

# PEDIGREE

A Windows Program for Dog Breeders

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## 1. Distribution

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This version of PEDIGREE Program may be distributed with the following limitations:

### GENERAL

PEDIGREE may be distributed free of charge; there can be no fee charged for the distribution of PEDIGREE other than reasonable media charges. PEDIGREE may only be distributed in its entirety — the archive format may be changed, but all of the files in the original archive must be included in the new archive.

The limitations specified in this section are not designed to interfere with your use or distribution of the program; they are designed to protect the interests of the programmer.

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## 2. Disclaimer

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## Introduction -

This Pedigree Program allows the user to generate a list of dogs (up to 32,767 entries) including conformation and obedience/field title status and establishes linkages with the dog's sire and dam. After these linkages are set, a 5-generation pedigree file (backward looking), or a 6-generation progeny file (forward looking) can be written as a text file for later printing using any word processing program. The program also allows the pedigree or progeny files to be previewed and printed at the time they are created. In order to use the program the dynamic-link library file for MS Visual Basic, Version 3.0, VBRUN300.DLL (included) must be installed on your computer, usually in the Windows directory. Computer memory resources may limit the total number of entries per list and the number of associated records.

The Pedigree Program also allows note files, show records, medical records, litter records, show entry forms and ownership/breeding records to be accumulated for each dog in the list, and, if BMP graphic files are available in approximately 200 x 200 pixels size, these pictures can be called up when that dog's name is entered in the NAME box. The dog list file, records and the graphics files should be placed in the same directory. If desired, more than one dog list file and associated records and pictures may be maintained, but each such set of records should be put in a separate subdirectory. The convention for naming the files uses the dog's index number in the list (e.g., for a dog indexed as number 35 in the list the associated records file is called 0035PEDI.REC). Similarly, the picture file for a scanned picture of this dog should be named 0035PICT.BMP in order to be found by the program.

An Income & Expenses record can be generated to track the costs associated with the maintenance and showing of the dogs. This function is accessed from the menu selections on several of the forms. It is a text file which will be named PEDICOST.FNC and when saved will be stored in the active folder.

The screenshot shows the 'Pedigree' software window. On the left is a vertical pane labeled 'DOG LIST'. The main area contains a form with the following fields and controls:

- Sire: [ ] Sire [ ]
- Name: [ ] Dog Name [ ]
- Dam: [ ] Dam [ ]
- SAVE and CLEAR [ ]
- Pre-Title: [ ] (List: CH, FC, AFC, NAFC, CT)
- Inced Title: [ ]
- Post-Title: [ ] (List: CD, CDX, UD, LUD, LUDX, TD)
- NOTES [ ] SAVE [ ] PICTURE [ ] SAVE [ ]
- AKC No: [ ] Dab: [ ] CEFF: [ ]
- Breeder: [ ] Sex: [ ] OFA: [ ]
- Owner: [ ] Color: [ ] BAER: [ ]
- NOTES: [ ]

## Getting Started -

The program initiates with the main Pedigree form.

1. If no previous list of dogs exists, a new list must be generated by using the program in the NEW FILE mode. Select NEW FILE under the FILE, OPEN FILE menu, then open the new file using a valid filename. Use the Windows 3.1 naming convention- (no more than 8 characters.PDG).

2. Begin entering dog names by typing in the NAME box (type in the center sector - leading and ending sectors are reserved for conformation and obedience/field titles, respectively).

After each entry press the carriage return button or click on SAVE and CLEAR to enter the names in the LIST box. They will automatically be sorted alphabetically as they are entered. Do not try to enter new names in the SIRE and DAM boxes; all new entries should be typed in the NAME box.

3. After all the names have been entered, SAVE the file from the FILE menu. For long dog list files, the displayed region will automatically scroll to keep the current position visible.

4. Click on SAVE and CLEAR only ONCE for any entry. Otherwise duplicate listings may be entered in the LIST box. If a mistake is made, it can be corrected later in the MODIFY FILE mode, but if the entry is already indexed to records and pictures, duplicate entries may be difficult to correct.

