birch - general 71 wB White birch 72 yB Yellow birch 73 wiB Wire birch - Wiscellaneous birches 80 M Maple - general 81 sM Sugar maple 82 rM Red maple 83 bM Black maple 84 siM Silver maple 85 mM Manitoba maple 86 bM Broadleaf maple Miscellaneous maple 90 Al Alder 91 As Ash
71 wB White birch 72 yB Yellow birch 73 wiB Wire birch
72 yB Yellow birch 73 wiB Wire birch
73 wiB Wire birch
Miscellaneous birches M Maple - general Maple
80 M Maple - general 81 sM Sugar maple 82 rM Red maple 83 bM Black maple 84 siM Silver maple 85 mM Manitoba maple 86 bM Broadleaf maple - - Miscellaneous maple 90 Al Alder 91 As Ash
81 sM Sugar maple 82 rM Red maple 83 bM Black maple 84 siM Silver maple 85 mM Manitoba maple 86 bM Broadleaf maple
Red maple Black maple Black maple Silver maple Silver maple Manitoba maple Broadleaf maple - Miscellaneous maple Alder As Ash
Black maple Silver maple Silver maple Manitoba maple Broadleaf maple - Miscellaneous maple Alder As Ash
84 siM Silver maple 85 mM Manitoba maple 86 bM Broadleaf maple - 89 -M Miscellaneous maple 90 A1 Alder 91 As Ash
85 mM Manitoba maple 86 bM Broadleaf maple - 89 -M Miscellaneous maple 90 Al Alder 91 As Ash
Broadleaf maple - 89 -M Miscellaneous maple 90 A1 Alder 91 As Ash
- Miscellaneous maple 90 Al Alder 91 As Ash
89 -M Miscellaneous maple 90 Al Alder 91 As Ash
90 Al Alder 91 As Ash
91 As Ash
92 Ba Basswood
Be Beech
94 Ch Cherry
95 E E1m
96 Hi Hickory
97 I Ironwood
98 0 0ak
99 W Willow

Standard Coniferous Species Groups - Eastern

Code	Abbreviation	Species Group
16	PS	Pine-spruce mixture

Code	Abbreviation	Species Group
17	PF	Pine-fir (Abies) mixture
18	SF	Spruce-fir (Abies) mixture
26	SFP	Spruce-fir-pine mixture
27	SL	Spruce (and/or fir) - larch
28	CL	Cedar-larch
29	SCL	Spruce (and/or fir) - cedar - larch
34	HP	Hemlock-pine (white and/or red)
35	SHP	Spruce (and/or fir) - hemlock - pine (white and/or red)
36	Z	Mixed or pure conifers (not other- wise classifiable)

Standard Coniferous Species Groups - Western

37	FS	Fir* - spruce (and/or balsam**)
38	FH	Fir - hemlock
46	FC	Fir - cedar
47	НВ	Hemlock - balsam (and/or spruce)
48	HC	Hemlock - cedar
49	BS	Balsam - spruce
54	FCH	Fir - cedar - hemlock
55	FHB	Fir - hemlock - balsam
56	СНВ	Cedar - hemlock - balsam
57		These codes have been left open
58		for temporary or local use, to cover special situations where
59		the standard coniferous groups
		are not applicable

Standard Deciduous Species Groups - Eastern and Western

74	BA	White birch (and/or wire birch) - aspen (and/or poplar)
75	BR	White birch (and/or wire birch) - red maple

^{*}Douglas-fir

^{**}Abies (spp.)

Code	Abbreviation	Species Group
76	ВМ	Yellow birch - sugar maple (and/or maple)
77	K	Beech - basswood - ash - oak - elm complex
78	BMK	(Combination of BM and K)
87	X	Mixed or pure hardwoods (not otherwise classifiable)
88 ⁻		This code is left open for temporary or local use to cover special situations where the standard deciduous groups are not applicable.

Rules for the Designation of Sub-types:

- 1. Individual species comprising 40% or more of the basal area of the stand $\underline{\text{must}}$ be named.
- 2. Individual species comprising less than 20% of the basal area $\underline{\text{must}}$ $\underline{\text{not}}$ be named.
- 3. Individual species comprising between 20% and 40% of the stand may be named, provided that no more than two species are used in the subtype name.
- 4. If two species occur in a sub-type name, the most abundant species will be written first, and will be assumed to constitute 40% or more of the total.
- 5. A standard species group may be substituted for species in the subtype name where single species individually
 - (a) do not make up the percentage indicated above, or
 - (b) would, if named, describe less than 80% of the stand.

In applying these rules the function of the standard species groups must be clearly understood. Species groups will be used <u>only</u> if the stand cannot be described according to the above rules in terms of one or two individual species. Each of the standard species groups shown is a group of either commonly associated conifers or commonly associated hardwood species. Hardwoods and softwoods do not appear in the same group. The order in which the species (genera) symbols appear in the specific group designation is fixed and does not reflect the relative importance of the species in the group.

DOMINANT SPECIES (Col. 29). (Enter appropriate code number)

Coding of the dominant species is dependent upon the presence of a sub-type code in field 13 of the sampling form. It has been assumed that the dominants will always be mentioned as part of the sub-type and the code simply indicates the position in which the dominant name occurs in the sub-type code, e.g., if the code appearing in field 13 is 0507 and ponderosa pine trees are dominant; the code entered in field 14 is 2. If lodgepole pine were dominant it would be 1. Where standard groups are used - i.e., if 4954 were entered in field 13 and hemlock are the dominant trees the code for dominant species is "5". If spruce were dominant it would be 2. As the order in which species appear in a standard group is fixed, the computer can be programmed to identify the dominant species.

HEIGHT OF DOMINANT TREES (FEET) (Col. 30). (Circle the appropriate category)

1.	0.5	feet	7.	45	feet
2.	1.5	19	8.	70	11
3.	3	**	9.	100	11
4.	7	11	0.	140	11
5.	15	11		180	11
6.	30	11	+	210	11

TREE SPECIES (Col. 31-33). (Enter appropriate code number)

For details of this code see appendix.

NUMBER OF TREES SAMPLED (Cols. 34 & 35). (Enter number sampled)

The number of trees sampled is entered directly up to 99. The figure 99 should be interpreted as 99 or more.

STATUS (Col. 36). (Circle appropriate category)

- 1. Living
- 2. Ingrowth (not used on this form)
- 3. Damage suspect (not used on this form)
- 4. Recently dead standing
- 5. Recently dead cut

- 6. Recently dead fallen
- 7. Old dead standing
- 8. Old dead fallen
- 9. Manufactured

This had been developed as one of the Department's standard codes hence the inclusion of 2 and 3 which are not used in most insect and disease survey sampling.

DEFINITIONS

Living. An uncut tree in which living tissue occurs.

<u>Recently dead.</u> A tree that has been cut, or if standing contains no living tissue (brown cambium completely encircles lower stem) and has been dead less than 2 years.

Old dead. A tree which has been dead more than 2 years.

<u>Manufactured</u>. Any timber or wood product. For purposes of this code trees which have been sawn or chipped, or processed as poles or plywood, will be considered to have reached the manufactured status.

TREE CLASS (Col. 37). (Circle appropriate category)

- 1. Dominant
- 2. Codominant
- 3. Intermediate
- 4. Suppressed
- 5. Undergrown regeneration
- 6. Understory tree
- 7. Fringe
- 8. Open
- 9. Old veteran

DEFINITIONS

<u>Dominant.</u> Trees with crowns extending above the general level of the crown and receiving full light from above and partly from the side; larger than the average trees in the stand, and with crowns well developed but possibly somewhat crowded on the sides.

<u>Codominant.</u> Trees with crowns forming the general level of the crown cover and receiving full light from above, but comparatively little from the sides; usually with medium-sized crowns more or less crowded on the sides.

<u>Intermediate</u>. Trees shorter than those in the two preceding classes, but with cover formed by codominant and dominant trees, receiving little direct light from above, but none from the sides; usually with small crowns considerably crowded on the sides.

<u>Suppressed.</u> Trees with crowns entirely below the general level of the crown cover receiving no direct light either from above or from the sides. Syn. overtopped.

<u>Undergrown regeneration</u>. Natural seedlings coming up under a canopy of trees. Usually restricted to trees less than 10 feet in height and $1\frac{1}{2}$ inch DBH.

<u>Understory tree.</u> Vigorous young trees growing under the canopy of a stand; larger than undergrown regeneration trees but not large enough to be considered intermediates.

<u>Fringe</u>. Trees with one or more sides exposed to the light the remaining sides shaded by trees of the stand.

Open. Trees which are exposed to the light on all sides.

<u>Old veteran.</u> A tree in a stand surviving from a previous generation which is larger than its neighbours and occupies more space than its silvicultural value warrants. May be used for old open-grown trees.

SAMPLING TECHNIQUE (Col. 38). (Circle appropriate category)

Qualitative		Quantitative
1.	2.	Beating
3.	4.	Hand picked
5.	6.	Traps
7.	8.	Ground observation
9.	0.	Aerial observation
_,	+.	Photography

DEFINITIONS

Quantitative. Where measuring equipment or techniques are used to give quantitative significance to the results obtained.

Qualitative. Where no measuring equipment or techniques are used.

Beating. Organisms dislodged from a tree by jarring it with a pole, axe or hand.

<u>Hand picked.</u> Removal of a specimen from a part of a tree by hand or hand tools.

<u>Traps.</u> The capture of an organism in an artificial enclosure (include sweep nets).

Ground observation. Areas examined from the ground or a ground vehicle.

Aerial observation. Areas examined from an aircraft.

<u>Photography</u>. Where the evidence of the existence of an organism at the sample location is contained in a photograph and no sample was collected.

POPULATION LEVEL OR INCIDENCE (Col. 39). (Circle appropriate category)

- 1. Negative
- 2. Trace
- 3. Low
- 4. Moderate
- 5. High
- 6. N.A.

