FOREST PATHOLOGY COMPUTER SYSTEM

USER GUIDE

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Date: 8 Dec-1992
Computer: VAX 6410
Operating system: VMS
Software: Oracle SQL*PLUS, SQL*FORMS V3

Abstract

This database system is an automation of the existing manual forest Pathology Recording System extended to include the Past Site History and Weather informations.

It is written in Oracle SQL*FORMS version3 with full data validation and querying facilities suitable for research.

1. INTRODUCTION

This computerized database system is an automation of the existing manual system of forest pathology records.

The existing manual system consists of a form (form no 1) of about one-and-a-half page long containing data items, which is to be ticked and blanks, which is to be filled by the field staff. This form has evolved over the past years, but during the recent four years it has become very stable and satisfactory. It is included in appendix 1 below. The information in it is self-explanatory and is not described here.

Some additional information from another form (form no 2, NUTRITIONAL AND PHYSIOLOGICAL PROBLEMS) was also included in this system. This required information is illustrated in appendix 2 below.

The screen layout for data entry and querying is made as similar to the manual system as possible.

This system provides standard querying facilities on screen, which is supported by SQL*FORMS V3. You can also query by SQL*PLUS to produce hardcopy reports, but this technique is not described here.

2. DESCRIPTION OF THE FIELD TYPES USED

The fields are listed in appendix 3, which specifies all the field types, field lengths and whether they are mandatory or not.

2.1 Fields of the Special Type used extensively

Many fields are of the type "tick as many as you like".

Take the field Sample as an example. Let our abbreviation convention be:

abbreviation	**value**
ROT	ROOT
ROC	ROOT COLLAR
TWG	TWIG
STM	STEM
BCH	BRANCH

Only the abbreviated values will be entered.

Then we use a single field to store its values as follows :

ROT,ROC,TWG. (a maximum total of 28 characters, as there may be 7 of them ticked)

where the abbreviated values are separated by commas and a period marks the end of the list of values chosen to be included by the User, as shown above.

Note that these field values are all highly standardized.

2.2 Fields of the Simple Type

Most other fields are of the simplest type such that their allowable values are mutually exclusive. These field values are also highly standardized and can only take up one of the valid values.

Fields of this type include Enquiry Type & Status.

2.3 The Species Fields

The User chose to record the Species Name by using four fields namely: Genus, Species, Rank & Infra_species, but not for the fields Insects and Fungi.

This has definite advantages in querying the database.

2.4 Descriptive Felds:

For fields, which cannot be standardized, eg. Fertilizers Applied, Other Conditions, we simply use one or more character fields to store the description of the situation. Admittedly, it will be harder to query these fields.

3. THE DATABASE TABLES :

Only one table , named FPT_MASTER is used to hold all the fields in the same order as in form no 1 above.

The fields are listed in appendix 3.

4. RUNNING THE SYSTEM

The User can start the system by keying in at the VMS prompt :
Cosmos> RUN_FP [Return]

then you will see the main menu. Proceed to choose options.

4.1 Function keys

Oracle systems rely completely on function keys.

It is a standard practice when referring to a key, we refer to its functional name, eg. [Next Record], rather than the label on the keyboard namely perhaps Down Arrow. The functional names never change but the key labels may differ from keyboard to keyboard.

At any stage, pressing [Control]+K keys together will show you the complete key-map explaining all the keys available to you, but you only need to be familiar with a few. The [Exit] key always brings you backward to your previous screen option you had chosen.

The particularly important key is the [Commit] key.

Whatever you have done to the data are not done permanently to the database yet until you press the [Commit] key. Thus you should press [Commit] no less often than every 15 minutes to guard against work loss due to power failure and the like.

5 CHANGING EXISTING DATA

Use the [Next Field] key to go to the required field and overtype the values.

All data entry and corrections must be consistent with the data type specifications in appendix 3. If you entered the wrong data type, you will be prompted to do it correctly.

To enter an existing data value, you can press the [List] key to see a list of the existing values. Then use querying techniques to find the required value and place.

6. ADDING A NEW RECORD

Press [Insert Record], then fill-in the blank fields.

7. DELETING A RECORD

When you press [Delete Record] then [Commit], the record is not deleted physically yet. It is only marked for deletion by setting the field Record_status to "D". It can still be recovered by SQL techniques.

8. SCREEN LAYOUT, NAVIGATION & DATA ENTRY.

Other than the main menu, the VDU screen was divided into two halves the upper and lower halves, each being a "Pop-up Page", in Oracle terms. The data itself spans over four Pages which always occupy the upper half of the screen. The lower half of the screen is reserved solely for displaying the valid values to the User after he pressed the [List] key, when the cursor is in a particular data field..