5. To DELETE an entry, you should first assure that there are no sire or dam links to the entry you want to delete. If there are, you will need to link these to the correct entry (or to the blank) while in the MODIFY FILE mode. An entry can be deleted by double clicking on the entry name in the list box and then clicking the DELETE button which will appear. When the file is saved from the FILE menu, the list of dogs will decrease by the number of entries deleted and the index numbers will be shifted accordingly.

6. After entering the names, the file should be opened for MODIFY (FILE MENU - OPEN FILE- MODIFY FILE) to set up the sire and dam linkages. It is possible to switch the file mode from the FILE MENU. This may be more efficient than saving, closing, and re-opening the file, but it will save the modified file

using the same file name and cause the old file to be overwritten without warning.

7. Highlight the dog's name from the LIST box and click on the Name option button to load the dog in the NAME box.

8. You can then highlight the sire's name in the LIST box and enter its name in the SIRE box by clicking the button in front of that box. The dam's name can be entered in the DAM box in the same manner.

9. After these entries have been made, click on the SAVE and CLEAR button to save the sire/dam linkages. If you prefer, you can start to type the sire or dam name in the proper box; the dog list will scroll to display your entry, and if it exactly matches a dog already listed, it will be properly linked after a carriage return is entered and the SAVE and CLEAR button is clicked.

10. Entering conformation (Pre-) and obedience (Post-) titles can be done in several ways. The titles can be typed directly in the appropriate spaces next to the NAME box, or the titles can be selected from the title list boxes which each include a blank for no title then click on the Insert Title button to enter the titles in the appropriate spaces (or you can double click on the entry in the title list box). You must click on SAVE and CLEAR for the changes to be recorded.

11. Note files can be generated for the dog entered in the NAME box while in the MODIFY mode. If a note file already exists for the entry, a green bar appears in the check box next to the NOTES button. Clicking on the NOTES button will then

load that file which can be amended and saved. If no file exists, you can click on NOTES, type the entries for Reg. No., Date of Birth, Breeder, Sex, Owner, Color, CERF, OFA, and BAER in appropriate boxes, then type the note for optional additional information about the dog, and click on the SAVE button to save to file. To facilitate searches, breeder and owner names should be entered in the format: Smith, John.

12. If a picture of the dog entered in the NAME box is in the current directory, a green bar appears next to the PICTURE button, the PICTURE button is enabled, and clicking on that button will load the picture. It is automatically unloaded when a new entry is made in the NAME box.

13. To access the Medical Record for the dog currently entered in the NAME box, click on the menu item RECORDS and then select Medical Record. Similarly, to access other records click on RECORDS and then make the selection. You will not be able to change and save any of the data in these records if the dog list file was opened as Read Only.

14. To satisfy the AKC requirements for record keeping, "Regulations for Record Keeping and Identification of Dogs, Jan 20, 1994," you are required to keep a separate printed copy of all required records. Current printouts of the Litter Records and the Ownership Records should be maintained for all dogs owned or leased and kept for a period of at least five years after the dog has died, been sold or given away.

15. The pedigree file can be generated by using the PRINT option under the FILE menu. The file will be placed in

the current directory for later manipulation using a word processing program. In order to have the spacing come out right you will need to print the file using a monospace type font (such as COURIER or LETTER GOTHIC). You can also preview and print the file directly from the Pedigree program.

16. The program workspace can be personalized by selecting the background color, wallpaper and font from the OPTIONS Menu. After exiting from the program, these selections will be saved in the file PEDIGR.INI which will be used to initialize the program when next started.

# RECORDS

## Litter Record -

The litter record can be used to keep track of litters produced by bitches selected from the dog list and entered in the NAME box. Completed record forms can be used to track the data in accordance with the requirements of AKC regulations.

The dam's name is entered when a new litter form is called. Other data must be entered in the appropriate boxes. These data will be saved in the Litter Record part of a file named, e.g., 0047PEDI.REC for the bitch with index number 47.