NOTE: Incidence is used here in the dictionary sense to mean "extent of damage". Editing will automatically eliminate information in this category on all specimen numbers larger than 01. The collector must indicate, in the remarks section, the organism to be coded 01.

DEFINITIONS

<u>Negative.</u> This category is used to indicate that a search was made for a particular organism but none was found or where a quantitative procedure was followed and no insect or disease organisms found.

The remaining categories in this section cannot be defined as they are directly related to the organism sampled. For some insects and diseases these terms have been defined in numbers or intensity per unit area, but for others, their definition must be developed. For those organisms that do not have an established quantitative definition, regions may tentatively define them for their own use. For some organisms broad categories loosely defined are meaningful to forest managers and Departmental personnel and should be used, e.g., the light, medium and high population categories used on many of the maps appearing in the Annual Report have no numerical value but serve a useful purpose.

COLLECTION SOURCE (Col. 40). (Circle appropriate category)

1.	Flower	
----	--------	--

2. Fruit

3. Buds

4. Old foliage

5. New foliage

6. New shoot

7. Branch

8. Stem

9. Butt

0. Root

-. Duff or soil

+. N.A.

DEFINITIONS

Flower. As in any botany text.

Fruit. As in any botany text.

Bud. As in any botany text.

Where organisms are taken from flower buds it would be better to indicate the source as "flower" rather than "bud" if the organism appears to differentiate between flower and foliage buds.

Old foliage. Foliage produced prior to the current year.

<u>New foliage</u>. Foliage produced during the current year. Foliage refers only to leaves and petioles not to twigs or shoots.

NOTE: A number of organisms feed on both old and new growth. These must be coded on one or the other but when data is extracted from a series of collections both will be represented.

<u>New shoot.</u> Distal growth 1 year or less in age, issuing from a twig, branch, or stem.

Branch. An appendage growing out of a stem, exclusive of the new shoot.

<u>Stem.</u> The trunk of a tree, it may extend to the top (conifers) or be lost in the ramifications of the crown (hardwoods). All logs are classified as stem.

<u>Butt.</u> The base of a stem, usually the thickest part just above the ground. In a cut tree that portion left attached to the root.

Root. That part of a tree which is normally below the earth's surface.

<u>Duff or soil.</u> All dead vegetative matter on the mineral soil including litter and incorporated humus and the mineral soil itself.

NUMBER OF UNITS (Col. 41 & 42). (Enter number of units)

A maximum of 99 units can be recorded. The size of the unit will depend upon the design of the sampling system and it will be the responsibility of the region to maintain a permanent record of the sampling system, size of units, etc., for each of the organisms for which this section of the sampling form has been used.

AVERAGE COUNT (Col. 43 & 45). (Enter appropriate digits)

These columns may be used for recording average count or total count at the discretion of the survey head but a record must be kept of the system used and the position of the decimal point. The information in these columns will be removed (by computer) from all but the 00 or 01 records. Hence the organism to which this information applies must always be assigned one of these specimen numbers.

DAMAGE AND HAZARD INDEX (Col. 46).

In developmental stages - ignore for present.

<u>COLLECTOR (Col. 47 & 48).</u> (Enter appropriate code number)

This field is used to identify the collector responsible for the collection or report. Field technicians of the Department are assigned

specific identification numbers which are entered in columns 47 and 48. Personnel of other agencies making collections are identified by major groups only. They are as follows:

- 94. Provincial Forest Service personnel.
- 95. Other Provincial employees.
- 96. Forest Industry employees.
- 97. Department of Fisheries and Forestry personnel exclusive of those who, as indicated above, have been assigned a number.
 - 98. Other Federal Government employees.
 - 99. Private persons not affiliated with any of the above.

Ninety-three numbers have been reserved for assignment to field technicians. When these 93 numbers have been used it will be necessary to reassign numbers but confusion will be minimized by the time lapse between original use and reuse.

LAND OWNERSHIP (Col. 49). (Enter appropriate code number)

Items 1-6 refer to land used for some forestry purpose such as lumber, pulp, recreation, watershed, etc. The codes are:

- 1. Federal crown land
- 2. Provincial crown land
- 3. Municipal crown land
- 4. Land owned by a forest industry
- 5. Land leased to a forest industry
- 6. Private
- 7. Land not used for a forestry purpose
- 8. Ownership unknown.

DAY (Col. 50 & 51). (Enter appropriate digits)

Entered directly as a figure, i.e., 01, 21, or 31.

MONTH (Col. 52 & 53). (Enter appropriate digits)

Entered directly as a figure, i.e., January=01, July=07, December=12.

YEAR (Col. 54 & 55). (Enter appropriate digits)

The last two digits of the year are entered directly.

FIDS REGION NUMBER (Col. 56). (Enter appropriate code number)

- 1. Newfoundland
- 6. Manitoba-Saskatchewan
- 2. Maritimes
- 8. Alberta-NWT-Yukon

3. Quebec

- 9. British Columbia (Victoria)
- 5. Ontario
- O. British Columbia (Vernon)

Because collections of insects are located at both Vernon and Victoria and the disposition of specimens will be recorded on cards, separate numbers have been retained.

REGISTRATION NUMBER (Col. 57-60). (Enter appropriate digits)

The number assigned to a collector and/or a report at the time of registry is entered directly. The numbers are assigned in sequence and should never be duplicated.

SPECIMEN NUMBER (Col. 61 & 62). (Enter appropriate digits)

These columns are used to record the number assigned to individual entries on the back of the sampling form. Negative records are numbered 00 and 90-99 and positive records from 01 to 89. It is permissible to enter positive and negative records on the same sampling form but the positive records must begin at 01 and the negative records at 90. Where a single negative record is recorded on a form it is recorded as 00, where two negatives are recorded on a form they are recorded as 00 and 90. Where one negative and one or more positives are recorded on a sampling form the positives begin at 01 and the negatives at 90. O1 AND 00 MUST NEVER APPEAR ON THE SAME SAMPLING FORM as they are used as keys to many of the data extraction procedures and their use on the same form would invalidate many of the results.

<u>SPECIES CODE - DISEASE CAUSE CODE (Col. 63-69).</u> (Enter appropriate code number)

These columns are used to enter the above-named codes produced as separate volumes. Details of the construction of these codes is included in the introduction to each.

INSECT STAGE (Col. 70-73). (Enter appropriate code number)

Columns are provided for the entry of the number of individuals in each stage. Since only one column is provided for each stage, their numbers are coded as follows:

Code No.	Number of Insects	Decode
1	1 .	1
2	2–5	3
3	6–10	8
4	11-20	15
5	21-40	30
6	41-60	50
7	61–100	80
8	100-200	150
9	200 +	200

NUMBER OF INSECTS (Col. 74-76). (Enter appropriate digits)

Three columns are provided for the number of individuals of each species and the actual number up to a maximum of 999 can be entered directly. This provides an accurate number of insects per collection and an approximate number in each stage.

STAGE OF DEVELOPMENT OF ORGANISM (Col. 70-71). (Enter appropriate code number)

Since several developmental stages of a pathogen are frequently present on a specimen, a double code has been developed for this section. This allows the two most important stages to be recorded; those most likely to occur together have been placed in different codes. They are as follows:

Code A. (Col. 70)

- 1. Vegetative state.
- 2. Mature perfect state (including telia of rusts).
- 3. Immature perfect state.
- 4. Overmature perfect state.
- 5. Mature aecia.

- 6. Immature aecia.
- 7. Overmature aecia.
- 8. Mature pycnia or spermagonia.
- 9. Immature pycnia or spermagonia.
- -. Overmature pycnia or spermagonia.
- 0. None of the above present or recorded.

Code B. (Col. 71)

- 1. Mature imperfect state (including uredia of rusts).
- 2. Immature imperfect state.
- 3. Overmature imperfect state.
- 4. Mature pycnia or spermagonia.
- 5. Immature pycnia or spermagonia.
- 6. Overmature pycnia or spermagonia.
- 7. Sclerotia.
- 8. Rhizomorphs.
- 9. Mycelial fans.
- 0. None of above present or recorded.

DISEASE SYMPTOMS (Col. 72-73 and 74-75). (Enter appropriate code number)

Provision has been made for field recording of symptoms as an aid to identification. This section allows either these symptoms or a refinement of them (made by laboratory personnel) to be recorded. They will allow the cataloging of diseases of unknown origin and may make subsequent identification possible. They will also identify the type of disease associated with an organism. For the purposes of this code a symptom is defined "as evidence of a diseased condition" and may include items usually called signs. A double set of columns has been provided to allow recording of the two most important symptoms:

Necrotic (death or break-down of tissue)

- 01 Current necrosis
- 02 Non-current necrosis
- 03 Wilt
- 04 Blight
- 05 Dieback

- 06 Spot
- 07 Discoloured areas
- 08 Persistent dead leaves
- 09 Defoliation
- 10 Damping-off
- 11 Rot unspecified
- 12 Rot sap
- 13 Rot heart
- 14 Stain
- 15 Canker
- 16 Canker target
- 17 Injuries (physical)

Hypertrophic (overdevelopment)

- 60 Hypertrophy unspecified
- 61 Hypertrophy fusiform galls
- 62 Hypertrophy globose galls
- 63 Fasciation
- 64 Fasciculation

Atrophy (underdevelopment)

- 80 Dwarfing
- 81 Chlorosis

Other Symptoms and Signs

- 90 Exudate Resinosis
- 91 Exudate Gummosis
- 92 Exudate Bleeding
- 93 Malformation

DEFINITIONS

<u>Premature abcission.</u> Unseasonal falling of leaves, flowers, fruits, or twigs.

<u>Blight.</u> Sudden drying and browning involving whole organs such as: fruits, blossoms, leaves, twigs, shoots; also the last stage of wilting.

<u>Canker.</u> Localized lesions on woody or more rarely herbaceous stems which generally result in the corrosion and sloughing away of tissue with the final production of an open wound exposing or penetrating the wood.