A typical appearance of the screen showing the first Page of the record is in appendix 4. When the cursor is moved into a particular data field, the Message Line near the bottom of the screen, most ofter than not, displays the corresponding default prompting message for that field..

When the cursor is in a data field of the Simple Type, eg Status, and the Special Type, eg Sample, if the user pressed the [List] key, the valid values for the field will be displayed in a

Pop-up Page. For the latter this occupies the lower half of the screen, where the cursor is also moved to. Here you can move the cursor up and down to view the valid values.

8.1 For the Fields of the Simple Type:

Pressing the [List] key will display the mutually exclusive valid values in a Pop-up Page. you can choose one by placing the cursor at it then press the [Accept] key. The value will be automatically copied over to the data field for you. You cannot update the valid values in these Pop-up pages. To update them you have to choose options in the main menu to do so.

8.2 For the Fields of the Special Type ("as many as you like") :

Take the field Sample as an example.

The [List] key works as above with the following exception.

When the cursor is in the lower half of the screen, hitting the [Previous Block] key will bring the cursor back to the field Sample into which the user can now enter the valid values while the lower screen is still displaying them. After the cursor is returned to the field Sample, pressing the [Next Field] key will make the lower Pop-up Page disappear.

You can also update the valid values when you are in the lower half of the screen.

Extensive validation is carried out using the user specified conditions inbuilt into the system by PL/SQL programming techniques. When an invalid value is entered, the you will hear a beep and a message is displayed prompting him what to do. If stuck, clear the field.

9. Querying

Please refer to appendix 5 for all the querying techniques.

10. Programmer's guide: (only for the maintenance programmer)

Please see appendix 6.

<end>

Appendix 1

FOREST PATHOLOGY RECORDS

CONTACT PERSON :_____ DATE:_____
ADDRESS:_____PHONE:_____

PLANT SPECIES AFFECTED:_____
BLOCK:_____ PLANT/COMPT. :_____
LAT/LONG:_____A/MAP GRID:_____OTHER:_____
HEIGHT(m):_____ DBH (cm):_____
AGE (yrs):_____ DOMINANCE: dom, co-dom, sub-dom, suppressed
SAMPLE :leaves__; twigs__, branches__, stem__, root collar__, roots__, soil__

SYMPTOMS (circle if present)

CROWN: LEAF COLOUR: green, yellow, white, silver, red, blue, brown, dead
LEAF SYMPTOMS: mildew, rust, smut, leaf spot, wilt, microphylly, necrosis, insect damage, sooty mould, twisting, none
POSITION OF SYMPTOMS ON LEAVES: tip, base, margin, between veins, along veins, bands, scattered, all over
AGE OF SYMPTOMATIC LEAVES: young, old, all ages
TWIGS: shoot death, canker, bud death twisting
POSITION OF SYMPTOMS IN CROWN: top, middle, bottom, scattered

BRANCHES: twisting, twig death, canker, kino/resin, bluestained wood, discoloured sapwood, discoloured heartwood, brown rot, straw rot, white pocket rot, insect damage, none

STEM: canker, kino/resin, bluestained wood, discoloured sapwood, discoloured heartwood, brown rot, straw rot, white pocket rot, insect damage, none

ROOT COLLAR: canker, kino/resin, bluestained wood, discoloured sapwood, discoloured heartwood, brown rot, straw rot, white pocket rot, insect damage, none

ROOTS: canker, root death, kino/resin, bluestained wood, discoloured sapwood, discoloured heartwood, brown rot, straw rot, white pocket rot, insect damage, none

OTHER SYMPTOMS:_____
FUNGI PRESENT:_____
INSECTS PRESENT:_____
FIRST OBSERVED:_____OTHER AFFECTED TREES _____

SITE

SOIL TEXTURE: sand, loam, clay GRAVEL CONTENT: none, low, high
DEPTH TO IMPEDING LAYER OR ROCK (cm):_____ ROCK OUTCROPS: Y/N
TOPOGRAPHICAL POSITION: crest, upper slope, mid-slope, lower slope, valley bottom
DRAINAGE: good, moderate, poor ASPECT: N, E, S, W

PAST SITE HISTORY

TIME SINCE CLEARING:_____
FERTILIZER APPLICATION_____
_____
HERBICIDE APPLICATION_____
_____

WEATHER

ANNUAL RAINFALL_____
RECENT ABNORMAL CONDITIONS: frost, hail, storm, flooding, exceptional heat.
other_____

LAB USE ONLY

REFERENCE NUMBER:_____ DATE:_____PAYMENT:_____
ENQUIRY: Forest, Plantation, Nursery, Utilization, Conservation,CALM, Commercial, Private

"Appendix 2"