Sex	Color & Markings	Puppy ID No.	Date Born	Date Sold	Name & Address of New Owner	Reg Appl	Reg Certif	Bill of Sale	Registered Name & No. of Puppy
F	Black	1	5/14/89		Stillborn				
F	Black	2		6/28/89	Janet Reno, 2185 Chevy Chase Ln, Washington, DC 21805	6/28/89		6/28/89	
F	Black	3		6/28/89	John Smith, 856 Dandora St, Trenton, NJ 21201	6/28/89		6/28/89	
M	Black	4		6/28/89	Henry Simpson, 55 TimberView St, Hummelstown, PA 17055	6/28/89		6/28/89	
F	Black	5		7/2/89	Andrew Michaelson, 788 Fox Ln, Baltimore, MD 21225	7/2/89		7/2/89	

The disposition of each puppy is recorded by entering data in the input boxes directly above the data grid. The keyboard tab key can be used to move the cursor between the boxes or the mouse can be moved to the box and clicked to begin typing. After com-

pleting the entries, clicking on the Enter button (or carriage return if in the final box) moves the data into the grid and clears the input boxes. A maximum of 17 rows are provided for listing the puppies. The data will be entered in the first row with no entry in the first column (sex column). N.B. , if you do not have a data entry in the first column, the rest of the table beyond that

point will not be saved.

To correct erroneous data double-click on the item in the data grid that is to be replaced. Typing corrected data in the input box above the item to be corrected and clicking on the Enter button will replace the data with the corrected entry. More than one item in the same row (or even the entire row) can be corrected simultaneously using this method. If there are no data in any of the input boxes, the entire grid row will be deleted.

Litters from the same bitch should be numbered sequentially. They can be called up by clicking on the File Menu and then on Open File. The litter number must be entered in the input box to call up the record. To start a new litter record enter the next higher number than the last litter recorded. This program provides for a maximum of ten litters. The form can be printed by clicking Print from the File Menu.

After all new data have been entered, clicking on Save under the File menu saves the updated record.

The font selection made from the options menu of the main Pedigree screen will affect the display font in the data grid for 800 x 600 screen resolutions.

## Medical Record -

The medical Record File is used to record vaccinations, examinations and veterinary treatments. The record for the dog entered in the NAME box will be called up when the menu Record is clicked and the Medical Record is selected.

If not already entered, Date of birth, Veterinarian and phone number should be entered in the appropriate boxes. When the save button is clicked these data will be saved to file.

The screenshot shows a window titled "Medical Record - (C:\Program Files\PEPPER.D)" with a menu bar containing "File" and "Options". The main area is titled "Medical Record of" followed by the name "AIDYRANTH WHISPERING HOPE II". Below this are input fields for "Date of Birth" (3/24/86), "Veterinarian" (Colin Morris, DVM), and "Phone" (717-608-5455). There are two tables: "Vaccination Record" and "Examination Record".

	Current	Date Due		Current	Date Due
Distemper	4/2/99	4/2/2000	Fecal	10/10/98	10/10/99
Hogadisk	4/2/99	4/2/2000	Heartworm	10/19/98	10/19/99
Lepidopteran	4/2/99	4/2/2000			
Parvovirus	4/2/99	4/2/2000			
Parvovirus	3/15/99	3/15/2000			
Caninevirus	3/15/99	3/15/2000			
Bordetella	10/10/98	10/10/99			
Bordetella	3/12/99	3/12/99			
Rabies	6/12/97	6/12/2000			

Record of Treatments

5/19/95 Thyroid Stimulation Test - Use 0.5 mg Solonase 2% daily until followup test in 6 months.

Buttons: Close, Save Record, Print Record

Vaccination dates and Examination dates should be entered in the corresponding boxes under Current. Date Due entries can also be made or you may accept the program's default values. The Date Due entries will be color-coded to

reflect the need to update vaccinations or exams (red for past due, amber for due within 30 days). Program default values for all exams and vaccinations other than rabies are set to one year. The rabies default value for puppies is one year and for adults three years. The medical record has two extra spaces for user options. Select and delete the square brackets and enter your preferences. The date due for these is set to 1 year post vaccination. The estrus block sets the due date to 6 months post last. The Record of Treatments box should be used to record office visits, treatments, seasons for bitches, breeding notes, etc.

It is important to click the Save button before clicking on the Close button, otherwise the file will not be updated to reflect the changes that have been made.