<u>Canker-target</u>. A perennial canker characterized by prominent, concentrically arranged zones, which mark successive outgrowth and death of tissue surrounding wound.

<u>Chlorosis</u>. Diffused or patterned subnormal chlorophyll development producing a yellow discoloration.

<u>Damping-off.</u> The killing of young seedlings by fungi that cause decay of the stem or roots.

<u>Dieback.</u> Dying back of twigs or branches from the tips inward toward the trunk.

<u>Discoloured areas.</u> The presence of discoloured areas on fruit, green stems, or leaves. This category is used where "spot" does not seem appropriate because of the large size, the irregularity, or the location of the damage.

<u>Dwarfing.</u> Subnormal size of plant or some of its organs.

<u>Exudate - Bleeding.</u> (Slime-flux) - Chronic sap-flow from wounds or other lesions.

<u>Exudate - Gummosis.</u> Formation of gums by diseased cells and tissues, and extrusion of gum from wounds and other lesions.

Exudate - Resinosis. Flow of resin or pitch from wounds or other lesions in conifers.

<u>Fasciation</u>. Flattening or cohering of organs such as stems, flowers, and roots.

<u>Fasciculation</u>. (Hairy root, witches' brooms). Clustering of organs such as roots, twigs, fruits, about a common point, arising from adventitious development caused by pathogen irritation.

Hypertrophy. Abnormal growth of cells or abnormal production of cells causing enlargement of some part of a plant.

Hypertrophy - fusiform galls. As above causing fusiform galls.

Hypertrophy - globose galls. As above causing globose galls.

<u>Injuries (physical)</u>. Damage caused by physical factors such as hail, lightning, logging and equipment, etc. (The cause of injury is specified under the disease cause code).

Leaves persistent. Dead leaves persist for an abnormally long time.

<u>Malformation</u>. Abnormal configurations that cannot be considered to be either hypertrophy or atrophy.

<u>Current necrosis.</u> Not ascribable to any of the following; death occurred in the current growing season.

Non-current necrosis. Not ascribable to any of the following; death occurred prior to the current growing season.

Rot. Discolouration and decay of woody tissue.

Rot - Heart. As above in heartwood.

Rot - sap. As above in sapwood.

<u>Spot.</u> Localized circular, areolate, or irregular discoloured or killed areas on leaves, fruits, or green stems.

Stain. Discolouration without obvious deterioration of woody tissue, may be either in streaks or bands.

<u>Wilt.</u> A drooping appearance of leaves and shoots resulting from temporary or permanent lowering of turgor due to excess of transpiration over water supply to the leaves and shoots.

BASIS OF IDENTIFICATION (Col. 76). (Enter appropriate code number)

This section is included to establish the degree of confidence which can be placed in an identification. When extending information it should be used in conjunction with field 38. The codes are:

- 1. Field observations unsupported by a description of symptoms or a collection.
- 2. Symptoms of a specimen in a collection or a description of symptoms if no specimen was submitted.

- 3. Examination of the organism in collection.
- 4. Examination of the cultural characteristics of the organism.
- 5. Inoculation with the organism.
- 6. Chemical analysis.

IDENTIFIER (Col. 77). (Enter appropriate code number)

- 1. Probable Identification (poor specimen or incomplete report, there is no possibility of ever making a positive identification).
 - 2. Field Technician.
 - 3. Laboratory Technician.
- 4. Forest Insect and Disease Survey Taxonomist or other regional authority (the regional authority may be equivalent to a taxonomic specialist and if so code 5 should be assigned).
 - 5. Taxonomic Specialist (Research Institute or equivalent).
 - 6. Identifications by 2, 3 or 4 confirmed by a specialist.

DISPOSAL (Col. 78). (Enter appropriate code number)

The disposal of the specimen is recorded using the following code:

- 0. Holding, disposition undecided.
- 1. No specimen or damage.
- 2. Sample contained damage definitely attributable to the organism entered in field 34 (columns 63-69). (Sample may be discarded or retained for display purposes).
 - 3. Specimen discarded.
 - 4. Specimen retained.
 - 5. Reared or cultured.
- 6. Look for additional information (use only when 4 and 5 do not apply).

<u>NOTE</u>: Code numbers 4, 5, and 6 will usually indicate that additional information is available about this specimen which may be added to the record at a later date.

CHANGING, ADDING OR DELETING RECORDS

Records that have been entered into the FIDS Records System may be changed by the use of optical scanning forms (see following pages) or by deletion and the resubmission of sampling forms. Records that are entirely new must be added by the submission of a sampling form but records which are already partially entered (e.g. columns 1-60 exist in the system) should be added by optical scanning forms. Records must be deleted by optical scanning forms. The details of these procedures appear in the section on the use of optical scanning forms.

All of the forest insect and disease records have been or will be converted to the format and the codes of the sampling form in current use prior to any updating. This means that any information you wish to change is now located in the column indicated for that category on the Forest Insect Disease and Survey Sampling Form FE 10, i.e., the aspect code under the old 90 column (Remington Rand System) was located in column 76. It has now been transferred to column 18 and any change of aspect must stipulate that the change be made in column 18. If aspect was flat the code would have been "1" but it has been transformed to a "9". There are now no records in the old format or codes.

Editing checks have been built into the system which will prevent a record from entering the permanent file if it contains illogical information, i.e., a region number for Ontario accompanied by a grid number which is in Manitoba or Quebec, or a district number which does not occur in Ontario. Some of these checks can be precisely defined but others must be defined fairly broadly. For instance it is difficult to define the Quebec-Ontario border with precision and the computer may sometimes indicate that a Quebec location close to the border is in error when actually it is correct (see item 8). It is for situations like these that the error acceptance signal is needed. We have defined a number of areas where we feel the computer can be instructed to indicate errors and we hope to define others as time permits. Print outs indicating the area in which the errors occur will be supplied as the errors become apparent to us.

Instructions for the Use of Optical Scanning Forms for Updating Survey Records

Optical scanning forms have been developed for recording the changes to be made in Forest Insect and Disease Survey data stored in magnetic tape files. Pencil marks placed in the response boxes of these forms are sensed by an optical scanning machine and translated into magnetic tape impulses.

The example on the right shows how the year 67 is indicated. This method of indicating the number to be read by the scanning machine applies throughout the form.



Forms printed in green (FE 131 and 132) are for correcting insect files; those printed in red (FA 157 and 156) for correcting disease files. It is imperative that the correct form be used as the small black rectangles preprinted in the upper left-hand corner of the red form occurs in a different location than that on the green form. These rectangles determine the file to be up-dated and misuse will introduce incorrect data into another file.

The optical scanning form cannot be used to:

- a. Insert the special characters "+" and "-". This means that if a special character is already in a certain column you can change it to a number but you cannot change from one special character to another or from a number to a special character. To change a special character you must delete the record and reinsert it.
- b. Change the year (columns 54-55), region (column 56), collection number (column 57-60), or specimen number (column 61-62). To change any of these you must delete and reinsert.
- c. Change or insert information into columns 39 and 43-46 if the specimen is greater than 01.

General Rules for Completing Optical Scanning Forms

- 1. Use only an HB lead pencil; <u>DO NOT</u> use a ball point or other type of pen. The response area does not have to be neat but must be fully filled, it is better to have too large an area covered than too small an area provided it does not extend into the next response box.
- 2. Accuracy is essential as evidence of errors will only be apparent after updating is complete. In order to ensure accuracy a printout showing the record before and after correcting will be sent to originator. Spaces to write numbers have been provided at the top of each column, these are of no use to the scanner but may increase the accuracy of the user.
- 3. An erasure may be made on these forms provided another box of the same column is being marked. The machine is programmed to select the darkest response position and will reject the erasure if there is a darker position in the same column.
 - 4. Unused portions of a sheet should not be ruled or crossed out.
- 5. Do not staple anything to the sheets or staple them together, as the staples may go unnoticed and cause a machine jam.
- 6. Separate each sheet from the pad so they can be fed directly into the machine.
- 7. The two types of form should not be intermingled in shipment as they must be separated before being fed to the machine. A record of the number of each type should accompany every shipment to Biometrics Research Services.

Rules for Completing Standard Change Forms

The Standard Change Form allows you to add or correct information in columns 63-69 and 77. Each sheet can be used to change up to six records if the year and region is common to all. A new sheet must be used if either the region number or the year changes. No gaps in information are allowed. Each column of a section must be completely filled out but it is not necessary that all six sections be used.

NOTE: As six changes can be made on this form it is sometimes more economical to repeat the recorded portion of the species code than to use the non-standard change form for adding or changing species or genera codes.