NUTRITIONAL AND PHYSIOLOGICAL PROBLEMS

CONTACT PERSON :_____ DATE:_____
ADDRESS:_____PHONE:_____

PLANT SPECIES AFFECTED:_____
BLOCK:_____ PLANT./COMPT. :_____
LAT/LONG:_____A/MAP GRID:_____OTHER:_____
HEIGHT(m):_____ DBH (cm):_____
AGE (yrs):_____ DOMINANCE: dom, co-dom, sub-dom, suppressed
SAMPLE :leaves__; twigs__, bark __, wood __, root __, soil__, depth of soil sample___

SYMPTOMS (circle if present)

CROWN: LEAF COLOUR: green, yellow, white, silver, red, blue, brown, dead
LEAF SYMPTOMS: mildew, rust, smut, leaf spot, wilt, microphylly, necrosis, insect damage, sooty mould, twisting, none
POSITION OF SYMPTOMS ON LEAVES: tip, base, margin, between veins, along veins, bands, scattered, all over
AGE OF SYMPTOMATIC LEAVES: young, old, all ages
TWIGS: shoot death, canker, bud death twisting
POSITION OF SYMPTOMS IN CROWN: top, middle, bottom, scattered

BRANCHES: twisting, twig death, canker, kino/resin, bluestained wood, discoloured sapwood, discoloured heartwood, brown rot, straw rot, white pocket rot, insect damage, none

OTHER SYMPTOMS:_____
FUNGI PRESENT:_____
INSECTS PRESENT:_____
FIRST OBSERVED:_____OTHER AFFECTED TREES _____

SITE

SOIL TEXTURE: sand, loam, clay GRAVEL CONTENT: none, low, high
DEPTH TO IMPEDING LAYER OR ROCK (cm):_____ ROCK OUTCROPS: Y/N
TOPOGRAPHICAL POSITION: crest, upper slope, mid-slope, lower slope, valley bottom
DRAINAGE: good, moderate, poor ASPECT: N, E, S, W

PAST SITE HISTORY

TIME SINCE CLEARING:_____
FERTILIZER APPLICATION_____
_____
HERBICIDE APPLICATION_____
_____

WEATHER

ANNUAL RAINFALL_____
RECENT ABNORMAL CONDITIONS: frost, hail, storm, flooding, exceptional heat.
other_____

Only this information is required in this form

.....

LAB USE ONLY

REFERENCE NUMBER:_____ DATE:_____ PAYMENT:_____
ENQUIRY: Forest, Plantation, Nursery, Utilization, Conservation,CALM, Commercial, Private

Appendix 3

```
CREATE TABLE  FPT_MASTER
   (REFNO          CHAR(10)          NOT NULL,
    SAMPLE_DATE     DATE             NOT NULL,
    CLIENT_GIVNAM   CHAR(30)         NOT NULL,
    CLIENT_SURNAM   CHAR(30)         NOT NULL,
    CLIENT_PHONE    CHAR(7),
    CLIENT_ADDR     CHAR(60)         NOT NULL,
    ENQ_TYPE       CHAR(15)          NOT NULL,
    USER_STATUS    CHAR(15)          NOT NULL,
/*      species                                  */
    GENUS          CHAR(30)          NOT NULL,
    SPECIES        CHAR(37),
    RANK           CHAR(9),
    INFRA_SPECIES   CHAR(37),
/*                                               */
    BLOCK          CHAR(25),
    PLANTN         CHAR(25),
    LAT_DEG        NUMBER(2)
    LAT_MIN        NUMBER(2)
    LAT_S          NUMBER(2),
    LONG_DEG       NUMBER(3)
    LONG_MIN       NUMBER(2)
    LONG_S         NUMBER(2),
/*              A/MAP                            */
    ZONE           NUMBER(2),
    EASTING        NUMBER(6),
    NORTHING       NUMBER(8),
/*                                               */
    LOC_OTHER       CHAR(40),
    HEIGHT        NUMBER(4),
    DBH           NUMBER(4),
    AGE           NUMBER(5),
    SAMPLE        CHAR(45),
/*     --------------- SYMTOMS  --------      */
    C_L_COLOUR   CHAR(20),
    C_L_SYMP     CHAR(20),
    C_L_SYMP_POSN    CHAR(32),
    C_SYMP_L_AGE     CHAR(10),
    C_TWG_SYMP       CHAR(16),
    C_SYMP_POSN      CHAR(24),
    BCH_SYMP         CHAR(36),
    STM_SYMP         CHAR(36),
    RT_COL_SYMP      CHAR(36),
    RT_SYMP          CHAR(36),
    OTHER_SYMP       CHAR(40),
    FUNGI            CHAR(100),
    INSECTS          CHAR(100),
    FIRST_OBS_DATE   DATE,
    OTHER_TREES      CHAR(4),
/*     ---------------------- SITE ------------------  */
    SOIL_TEXT        CHAR(20),
    GRAVEL_AMT       CHAR(6),
    DPTH_IMPED_LAYER    NUMBER(4),
    ROCK_OUTCRP         CHAR(1),
    TOPO_POSN           CHAR(20),
    DRAINAGE            CHAR(20),
    ASPECT              CHAR(6),
/*     ---------------------SITE HISTORY ---------------  */
    YRS_CLEARED         NUMBER(10),
    FERT_APPD           CHAR(80),
    HERBI_APPD          CHAR(80),
/*     -------------------- WEATHER  --------------------- */
    RAIN_MMPA           NUMBER(5),
    RECENT_ABCOND       CHAR(30),
    OTHER_COND          CHAR(80),
/*     --------------------LAB REPORT  --------------  */
    TISSUE_SAMPLED      CHAR(100),
    TISSUE_NUTRI        CHAR(1),
    AGAR                CHAR(40),
    SOIL BAIT           CHAR(1),
```