## Ownership Record -

The ownership record can be used to record significant data on each dog. This data form includes the information required for record keeping by the AKC. The breeding list should be completed for each dog and bitch owned.

The screenshot shows a software window titled "Ownership Record - (F:\pedigree\0047PEDI.REC)". The form contains the following fields:

- Breed: Dalmatian
- Name: LABYRINTH WHISPERING HOPE II
- Registration or Litter No.: NT875328
- Sire: LABYRINTH OSCAR MADISON
- Dam: LABYRINTH ORPHAN ANNIE
- No.: NS88981
- No.: NS845336
- Date of Birth: 1/28/86
- Sex: Female
- Markings: Black Spotted
- Name and Address of Person from whom obtained: Christine Dyker, 15158 Lithicum Rd, Dickerson, MD 20842
- Date Obtained: 4/21/86
- Breeder: Alberta Holdes & Christine Dyker
- Name and Address of Person to whom sold or given: (empty)
- Date of final disposition of dog: (empty)
- Died:  Sold:  Given away:
- Dates of papers given to buyer: (empty)
- Reg. Certificate: (empty)
- Reg. Application: (empty)
- Bill of Sale: (empty)
- Dog Identification Mark or Tattoo No.: None

Below the form is a table titled "BREEDING RECORD OF ABOVE DOG" with an "Enter" button to the right.

Date of Mating	Name and Reg. No. of Dog Mated	Names of Persons Handling Mating	Name & Address of Owner of Dog Mated
2/12/89	Labyrinth Mountain King, NT204873	Devis Sansone	Devis Sansone, 2834 Buckley Ln, Pounding, PA 19623

The dog's name (and sire and dam) is entered for the dog currently entered in the Name box. Other data must be entered in the appropriate boxes. These data will be saved in the Owner record of a

file named, e.g., 0047PEDI.REC, for the dog with index number 47.

The breeding entries for each mating are recorded by entering data in the input boxes directly above the data grid. The keyboard tab key can be used to move the cursor between the boxes or the mouse can be moved to the box and clicked to begin typing. After completing the entries, clicking on the Enter button (or carriage return if in the final box) moves the data into the grid and clears the input boxes. The data will be entered in the first row with no entry in the first column (date of mating column). N.B. , if you do not have a data entry in the first column, the rest of the table beyond that point will not be saved.

To correct erroneous data double-click on the item in the data grid that is to be replaced. Typing corrected data in the

input box above the item to be corrected and clicking on the Enter button will replace the data with the corrected entry. More than one item in the same row (or even the entire row) can be corrected simultaneously using this method. If there are no data in any of the input boxes, the entire grid row will be deleted.

The form can be printed by clicking Print from the File Menu.

After all new data have been entered, clicking on Save from the File Menu saves the updated record.

The font selection made from the options menu of the main Pedigree screen will affect the display font in the data grid for 800 x 600 screen resolutions.

## Show/Trial Record -

The Show/Trial Record File can be used to keep track of show, field trial, obedience trial, agility trial entries and results. The record for the dog entered in the NAME box will be called up when the Record menu is clicked. Clicking one of the tabs at the top of the form will switch to that record.

If not already entered, AKC Registration number, Breeder identification and dog's Date of Birth can be entered by typing in the appropriate boxes. When the record is saved these data will be saved as well.

Date	Name of Show	Handler	Judge	Points	Comments
11-23-06	Maryland KC	Smith	Magnuson	0	Reserve WD from puppy class
4-5-07	Chesapeake KC	Smith	Kendrick	1	WB, BOS from Open
7-11-07	Catactia KC	Franklin	Sline	1	WB from Open
8-23-07	Mid-Susquehanna	Jones	Gerhart	1	WB, BOS
9-20-07	James River	Jones	Cannolly	2	WB, BOS
5-30-08	Worthington KC	Jones	Stanhope	1	WB, BOB from Open
7-23-08	Nita-Nee KC	Jones	Riley	1	WB, BOB from Open
7-24-08	York KC	Jones	Sline	2	WB

Updates can be entered by typing in the input boxes directly above the data grid. The

keyboard tab key can be used to move the cursor between the boxes or the mouse can be moved to the box and clicked to begin typing. After completing the new entries, clicking on the Enter button moves the data into the grid and clears the input boxes. The data will be entered in the first row with no entry in the first column (date column). N.B. , if you do not have a data entry in the first column, the rest of the table beyond that point will not be saved.