DEPARTMENT OF FORESTRY AND RURAL DEVELOPMENT



FOREST INSECT AND DISEASE SURVEY STANDARD CHANGE FORM~

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FOREST INSECT AND DISEASE SURVEY NON-STANDARD CHANGE AND RECORD DELETION FORM

DEPARTMENT OF FORESTRY AND RURAL DEVELOPMENT

_·	Deletion Change
CI	D NOT MAKE DELETIONS AND HANGES ON THE SAME SHEET

YEAR		1	REGIO
	CO3		BCVE
	cl3		NFLD
	c23		MAR
	c 3 3		QUE
C43	c4 3		ONTO
c53	c53		ONT
C63	c6 3		MASA
c 7 3	c 7 3		INH
	□8 □		ANY
	C 9 3		BCVI
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c33		c33	c3 3	c33	c 32	c33	E33
E43		C43	C43	C43	C42	c43	c43
c 5 3		c 53	c 5 3	c53	C 53	C53	c53
c63		c63	E63	C63	E63	c63	C63
C 73		c73	C73	C 73	c 73	c73	c 73
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C43	c 43	c43	C43	E43	c43
C53	E 53	C 53	E\$3	c 5 3	€53
c63	C 63	C63	c63	c63	C63
c 73	c 73	c 7:3	C 7 3	C 73	E 773
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E 90	C 90	c 9 3	E93	E93	E93
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FE-132

UTILITY FORM 2504 A

TICAL SCANNING CORPORATION ... 44-14-14

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DEPARTMENT OF FORESTRY AND RURAL DEVELOPMENT



FOREST INSECT AND DISEASE SURVEY STANDARD CHANGE FORM

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DEPARTMENT OF FORESTRY AND RURAL DEVELOPMENT

FOREST INSECT AND <u>DISEASE</u> SURVEY NON-STANDARD CHANGE AND RECORD DELETION FORM



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DO NOT MAKE DELETIONS AND CHANGES ON THE SAME SHEET

Deletion Change

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DATA BUSINESS FORMS LIMITED

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Completing Non-Standard Change and Deletion Forms

- 1. The Non-Standard Change and Deletion Form is used for records involving changes other than the above. Two changes or two deletions may be made on each sheet if the year and region number are common to both.
- 2. The "Digits to be Inserted" section need not be completely used, but marking must start at the left-hand side. The spaces following the last digit must be left blank. Each column of the sections "Year, Region, Record No., Spec. No. (except as noted in item 4), and first Col. Chgd." (except as noted in item 5) must contain a mark. Each sheet of this form allows two records to be changed or deleted and cannot be used for a mixture of changes and deletions as only one category in the "Deletion, Change" section can be marked in each form. This section is used to indicate to the computer the appropriate program to be used in updating the record and simultaneous selection of two programs would cause the computer to halt.
- 3. To add a new record i.e., where an "02" or an "03" is added to an existing sampling form, the "Change" box is marked as are appropriate boxes for year, region and registration number. The new "Spec. No." is inserted in the appropriate columns; the first column to be changed is always column 63. The first column under "Digits to be Inserted" will contain the first digit of the insect or disease cause code. See example below.

	Reco	d N	0.	Spec.	No.	1st	Col.	Chgd.							[Digit	s to	be	ins	erted
1	3	2	6	0	2		6	3	6	5	4	0	3	3	1	6	A	3	2	2
0 ==	-0	- 0 =	-0 =		-0=		::0 ::	=0 ==	0	::0:>	C O ::3	100000000	:::0 ::1	-0-		(10	(1)	□0 =⊃	E-0:3	□0 □□
		C.1 (2)	c#2	cata			e t s	=1=		calan.	. r= t ==	⇔				c t =	c.t.	=1	cotto	
2:	r= 2 ==		-2	r:: 2 :::			c- 2 -3	□2 ::::	2	2	=2=	m 2 -1	2	2	-2-	2	2	2		
-3-		-3 -=	-3 -	c:: 3 ::::	-3-		3		T.3.0	-3	17.3	3:::1		0.00	∵3 ∵:	3 -,	~3		□\$ □	c 3 co
4-	L. 4	=	=	=4 =	c 4 :		-4	14	4	::4 ::2	e)sage	=4 .0	- 1	4 :	-	-4 -3		=	t: 2 =0	===
-5 =	5	c.\$	r. 5	c :\$::3	5		r.= 5 :!	€5	5		-5	- \$	ು‡ವ	\$	_\$::5:::	~ 5 70	C 3 ==	=	=
-6	C6=	c \$:::		E-8-77	5			ं 6⊃		∴ \$⊃	- 3	- \$ -3	C. \$	- 6	6.2		E-8-23	&	C\$	⊏\$ ⊐
7.3	c. 7	-1-	-7	=2=	=			=₹ :::	-2-	-2-	c2::		=7 :0	:: }:::		1	-7 =	11.3 .22	11 3 11	c 7
-8	E-8==	-8 -0	=8 =	=8==	=8 =3		C \$=	=:8 == .	: 8 :::	≔8 ===	c:8::	∷8 ⇒	c:8 :::	53 33	:8 :3	c:8::::	E-8:33	::8 :::	8	=8 =
91	-9 -	T-\$	= \$	120	_ 		C9	E29223	9.5	C\$ 22	C. Q	_9	्रभू	-		-	-	-	: V	- 9

- 4. When the change being made occurs in columns 1-60 and hence refers to all the records generated from a sampling form, the "Spec. No." columns are left blank. Blanks in this area will always signify to the computer that the change is to be made to all the records generated from the sampling form whose "Record No." is shown on the optical scanning form.
- 5. It is necessary to leave some columns blank on many of our records as we have no other way of indicating "no information". Because of this it may also be necessary to create or insert a blank in some columns. The procedure for this is as follows: If the blank occurs in the middle of a correction, the correction is made in the usual way and the appropriate column is left blank. However, if the blank occurs at the

	Recor	d N	0.	Spec	No.	1st	Col. C	hgd.							[Digit	s to	be	ins	erted
3	6	8	2	0	2		6	5		3	2	2		3	4					
0	=0==	0	0		-0		-0 -3	-0 -	=0=	∵0 □	C1 6 222		- =0.==	:0 :=		⊏\$ ==			0	-0
	to kind	E	5.1.2	c#:			mbm -	cata:	10 10 10	cto	Sand Sand			0.000			-	C 1		C.1:3
2	-2-	-2		c-2			-2-	-2-	5.2.	2			(-2-)		-2-	:-2 ::::	2 :3	-2-	1:2:	2 ::3
	-3-	-3	1.3.3	:: 3 :::	-3-		cc 3 cc	-3	- - 3	(A. 100)	-	::3 :::	-3 -3	3.5	c: 3 :.9	€3=>	=3 =	=3 =	-3-	c:3==
4	-4	M400	4 3	1004001	-4 -9		-4 -3	1.24.00	t 4 3	-4-	-4-	4	-4-3	-4-7	4	=4 =3	-4		C.4	-4 -1
5	⊆. 5 ∷≎	-5-		c=\$==	-5-3		5.		=5==	-5-	-\$	-	53	::5::		:	5	£ 5	::5 :::	-5-
6		∈6 ⊃	6	-6-1	~6 ∷			- 4 -3	-6-	~ \$ >	1.2	-6-3	-	4	-6-	-	-6-3	E-8	r_6	E-8-
7	() ·	E.Z.:		= 7 =3	=7 :		-7-3	70		-7	-	7	C.7-	2=	c- 7 _3	::7::	£.7	r 7 3	-7 -	
8	8 =1		-8 =	=8 =3	::8 :::		= \$=	-8 -3	-8		(:8: :3	-8 -	:3 :1	3	-8:	-8 -	118 111	C.(830)	12 8 23	-8
9	1000	91	(2 9 200	- i	— — 3	1	-9	=:9===	F.9	ci ý io	-			-9-3	-9 -3	•		1.9.	-	

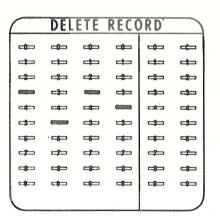
	Recor	dN	0.	Spec.	No.	1st	Col. (Chgd.						**********		Digit	s to	be	ins	erted
2	3	6	8				3	9		7										
-0	0	-0=	.0	=0==	-0		=0 ==	E 0 E	<0=	c 0	r= 0 :==	- 0	=0=,		- 4		- 4			
-	1-1-1		ets											= 0 ==	= 0 ==		cto			c.0
	∷2 ∷⊃	-2-	2	-2-	-2=		-2	=2 =	-2-	~2 ~	-2	c 2	-2=	∷2 ⊐	-2	-2-	c: 2 :::1	-2-	-2 -3	-2
=3=		=3 =	=3 ==	3 -3	-3 -3			=3=	. u 3 m	=3=	=\$ =	=3 =	3 ⇒	=3 =	=3 =	-3-	-3 -	:3 ⇒	-3-	£.3=7
=	C.4	C.4,	:: 4 :3		C2\$25		4 7	C. 2 1.13	4	-4-	-4	=4 =3	4.3	C4	4. 3	=			-4	E 4 E
-\$	-3-	=5:3	3	:::S::::1	-5-		:5 ::	E:: \$::::>	C. 3 7	:: \$:::	~ 5 ~	⊏5 ≔	~ :	-5	=	-\$ -3	□\$ ⇒	-\$	⊏\$ ⇒	=\$ =
-6-	6		- 6	⊏8 □	6		-6-	⇔	20823	. 6	1.5		-	-8-3	c. 5	-4	=		C-4:03	□\$ □
<i>□</i> 7	- 7	□7 :::		=7 =					22m	250	=		13		-7 -3	-7-1	=	□‡ □	-	c.7
-3-	-8	28	•	∷8 :⊐	=8 ==		=3 =	-8	-8 -1	-8	ः\$ □	-8 -3	-3 :2	=8 ==	=8 =	-8-	-3 -3	=:8 ==	-8	=8 =
9==>	□\$ □	-9	co g co	-	-9		ET \$ 200	•	-9	9	9-3	29	9	-9-	E. 9	-9	=	_9	E	

end of the correction, a digit must be inserted in the next column. If the insertion of a blank is the only correction to be made the form is filled out in the usual way, i.e., year, region, record number, etc. The number of the column to be left blank is inserted in the "lst Col. Chgd.", the first column of the "Digits to be Inserted" area is left blank and the digit which follows the blank column is inserted in the next column of this area. This means that you are changing one extra column but since the last column already contained the digit entered from the optical scanning form it has not been changed. A digit must always follow a blank to be inserted as scanning of the records is done in reverse and a digit is needed to indicate the length of the correction. If the column following the one in which you wish to insert a blank contains a special character the optical scanning form cannot be used.

6. To delete a record, mark the deletion box, the appropriate year and region boxes and insert the proper registration and specimen numbers. If only the registration number is inserted and the specimen number left blank all records pertaining to that sampling form will be deleted. If both registration number and specimen number are inserted only the record with the indicated specimen number will be deleted.