not all null

```
SOIL_NUTRI          CHAR(1),
FUNGI_ISO           CHAR(100),
PLANT_ANAL          CHAR(100),
SOIL_ANAL           CHAR(100),
CONCLUSION1         CHAR(255)     NOT NULL,
CONCLUSION2         CHAR(145),
RESPONSE            CHAR(40),
WAHERB_NO           CHAR(10),
CULTURE_NO          CHAR(10)   ) ;
```

RECORD_STATUS CHAR(1)

Appendix 4 Screen layout

```
     FOREST PATHOLOGY SYSTEM ;  update table   FPT_MASTER          (page 1)

REF_NO YUNG1                                      SAMPLE_DATE 19-NOV-92
CLIENT: givnam F          surname F               phone F
        address GHG                               enq_type CONSER user_status COMM
GENUS YU        SPECIES              RANK         INFRA_SPECIES
Block            Plantn           Lat.(DDMMSS) 12 12    Long.(DDDMMSS) 12  12
A/MAP: Zone (99)     Easting          Northing
Loc_other                  Height      DBH      Age       Sample LEA,BCH.
```

```
                ===  Valid  SAMPLE  values    ====    (page 5)

   VSA   VSAMPLE
   LEA   LEAVES
   TWG   TWIGS
   BCH   BRANCHES
   STM   STEM
v  ROC   ROOT COLLAR
```

```
Count:  5            v                                          <Replace>
On line.  (Alt H for Help)
```

Appendix 5 Search for a record which contains a specified character string in a particular field.

In entering the character string into the chosen field, only two techniques are necessary to get you started.

1. The single character '%' (percent) represents a character string containing one or more characters. For example,

entry	outcome
%	The first record containing any characters in this field will be displayed.
%K	Any character string ending with 'K' will pass this test.
%SHIRE%	'THE SHIRE' and 'A SHIRE CLERK' will pass this test.

2. The single character '_' (the underscore) represents any single character. For example,

entry	outcome
_HIRE	Any single character followed by 'HIRE' will pass this test.

There are many more techniques in searching. See an SQL manual to learn them if needed.

Appendix 6 Maintenance programmer's guide

A6.1 Block and Page arrangement in SQL*FORMS:

The data itself resides in Block 1. It spans Pop-up Pages 1 to 4, which always occupy the upper half of the screen.

Page 5 onwards are the Pop-up Pages, which list the valid values of the fields belonging to the Special Type. When they appear, they always occupy the lower half of the screen. There is one block per Page.

A6.2 Validation of hte Special Field Type fields

There is only one Form Level Procedure CHECK3, which is called by a Post-change trigger for each of the fields of the Special Type to do the validation. Comments in CHECK3 explains clearly what each module does.

A6.3 Tables, Scripts & Forms used

All tables have prefix FPT_ , where T stands for "table".

All Scripts have prefix FPC_, where C stands for "create".

All Forms have prefix FPU_ , where U stands for "update".

There is only one Index to keep the first field Refno unique.

The tables containing the valid values of the fields of the Simple Type and their forms for updating them are respectively :

FPT_ENQ_TYPE	FPU_
FPT_USER_STATUS	FPU_
FPT_C_SYMP_L_AGE	FPU_
FPT_OTHER_TREES	FPU_
FPT_GRAVEL_AMT	FPU_
FPT_ROCK_OUTCRP	FPU_
FPT_TISSUE_NUTRI	FPU_
FPT_SOILBAIT	FPU_
FPT_SOIL_NUTRI.	FPU_

Supplement

Error message :

FRM-40508 , can't insert
FRM-40509 , can't update

are caused by Refno you entered happened to be the same as an existing value in a record, including those you marked as deleted.