To correct previously entered data double-click on an entry for the line or item(s) to be replaced. Clicking on the Enter

button will then replace the selected line with the new data in the input boxes. Single item entries can be corrected by leaving all the input boxes blank except the item to be corrected. If there are no data in any of the input boxes, the entire grid row will be deleted.

After all new data have been entered, clicking on the Save to File button saves the updated record.

## Income & Expenses Record -

The Income & Expenses record form is accessed from the menu bars of the Main form and the Litter, Medical, Ownership and Show records.

To use this record select a tab from the categories:

General  
Show  
Breeding  
Veterinary

Index	Date	Amount	Inc./Exp.	Item Description
1	4/2/99	\$120.50	Expense	Misc. kennel supplies
2	4/3/99	\$25.37	Expense	Dog food
3	4/3/99	\$35.45	Expense	Cleaning supplies
4				
5				
6				
7				

To enter new data select a new row by scrolling the index to a new number or click on the index (left) column in the grid at the first unused row. Enter the date, amount and description of the transaction and select the option, income or expense.

Click the Enter button to move the data into the grid. scroll the index to the next unused row to continue entering more data.

To delete an item select the item from the grid and click on the Delete button. To change the entry select the item from the grid, enter the new data in one of the input boxes above the grid and click the Enter button.

To delete multiple entries select the region by depressing

and dragging the mouse in the grid and then clicking the Delete button. and dragging the mouse in the grid and then clicking the Delete button. To select an entire row click in the numbered box to the left of the row. To select an entire column click in the column title box at the top of the column. To select the entire grid click on the box in the top left corner of the grid. Hitting the delete button will delete everything in the selected region.

To save the data to file (which will be placed in the active folder and named PEDICOST.FNC) click on the Save button. Only those grid rows will be saved that have data entered in the "Amount" column. If this item is blank, the data in that row will not be saved.

The record can be printed by selecting the Print option under the menu item: Expenses.

You can also rename or delete records from the menu. When renaming, select a new name when requested (up to 8 letters - no spaces, no extension); the DOS extension .FNC will be added. Care should be exercised when deleting records, since deleted records cannot be recovered.

# PROCEDURES

## **Menu Bar -**

By clicking the FILE menu bar and selecting OPEN FILE - (READ ONLY, NEW FILE, MODIFY FILE or APPEND FILE) a file selection box appears.

Selecting the drive, the directory, and the filename (if it already exists) and clicking on OK will open the file.

Selecting the drive, the directory, and typing a new filename in the box while in the NEW FILE mode will open a new file. To expedite data entry or modification it is possible to switch the file mode from NEW FILE to MODIFY, from MODIFY to APPEND, or from APPEND to MODIFY. This switching does not allow the user to specify a new file name but overwrites the old file.

Printer setup options are available, and pedigree, progeny or AKC show entry files can be produced, previewed and printed. It is also possible to generate 4- or 5-generation pedigree files in HTML format for publishing on a web page and to launch MS Word® or MS Excel® programs.

It is possible to DELETE or RENAME dog list files from the FILE menu. These procedures are only available when a file is opened for MODIFY.

Use extreme care in using the DELETE option since this procedure does not allow recovery from the Recycle Bin. Any

records and pictures that may be associated with the deleted dog list, however, are not deleted, and these must be removed manually.

Renamed dog list files must be placed in the original folder. Renaming the dog list will not change the links to associated records and pictures.

Printer setup options are available, and pedigree, progeny or AKC show entry files can be produced, previewed and printed. It is also possible to generate and preview 4- or 5-generation pedigree files in HTML format for publishing on a web page.

Selecting LAUNCH VISIBLE COI will start the "Visible COI" program if you have that program installed. The first time you select this option you will need to locate the program. This location will be stored in the .ini file. Subsequent calls will launch immediately unless the .ini file has been deleted. The call to the "Visible COI" program from Pedigree will load the currently opened dog list and calculate and display the 5-generation COI for the selected dog.