	DEL	ETE	RECC)RD			
⊏0 :::	=0 =	c: 0 ::3	(1)		د		
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r.2	-2-	2 =	-2	c 2 ::3	E2:3		
	(_3	1. 1	c. 3 3	c: 3 ::::			
4		4	cz t c3	1004000	-4		
=\$ ==	=5 =	- 5	5 5	c 3 co	::5 :::1		
:: \$⊃	□\$ □□	-6 -3	=6 ==	-6	c.\$		
-7-	-	C-7		a. 7 .31	ro ž ta		
c: \$::2	E-8:==	∈8 ⊃	-8 -3	E-8-3	28 2		
0.9:15	E \$m	9	9 3	.: :\$::::3	-9-3		

deletes only 3437-03 3437-01 and 02 will remain in the file as will 04 and 05 if such existed



will delete all records with 3534 in columns 57-60

- 7. Insertion If a registration number (columns 57-60) is not present in the file, either by omission or deletion, it must be reinserted by submission of the sampling form (or a photocopy). If a record has been deleted and there is an existing registration number and specimen number which is smaller than the specimen number of the record to be inserted, an optical scanning form can be used, i.e., if a 01 is in existence you can use the optical scanning form to insert a 02 or higher.
- 8. Acceptance of errors to indicate that a record which has been rejected during editing can be accepted, an optical scanning form should be prepared as follows: mark the change box, fill in the year, region and record number in the usual way and insert "00" in the "Col. Chgd." area. Leave the "Digits to be Inserted" area blank. Only one optical scanning form is needed per record regardless of the numbers of errors in it.
- 9. When the "delete and reinsert" procedure is necessary to correct a record, it is imperative that the deletion take place prior to reinsertion (or other change). To insure that deletion instructions do not cause the loss of records that should be retained, send the deletion instructions then wait for confirmation of the deletion (report S132BG) before resubmitting the sampling form.

	Reco	rd N	0.	Spec	No.	1st	Col. C	hgd.								[Digits	s to	be	ins	ertec
2	3	7	1	0	1		0	0													
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	C2	E-2==	C- 2	□2 □	2-		-2-	-2-3		-2 -	-2-	= 2 ==	-2-	r:2:::	-2 -3	-2 -	-2 -	-2-	-2-1	-2-	C-\$=>
-3		حلات		22322	-3			□\$□ .	-		c-\$==	≔3 ==	::- 3 :	-3 -2	-3 -	C.3 C3	=3 =	-	-	-	-
					=		=4 =	=		-4-	-	C4 :3	C 2	-4 -3		=	-4	=			
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HOST TREE CODE

A - Arranged by Code Number and Natural Groups

Code Number	Scientific Name	Common Name
	MISCELLANEOUS	
999	No host	
800	Miscellaneous trees, shrubs, herbs, etc.	
	CONIFEROUS SPECIES	
001	Abies spp.	Fir
002	amabilis (Dougl.) Forb.	Fir, amabilis
003	balsamea (L.) Mill.	Fir, balsam
004	balsamea (L.) Mill.	,
	var. phanerolepis Fern.	Fir, bracted balsam
005	concolor (Gord. & Glend.) Lindl.	Fir, silver
006	grandis (Dougl.) Lindl.	Fir, grand
007	lasiocarpa (Hook.) Nutt.	Fir, alpine
010	Auracaria spp.	Monkey tree
011	Cedrus spp.	Cedar
012	libani Loud.	Cedar, Lebanon
013	Chamaecyparis spp.	Cedar
014	nootkatensis (D. Don) Spach	Cedar, yellow
018	Cupressus spp.	Cypress
019	macrocarpa Gord.	Cypress, Monterey
020	Juniperus spp.	Juniper
021	communis L.	Juniper, common
022	communis L.	
	var. depressa Pursh	Juniper, ground
023	communis L.	The state of the
	var. hibernica Gord.	Juniper, Irish
024	horizontalis Moench	Savin, creeping
025	scopulorum Sarg.	Juniper, Rocky Mountain
026	virginiana L.	Juniper, red
027	virginiana L.	
	var. $crebra$ Fern. and Grisc.	Cedar, northern red
030	Larix spp.	Larch
031	decidua Mill.	Larch, European
032	laricina (Du Roi) K. Koch	Tamarack

Code Number	Scientific Name	Common Name
	Larix contd.	
033	leptolepis (Sieb. and Zucc.) Rehd.	Larch, Japanese
034	lyallii Parl.	Larch, alpine
035	occidentalis Nutt.	Larch, western
036	siberica Ledeb.	Larch, Siberian
	concerned added.	, dately observed
040	Picea spp.	Spruce
041	abies (L.) Karst.	Spruce, Norway
042	engelmannii Parry	Spruce, Engelmann
043	glauca (Moench) Voss	Spruce, white
044	glauca (Moench) Voss	
	var. albertiana (S. Brown) Sarg.	Spruce, western white
045	mariana (Mill.) BSP.	Spruce, black
046	pungens Engelm.	Spruce, Colorado
047	rubens Sarg.	Spruce, red
048	sitchensis (Bong.) Carr.	Spruce, Sitka
050	Pinus spp.	Pine
051	albicaulis Engelm.	Pine, whitebark
052	banksiana Lamb.	Pine, jack
053	contorta Dougl.	Pine, shore
054	contorta Dougl.	
	var. <i>latifolia</i> Engelm.	Pine, lodgepole
055	flexilis James	Pine, limber
056	monticola Dougl.	Pine, western white
057	mugo Turra	Pine, mugho
058	nigra Arn.	Pine, Austrian
059	ponderosa Laws.	Pine, ponderosa
060	resinosa Ait.	Pine, red
061	rigida Mill.	Pine, pitch
062	strobus L.	Pine, eastern white
063	sylvestris L.	Pine, Scots
064	thunbergii Parl.	Pine, Japanese black
065	peuce Griseb.	Pine, Balkan
066	pinaster Ait.	Pine, cluster
070	Do and about a series	Daniel and Sin
070	Pseudotsuga spp.	Douglas-fir
071	menziesii (Mirb.) Franco	Douglas-fir
072	menziesii (Mirb.) Franco	D1 64 1-1
	var. glauca (Beissn.) Franco	Douglas-fir, blue
080	Sequoia spp.	Sequoia
082	Taxus spp.	Yew
083	brevifolia Nutt.	Yew, western
084	canadensis Marsh.	Hemlock, ground
085	Thuja spp.	Cedar
086	occidentalis L.	Cedar, eastern white
087	plicata Donn	Cedar, western red
007	poodod Domi	ocual, western red

Code Number	Scientific Name	Common Name
090	Tsuga spp.	Hemlock
091	canadensis (L.) Carr.	Hemlock, eastern
092	heterophylla (Raf.) Sarg.	Hemlock, western
093	mertensiana (Bong.) Carr.	Hemlock, mountain
3,3	mer condition (Benge, Garre	nomicon, mountain
	NON-CONIFEROUS SPECIES	
100	Acer spp.	Maple
101	circinatum Pursh	Maple, vine
102	glabrum Torr.	impie, vine
202	var. douglasii (Hook.) Dipp.	Maple, Douglas
103	macrophy llum Pursh	Maple, broadleaf
104	negundo L.	Maple, Manitoba
105	negundo L.	impie, imileoba
103	var. interius (Britt.) Sarg.	Maple, inland Manitoba
106	nigrum Michx. f.	Maple, black
107	pensylvanicum L.	Maple, striped
108	platanoides L.	Maple, Norway
109	pseudoplantanus L.	Maple, sycamore
110	rubrum L.	Maple, red
111	saccharinum L.	Maple, silver
112	saccharum Marsh.	Maple, sugar
113	spicatum Lam.	Maple, mountain
114	ginnala Maxim.	Maple, ginnala
	g or the out Interests	impie, giinata
120	Aesculus spp.	Buckeye
121	carmea Hayne	Horse-chestnut, red
122	hippocastanum L.	Horse-chestnut
126	Ailanthus spp.	Tree-of-heaven
127	altissima (Mill.) Swingle	Sumac, Chinese
22,	arrange (military buringer	bande, on mede
130	Alnus spp.	Alder
131	crispa (Ait.) Pursh	Alder, green
132	glutinosa (L.) Gaertn.	Alder, black
133	incana (L.) Moench	Alder, gray
134	rhombifolia Nutt.	Alder, white
135	rubra Bong.	Alder, red
136	<i>rugosa</i> (Du Roi) Spreng.	
	var. <i>americana</i> (Regel) Fern.	Alder, speckled
137	serrulata (Ait.) Willd.	Alder, common
138	sinuata (Regel) Rydb.	Alder, Sitka
139	tenuifolia Nutt.	Alder, mountain
150	Arbutus spp.	Madrone
151	menziesii Pursh	Arbutus
4.J.L	MOIND DOO DO I GIOII	111 00000
155	Asimina spp.	Pawpaw
156	triloba (L.) Dunal	Pawpaw

Code Number	Scientific Name	Common Name
160	Betula spp.	Birch
161	borealis Spach	Birch, northern
162	caerulea-grandis Blanch.	Birch, blueleaf
163	eastwoodae Sarg.	Birch, Yukon
164	gladulosa Michx.	Birch, dwarf
165	lenta L.	Birch, sweet
166	alleghaniensis Britt.	Birch, yellow
167	occidentalis Hook.	Birch, water
168	papyrifera Marsh.	Birch, white
169	papyrifera Marsh. var. commutata (Regel) Fern.	Birch, western white
170	papyrifera Marsh.	
171	var. cordifolia (Regel) Fern.	Birch, mountain white
171	papyrifera Marsh. var. elobata (Fern.) Sarg.	Birch, Gaspé white
172	papyrifera Marsh.	
173	var. humilis (Regel) Fern. & Raup papyrifera Marsh.	Birch, Alaska white
1/3	var. macrostachya Fern.	Birch, large-fruited white
174	papyrifera Marsh.	
	var. pensilis Fern.	Birch, weeping white
175	papyrifera Marsh.	
	var. subcordata (Rydb.) Sarg.	Birch, northwestern white
176	pendula Roth	Birch, European
177	populifolia Marsh.	Birch, wire
178	pumila L.	Birch, swamp
180	Caragana spp.	Caragana
181	arborescens Lam.	Caragana, Siberian
182	frutex K. Koch	Caragana, Russian
183	pygmaea DC.	Caragana, pygmy
184	spinosa (L.) DC.	Caragana, spiny
187	Carpinus spp.	Blue-beech
188	caroliniana Walt.	
	var. virginiana (Marsh.) Fern.	Blue-beech
190	Carya spp.	Hickory
191	cordiformis (Wang.) K. Koch	Hickory, bitternut
192	glabra (Mill.) Sweet	Hickory, pignut
193	laciniosa (Michx. f.) Loud.	Hickory, shellbark
194	ovalis (Wang.) Sarg.	
	var. borealis (Ashe) Sarg.	Hickory, Michigan red
195	ovalis (Wang.) Sarg.	****
100	var. odorata (Marsh.) Sarg.	Hickory, roundnut red
196	ovata (Mill.) K. Koch	Hickory, shagbark
197	ovata (Mill.) K. Koch	114-1
198	var. fraxinifolia Sarg. tomentosa Nutt.	Hickory, ashleaf shagbark Hickory, mockernut

Code Number	Scientific Name		Common Name
200	Castanea spp.		Chestnut
201	dentata (Marsh.) Borkh.		Chestnut, sweet
202	Catalpa spp.		Catalpa
203	hybrida Spaeth		Catalpa, hybrid
204	ovata G. Don		Catalpa, Chinese
205	speciosa Warder		Catalpa, western
206			
206	Celtis spp.		Hackberry
207	occidentalis L.		Hackberry
208	Cercis spp.		Redbud
209	canadensis L.		Redbud
210	Cornus spp.		Dogwood
211	acadiensis Fern.		_
212			Dogwood, hybrid
	alternifolia L. f.		Dogwood, alternate-leaf
213	drummondii C.A. Meyer		Dogwood, roughleaf
214	florida L.		Dogwood, eastern flowering
215	<i>nuttallii</i> Audubon		Dogwood, western flowering
216	rugosa Lam.		Dogwood, round-leaved
217	stolonifera Michx.		Dogwood, red osier
220	Corylus spp.		Hazelnut
221	americana Walt.		Hazelnut, American
222	californica K. Koch		Hazelnut, California
223	cornuta Marsh.		Hazelnut, beaked
224	avellana L.		Filbert, European
230	Crataegus spp.		Hawthorn
231	chrysocarpa Ashe		
232	columbiana Howell		Hawthorn, roundleaf
233			Hawthorn, Columbia
233	douglasii Lindl.		Hawthorn, black
240	Fagus spp.		Beech
241	grandifolia Ehrh.		Beech, American
242	sylvatica L.		Beech, European
250	Fraxinus spp.		Ash
251	americana L.		Ash, white
252	excelsior L.		Ash, European
253	nigra Marsh.		Ash, black
254	pennsylvanica Marsh.		Ash, red
255	pennsylvanica Marsh.		
-33	var. <i>austinii</i> Fern.		Ash, northern red
256	pennsylvanica Marsh.		
	var. subintegerrima (Vahl)	Fern.	Ash, green
257	quadrangulata Michx.		Ash, blue

Code Number	Scientific Name	Common Name
260	Ginkgo biloba L.	Ginkgo Ginkgo
262	Gleditsia spp.	Honey-locust
263	triacanthos L.	Honey-locust
264	Gymnocladus spp.	Coffee-tree
265	dioica (L.) K. Koch	Coffee-tree, Kentucky
266	Hamamelis spp.	Witch-hazel
267	virginiana L.	Witch-hazel
270	Ilex spp.	Holly
271	aquifolium L.	Holly, English
272	glabra (L.) Gray	Inkberry
273	verticillata (L.) Gray	Holly, Canada
275	Juglans spp.	Walnut
276	cinerea L.	Butternut
277	nigra L.	Walnut, black
278	Liquidambar spp.	Gum, sweet
279	styraciflua L.	Gum, sweet
280	Liriodendron spp.	Tulip-tree
281	tulipifera L.	Tulip-tree
	Maclura	Ocago-orango
283	pomifera (Raf.) Schneid.	Osage-orange Osage-orange
284	Magnolia spp.	Magnolia
285	acuminata L.	Cucumber-tree
203	acumenava L.	Gucumber-tree
287	Morus spp.	Mulberry
288 289	alba L. rubra L.	Mulberry, white Mulberry, red
		indibelly, led
290	Nemopanthus spp.	Mountain-holly
291	mucronata (L.) Trel.	Mountain-holly, false
292	Nyssa spp.	Tupello
293	sylvatica Marsh.	Gum, black
294	Ostrya spp.	Ironwood
295	virginiana (Mill.) K. Koch	Ironwood, rough-barked
296	Platanus spp.	Cycamore
297	acerifolia (Ait.) Willd.	Plane, London
298	occidentalis L.	Sycamore

Code Number	Scientific Name	Common Name
300	Populus spp.	Poplar
301		-
	acuminata Rydb.	Cottonwood, lanceleaf
302	alba L.	Poplar, silver
303	angustifolia James	Cottonwood, narrowleaf
304	balsamifera L.	Poplar, balsam
305	eugenei Simon-Louis	Poplar, Carolina
306	candicans Ait.	Balm of Gilead
307	deltoides Marsh.	Cottonwood, eastern
308	grandidentata Michx.	Aspen, largetooth
309	nigrα L. var. <i>italicα</i> Muenchh.	Poplar, Lombardy
310	deltoides Marsh.	,
	var. occidentalis Rydb.	Cottonwood, plain
311	tremuloides Michx.	Aspen, trembling
312	trichocarpa Torr. & Gray	Cottonwood, black
312	or venocurpu fort. a dray	Gollonwood, black
320	Prunus spp. (see also 520 & 521)	Cherries and plums
321	americana Marsh.	Plum, wild
322	cerasifera Ehrh.	Plum, cherry
323	emarginata Dougl.	Cherry, bitter
324	nigra Ait.	Plum, Canada
325	pennsylvanica L. f.	Cherry, pin
326	serotina Ehrh.	Cherry, black
327	virginiana L.	Cherry, eastern choke
328	virginiana L.	
	var. demissa (Nutt.) Torr.	Cherry, western choke
329	virginiana L.	
	var. melanocarpa (A. Nels.) Sarg.	Cherry, black choke
330	Ptelea spp.	Hop-tree
331	trifoliata L.	Hop-tree
340	Malus spp.	Apple
341	Aronia arbutifolia (L.) Ell.	Chokeberry, red
342	Malus coronaria (L.) Mill.	Crab-apple, sweet wild
343	fusca (Raf.) Schneid.	Crab-apple, Pacific
344	glaucescens Rehd.	Crab-apple, wild
	Sorbus	
345	americana Marsh.	Mountain-ash, American
346	aucuparia L.	Mountain-ash, European
347	decora (Sarg.) Schneid.	Mountain-ash, showy
348	occidentalis (Wats.) Greene	Mountain-ash, western
349	sitchensis Roem.	Mountain-ash, Sitka
547	C C C C C C C C C C C C C C C C C C C	maneali asii, bleka
350	Quercus spp.	0ak
351	alba L.	Oak, white

Code Number	Scientific Name	Common Name
0.50	Quercus contd.	0.1
352	bicolor Willd.	Oak, swamp white
353	rubra L.	Oak, red
354	coccinea Muenchh.	Oak, scarlet
355	ellipsoidalis E.J. Hill	Oak, northern pin
356	garryana Dougl.	Oak, Garry
357	macrocarpa Michx.	Oak, bur
358	montana Willd.	Oak, chestnut
359	muehlenbergii Engelm.	Oak, chinquapin
360	palustris Muenchh.	Oak, pin
361	velutina Lam.	Oak, black
370	Rhamnus spp.	Buckthorn
371	alnifolia L'Her.	Buckthorn, alderleaf
372	cathartica L.	Buckthorn, common
373	purshiana DC.	Cascara
374	frangula L.	Buckthorn, alder
376	Rhododendron spp.	Rhododendron
377	maximum L.	Laurel, great
3.80	Rhus spp.	Sumac
381	glabra L.	Sumac, smooth
382	typhina L.	Sumac, staghorn
383	vernix L.	Sumac, poison
390	Robinia spp.	Locust
391	pseudo-acacia L.	Locust, black
392	viscosa Vent.	Locust, clammy
372	vocosa vent.	locust, Claning
400	Salix spp.	Willow
401	alaxensis (Anderss.) Cov.	Willow, feltleaf
402	alba L.	Willow, white
403	alba L.	
	var. vitellina (L.) Stokes	Willow, golden
404	amygdaloides Anderss.	Willow, peachleaf
405	babylonica L.	Willow, weeping
406	bebbiana Sarg.	Willow, Bebb
407	candida Flugge	Willow, hoary
408	caudata (Nutt.) Heller	Willow, whiplash
409	cordata Michx.	Willow, heart-leaved
410	coulteri Anderss.	Willow, Coulter
411	discolor Muhl.	Willow, pussy
412	exigua Nutt.	Willow, coyote
413	fragilis L.	Willow, crack
414	hookeriana Barratt	Willow, Hooker
415	interior Rowlee	Willow, sandbar
416	lasiandra Benth.	Willow, Pacific
417	lucida Muh1.	Willow, shining

Code Number	Scientific Name	Common Name
		Control of the Contro
	Salix contd.	
418	lutea Nutt.	Willow, yellow
419	mackenzieana (Hook.) Barratt	Willow, Mackenzie
420	melanopsis Nutt.	Willow, dusky
421	nigra Marsh.	Willow, black
422	pentandra L.	Willow, bayleaf
423	pseudomonticola Ball	Willow, serviceberry
424	purpurea L.	Willow, basket
425	pyrifolia Anderss.	Willow, balsam
426	scouleriana Barratt	Willow, Scouler
427	sericea Marsh.	Willow, silky
428	sessilifolia Nutt.	Willow, northwest
429	sitchensis Sanson	Willow, Sitka
430	vestita Pursh	Willow, hairy
440	Sambucus spp.	Elder
441	canadensis L.	Elder, common
442	glauca Nutt.	Elder, blueberry
443	pubens Michx.	Elder, red-berried
446	Sassafras spp.	Sassafras
447	albidum (Nutt.) Nees	Sassafras, white
448	albidum (Nutt.) Nees	
	var. molle (Raf.) Fern.	Sassafras, red
450	Tilia spp.	Basswood
451	americana L.	Basswood, American
452	cordata Mill.	Linden, small-leaved
453	platyphyllos Scop.	Linden, large-leaved
460	Ulmus spp.	E1m
461	americana L.	Elm, white
462	glabra Huds.	Elm, Wych
463	montana Stokes	Elm, Scotch
464	procera Salisb.	Elm, English
465	pumila L.	Elm, Siberian
466	rubra Muhl.	Elm, slippery
467	thomasii Sarg.	Elm, rock
468	parvifolia Jacq.	Elm, Chinese
475	Lonicera spp.	Honeysuckle
476	canadensis Bertr.	Honeysuckle, American fly
480	Diervilla lonicera Mill.	Honeysuckle, bush
481	Viburnum spp.	Viburnum
482	lentago L.	Nannyberry
483	cassinoides L.	Wild-raisin
484	trilobum Marsh.	Cranberry, highbush

Code Number	Scientific Name	Common Name
490	Berberis spp.	Barberry
491	thunbergii DC.	Barberry, Japanese
492	vulgaris L.	Barberry, common
,,,	747 gaz 75 z 1	,
495	Shepherdia spp.	Shepherdia
496	argentea Nutt.	Buffalo-berry
497	canadensis (L.) Nutt.	Soapberry
	,	
499	Chamaedaphne Moench calyculata (L.) Moench	Leatherleaf
500	Spiraea spp.	Spiraea
510	Amelanchier spp.	Serviceberry
511	alnifolia (Nutt.) Nutt.	Saskatoon
512	canadensis (L.) Medic.	Serviceberry
	(21) 1111111	
520	Prunus amygdalus Batsch	Almond
521	padus L.	
	var. commutata Dipp.	May-day tree
530	Syringa spp.	Lilac
531	vulgaris L.	Lilac
	3 3	
535	Arctostaphylos spp.	Bearberry
536	uva-ursi (L.) Spreng.	Bearberry, common
330	www.mior (me) opiong.	bear berry , commen
540	Ribes spp.	Currants and
340	nobel Spp.	gooseberries
		goosebellies
560	Rosa spp.	Rose
500	nosa spp.	Rose
570	Ledum spp.	Labrador-tea
370	Deaum Spp.	Labrador-tea
575	Elaeagnus spp.	Russian-olive
576		Russian-olive
370	angustifolia L.	Vasstau-office
580	Cotoneaster spp.	Cotoneaster
300	coronecters sph.	COLUMEASTEL

B - Arranged Alphabetically by Common Name

Common Name	Scientific Name	Code Name
Alder	Alnus spp.	130
black	glutinosa (L.) Gaertn.	132
common	serrulata (Ait.) Willd.	137
gray	incana (L.) Moench	133
green	crispa (Ait.) Pursh	131

Common Name	Scientific Name	Code Number
Alder contd.		
mountain	tenuifolia Nutt.	139
red	rubra Bong.	135
Sitka	sinuata (Regel) Rydb.	138
speckled	rugosa (Du Roi) Spreng.	
	var. americana (Regel) Fern.	136
white	rhombifolia Nutt.	134
Almond	Prunus amygdalis Batsch	520
Apple	Malus	340
Arbutus	Arbutus	
	menziesii Pursh	151
Ash	Fraxinus spp.	250
black	nigra Marsh.	253
blue	quadrangulata Michx.	257
European	excelsion L.	252
green	pennsylvanica Marsh.	
	var. subintegerrima (Vahl) Fern.	256
northern red	pennsylvanica Marsh.	
	var. <i>austini</i> Fern.	255
red	pennsylvanica Marsh.	254
white	americana L.	251
Aspen	Populus	
largetooth	grandidentata Michx.	308
trembling	tremuloides Michx.	311
Balm of Gilead	candicans Ait.	306
Barberry	Berberis spp.	490
common	vulgaris L.	492
Japanese	thunbergii DC.	491
Basswood	Tilia spp.	450
American	americana L.	451
Beech	Fagus spp.	240
American	grandifolia Ehrh.	241
European	sylvatica L.	242
Bearberry	Arctostaphylos spp.	535
common	uva-ursi (L.) Spreng.	536
Blue-beech	Carpinus spp.	187
	caroliniana Walt.	
	var. <i>virginiana</i> (Marsh.) Fern.	188

Common Name	Scientific Name	Code Number
Birch	Betula spp.	160
Alaska white	papyrifera Marsh.	
	var. humilis (Regel) Fern. & Raup.	172
blueleaf	caerulea-grandis Blanch.	162
dwarf	glandulosa Michx.	164
European	pendula Roth	176
Gaspé white	papyrifera Marsh.	
	var. elobata (Fern.) Sarg.	171
large-fruited white		
	var. macrostachya Fern.	173
mountain white	papyrifera Marsh.	
	var. cordifolia (Regel) Fern.	170
northern	borealis Spach	161
northwestern white	papyrifera Marsh.	
	var. subcordata (Rydb.) Sarg.	175
swamp	pumila L.	178
sweet	lenta L.	165
water	occidentalis Hook.	167
weeping white	papyrifera Marsh.	
	var. pensilis Fern.	174
western white	papyrifera Marsh.	
	var. commutata (Regel) Fern.	169
white	papyrifera Marsh.	168
wire	populifolia Marsh.	177
yellow	alleghaniensis Britt.	166
Yukon	eastwoodae Sarg.	1 63
Buckeye	Aesculus spp.	120
Buckthorn	Rhamnus spp.	370
alderleaf	alnifolia L'Her.	371
common	cathartica L.	372
alder	frangula L.	374
44402	January and Livery and	37.
Buffalo-berry	Shepherdia argentea Nutt.	496
Butternut	Juglans	
	cinerea L.	276
Caragana	Caragana spp.	180
pygmy	pygmaea DC.	183
Russian	frutex K. Koch	182
Siberian	arborescens Lam.	181
spiny	spinosa (L.) DC.	184
Catalpa	Catalpa spp.	202
Chinese	ovata G. Don	204
hybrid	hybrida Spaeth	203
western	speciosa Warder	205

Common Name	Scientific Name	Code Number
Cascara	Rhamnus purshiana DC.	373
Cedar eastern white Lebanon northern red	Cedrus, Chamaecyparis, Thuja spp. Thuja occidentalis L. Cedrus libani Loud. Juniperus virginiana L.	011, 013, 085 086 012
western red	var. <i>crebra</i> Fern. & Grisc. <i>Thuja plicata</i> Donn	027 087
yellow	Chamaecyparis nootkatensis (D. Don) Spach	014
Cherry bitter black	Prunus spp. emarginata (Dougl.) D. Dietr. serotina Ehrh.	320 323 326
black choke eastern choke pin plum	virginiana L. var. melanocarpa (A. Nels.) Sarg. virginiana L. pennsylvanica L. f. cerasifera Ehrh.	329 327 325 322
western choke	virginiana L. var. demissa (Nutt.) Torr.	328
Chestnut sweet	Castanea spp. dentata (Marsh.) Borkh.	200 201
Chokeberry red	Aronia arbutifolia (L.) Ell.	341
Coffee-tree Kentucky	Gymnocladus spp. dioica (L.) K. Koch	264 265
Cotoneaster	Cotoneaster spp.	580
Cottonwood black eastern lanceleaf narrowleaf plains	Populus trichocarpa Torr. & Gray deltoides Marsh. acuminata Rydb. angustifolia James deltoides Marsh. var. occidentalis Rydb.	312 307 301 303
Crab-apple Pacific sweet wild wild	Malus fusca (Raf.) Schneid. coronaria (L.) Mill. glaucescens Rehd.	343 342 344
Cranberry, highbush	Viburnum trilobum Marsh.	484

Common Name	Scientific Name	Code Number
Cucumber-tree	Magnolia	
Odcumber-tree	acuminata L.	285
Currant	Ribes spp.	540
Cypress	Cupressus spp.	018
Monterey	macrocarpa Gord.	019
Dogwood	Cornus spp.	210
alternate-leaf	alternifolia L. f.	212
eastern flowering	florida L.	214
hybrid	acadiensis Fern.	211
red osier	stolonifera Michx.	217
roughleaf	drummondi C.A. Meyer	213
round-leaved	rugosa Lam.	216
western flowering	nuttallii Audubon	215
Douglas-fir	Pseudotsuga spp. menziesii (Mirb.) Franco	070
Dide	var. glauca (Beissn.) Franco	072
Douglas-fir	menziesii (Mirb.) Franco	071
Elder	Sambucus spp.	440
blueberry	glauca Nutt.	442
common	canadensis L.	441
red-berried	pubens Michx.	443
E1m	Ulmus spp.	460
Siberian	pumila L.	465
English	procera Salisb.	464
rock	thomasii Sarg.	467
Scotch	montana Stokes	463
slippery	rubra Muh1.	466
white	americana L.	461
Wych	glabra Huds.	462
Chinese	parvifolia Jacq.	468
Filbert, European	Corylus avellana L.	224
Fir	Abies (See also Douglas-fir)	
alpine	lasiocarpa (Hook.) Nutt.	007
amabilis	amabilis (Dougl.) Forb.	002
balsam	balsamea (L.) Mill.	003
bracted balsam	balsamea (L.) Mill.	
	var. phanerolepis Fern.	004
grand	grandis (Dougl.) Lindl.	006
silver	concolor (Gord. & Glend.) Lindl.	005
Ginkgo	Ginkgo	
9.	biloba L.	260

Common Name	Scientific Name	Code Number
Gooseberry	Ribes spp.	540
Gum black sweet	Liquidambar, Nyssa spp. Nyssa sylvatica Marsh. Liquidambar styraciflua L.	278, 292 293 279
Hackberry	Celtis spp. occidentalis L.	206 207
Hawthorn black Columbia roundleaf	Crataegus spp. douglasii Lindl. columbiana Howell chrysocarpa Ashe	230 233 232 231
Hazelnut American beaked California	Corylus spp. americana Walt. cornuta Marsh. californica K. Koch	220 221 223 222
Hemlock eastern ground mountain western	Tsuga, Taxus spp. Tsuga canadensis (L.) Carr. Taxus canadensis Marsh. Tsuga martensiana (Bong.) Carr. Tsuga heterophylla (Raf.) Sarg.	090, 082 091 084 093 092
Hickory ashleaf shagbark	Carya spp. ovata (Mill.) K. Koch var. fraxinifolia Sarg.	190 197
bitternut Michigan red mockernut pignut	cordiformis (Wang.) K. Koch ovalis (Wang.) Sarg. var. borealis (Ashe) Sarg. tomentosa Nutt. glabra (Mill.) Sweet	191 194 198 192
roundnut red shagbark shellbark	ovalis (Wang.) Sarg. var. odorata (Marsh.) Sarg. ovata (Mill.) K. Koch laciniosa (Michx. f.) Loud.	195 196 193
Holly Canada English	Ilex spp. verticillata (L.) Gray aquifolium L.	270 273 271
Honey-locust	Gleditsia spp. triacanthos L.	262 263
Honeysuckle American fly bush	Lonicera spp. canadensis Bertr. Diervilla lonicera Mill.	475 476 480

Common Name	Scientific Name	Code Number
Hop-tree	Ptelea spp. trifoliata L.	330 331
Horse-chestnut	Aesculus	100
red	hippocastanum L. carnea Hayne	122 121
Inkberry	Ilex glabra (L.) Gray	272
Ironwood	Ostrya spp.	294
rough-barked	virginiana (M111.) K. Koch	295
Juniper	Juniperus spp.	020
common	communis L.	021
creeping	horizontalis Moench	024
ground	communis L.	
7 1 1	var. depressa Pursh	022
Irish	communis L.	000
	var. hibernica Gord.	023
red	virginiana L.	026
Rocky Mountain	scopulorum Sarg.	025
Labrador-tea	Ledum spp.	570
Larch	Larix spp.	030
alpine	lyallii Parl.	034
European	decidua Mill.	031
Japanese	leptolepis (Sieb. & Zucc.) Rehd.	033
Siberian	siberica Ledeb.	
	occidentalis Nutt.	036
western	occidentalis nutt.	035
Laurel	Rhododendron	
great	maximum L.	377
Leatherleaf	Chamaedaphne calyculata (L.) Moench	499
Lilac	Syringa spp.	530
	vulgaris L.	531
Linden	Tilia	
large-leaved	platyphyllos Scop.	453
small-leaved	cordata Mill.	452
Locust	Robinia spp.	390
black	pseudo-acacia L.	391
	viscosa Vent.	392
clammy	viscosa vent.	392
Madrone	Arbutus spp.	150

Common Name	Scientific Name	Code Number
Magnolia	Magnolia spp.	284
Maple	Acer spp.	100
black	nigrum Michx. f.	106
broadleaf	macraphy llum Pursh	103
Douglas	glabrum Torr.	
G	var. douglasii (Hook.) Dipp.	102
ginnala	ginnala Maxim.	114
inland Manitoba	negundo L.	
	var. interius (Britt.) Sarg.	105
Manitoba	negundo L.	104
mountain	spicatum Lam.	113
Norway	platanoides L.	108
red	rubrum L.	110
silver	saccharinum L.	111
striped	pensylvanicum L.	107
sugar	saccharum Marsh.	112
sycamore	pseudoplantanus L.	109
vine	circinatum Pursh	101
VIIIe	Core outam Tursh	101
May-day tree	Prunus padus var. commututa Dipp.	521
Monkey tree	Auracaria spp.	010
Mountain-ash	Sorbus	
American	americana Marsh.	345
European	aucuparia L.	346
showy	decora (Sarg.) Schneid.	347
Sitka	sitchensis Roem.	349
western	occidentalis (Wats.) Greene	348
Mountain-holly	Nemopanthus spp.	290
false	mucronata (L.) Trel.	291
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Mulberry	Morus spp.	287
red	rubra L.	289
white	alba L.	288
Nannyberry	Viburnum lentago L.	482
0ak	Quercus spp.	350
black	velutina Lam.	361
bur	macrocarpa Michx.	357
chestnut	montana Willd.	358
chinquapin	muehlenbergii Engelm.	359
Garry	garryana Dougl.	356
northern pin	ellipsoidalis E.J. Hill	355
pin	palustris Muenchh.	360
red	rubra L.	353
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Common Name	Scientific Name	Code Number
Oak contd.		
scarlet	coccinea Muenchh.	354
swamp white	bicolor Willd.	352
white	alba L.	351
Osage-orange	Maclura	
	pomifera (Raf.) Schneid.	283
Pawpaw	Asimina spp.	155
•	triloba (L.) Dunal	156
Pine	Pinus spp.	050
Austrian	nigra Arn.	058
Balkan	peuce Griseb	065
cluster	pinaster Ait.	066
eastern white	strobus L.	062
jack	banksiana Lamb.	052
Japanese black	thunbergii Parl.	064
limber	flexilis James	055
lodgepole	contorta Dougl.	055
rougepoie	var. latifolia Engelm.	054
mugho	mugo Turra	057
pitch	rigida Mill.	061
ponderosa	ponderosa Laws.	059
red	resinosa Ait.	
		060
Scots	sylvestris L.	063
shore	contorta Dougl.	053
western white	monticola Dougl.	056
whitebark	albicaulis Engelm.	051
Poplar	Populus spp.	300
balsam	balsamifera L.	304
Carolina	eugenei Simon-Louis	305
Lombardy	nigra L.	
·	var. italica Muenchh.	309
silver	alba L.	302
Plane	Platanus	
London	acerifolia (Ait.) Milld.	297
P1um	Prunus	
Canada	nigra Ait.	324
wild	americana Marsh.	321
WIId	aner cana raisii.	321
Redbud	Cercis spp.	208
	canadensis L.	209
Rhododendron	Rhododendron spp.	376
Rose	Rosa spp.	560

Common Name	Scientific Name	Code Number
Russian-olive	Elaeagnus spp. angustifolia L.	575 576
Savin creeping	Juniperus horizontalis Moench	024
Saskatoon	Amelanchier alnifolia (Nutt.) Nutt.	511
Sassafras red	Sassafras spp. albidum (Nutt.) Nees	446
white	var. molle (Raf.) Fern. albidum (Nutt.) Nees	448 447
Sequoia	Sequoia spp.	080
Serviceberry	Amelanchier spp. canadensis (L.) Medic.	510 512
Shepherdia	Shepherdia spp.	495
Soapberry	Shepherdia canadensis (L.) Nutt.	497
Spiraea	Spiraea spp.	500
Spruce black Colorado Engelmann Norway red Sitka western white	Picea spp. mariana (Mill.) BSP. pugens Engelm. engelmannii Parry abies (L.) Karst. rubens Sarg. sitchensis (Bong.) Carr. glauca (Moench) Voss var. albertiana (S. Brown) Sarg.	040 045 046 042 041 047 048
white	glauca (Moench) Voss	043
Sumac Chinese poison smooth staghorn	Ailanthus, Rhus, spp. Ailanthus altissima (Mill.) Swingle Rhus vernix L. Rhus glabra L. Rhus typhina L.	126, 380 127 383 381 382
Sycamore	Platanus spp. occidentalis L.	296 .298
Tamarack	Larix laricina (Du Roi) K. Koch	032
Tree-of-heaven	Ailanthus spp.	126
Tulip-tree	Liriodendron spp. tulipifera L.	280 281

Common Name	Scientific Name	Code Number
Tupello	Nyssa spp.	292
Viburnum	Viburnum spp.	481
Walnut	Juglans spp.	275
black	nigra L.	277
Wild-raisin	Viburnum cassinoides L.	483
Willow	Salix spp.	400
balsam	pyrifolia Anderss.	425
basket	purpurea L.	424
bayleaf	pentandra L.	422
Bebb	bebbiana Sarg.	406
black	nigra Marsh.	421
Coulter	coulteri Anderss.	410
coyote	exigua Nutt.	412
crack	fragilis L.	413
dusky	melanopsis Nutt.	420
feltleaf	alaxensis (Anderss.) Cov.	401
golden	alba L.	
8	var. vitellina (L.) Stokes	403
hairy	vestita Pursh	430
heart-leaved	cordata Michx.	409
hoary	candida Flugge	407
Hooker	hookeriana Barratt	414
Mackenzie	mackenzieana (Hook.) Barratt	419
northwest	sessilifolia Nutt.	428
Pacific	lasiandra Benth.	416
peachleaf	amygdaloides Anderss.	404
pussy	discolor Muhl.	411
sandbar	interior Rowlee	415
scouler	scouleriana Barratt	426
serviceberry	pseudomonticola Ball	423
shining	lucida Muhl.	417
silky	sericea Marsh.	427
Sitka	sitchensis Sanson	429
weeping	baby lonica L.	405
whiplash	caudata (Nutt.) Heller	408
white	alba L.	402
yellow	lutea Nutt.	418
Witch-hazel	Hamamelis spp.	266
	virginiana L.	267
Yew	Taxus spp.	082
western	brevifolia Nutt.	083