Selecting RUN TEMPLATE APPS provides the option to launch MS Word or MS Excel and, if you have preloaded the required template or worksheet, to construct formatted pedigrees using these applications.

EXPENSES accesses the Income & Expenses record which allows the user to record, save and print transactions involving general, show, breeding, and veterinary expenses.

EDIT allows the usual CUT, COPY, PASTE functions, and SEARCH provides options to search on Breeder's Name, Owner's Name, Date of Birth, CERF, OFA, and BAER results. For a breeder or owner name search enter the last name only; capitalization is disregarded but, otherwise, the search routine requires an exact match with your search criterion. With a dog list open in the Modify File mode and a dog selected in the Name box, you can use DELETE RECORD to erase a section of the selected dog's record. You can also erase the entire record file for the selected dog.

OPTIONS allows you to change fonts and color. This is more important when using a lower resolution (800 x 600) screen mode. A smaller font size should be selected so that the text fits entirely in the space provided. The screen font selection will also affect the data grid in the Litter and Ownership records in the 800 x 600 mode.

It is possible to merge two separate dog list files into a single file, but available computer memory may limit the size of the files that can be merged. Use the Browse command to select the files to be merged. This option is only available when there is no dog list file currently open.

Some CSV-type dog lists created using other programs or exported as ASCII (text) data records from database programs can be converted to the PDG dog list format used by Pedigree. Dog lists that have been imported can be audited for duplicates and sire or dam mis-linkages after the import routine has completed. Subsets of the dog lists can be exported for use with other programs.

By selecting Preferences you can insert search preferences that replace several of the default categories that are displayed in the NOTES section.

The Autoscroll Dog List option can be used to toggle the automatic scrolling operation of the dog list box. The default option enables autoscrolling when the menu option is checked. Unchecking the option will limit the automatic scrolling for dog lists that have more than 1000 entries.

The Auto backup on Save/Delete option provides automatic creation of backup dog lists (.bak file) whenever a save or delete file request is executed. This includes mode switching between Modify and Append. To recover the previous dog list you will need to copy the .bak file and change the extension to .pdg.

PICTURE Menu allows you to load, autosize, save and link picture files. These pictures, if saved, will be saved as BMP files indexed to the dog currently selected.

RECORDS Menu lets you select the Medical Record, Show/Trial Record, Litter Records or Ownership Record and to create new records or update existing records for the dog currently selected in the NAME box.

HELP Menu displays the help screen. Help topics may also be printed if a printer is available.

## **Index Number -**

The dogs' names appearing in the list box are sorted alphabetically, but the specific INDEX number assigned to any dog is sequential according to the order in which you entered the names and does not change unless entries are deleted or files are merged.

The index number assigned to a dog is the same number that is used in the file names for that dog's note file, picture file, and records. Index number one is reserved for the blank entry and appears as the first entry in the list of dog names.

While in the Read Only mode you can type the index number of a dog in the box above the dog list. When you hit enter (CR), the list will scroll to that dog.

If you have more than one dog list, you should keep them in different subdirectories. Otherwise associated records (notes, pictures, medical records, etc) with the same index number will be improperly cross-referenced and can be inadvertently overwritten.

## Dog List -

The dog list will appear in the list box which can be scrolled to the selected entry, clicking on that entry selects it. Then clicking on the NAME button loads that name into the NAME box for correction and additions or for accessing RECORDS and PICTURES.



Although ONLY the dog entered in the NAME box can be edited, a similar method may be used to enter the names of the Sire and the Dam in the appropriate boxes.

To delete a dog's name from the list, you can double click on the name and then click on the Delete button.

## **File Opening Mode -**

Only one mode can be selected. A choice is made from the FILE menu before an existing dog list file can be opened or a new one created. A dog list file must be opened before any data can be entered.

READ ONLY can be used for reviewing an existing dog list and associated records. No records can be modified and saved while in this mode.

NEW FILE is used to start a new dog list by entering the dog names in the NAME box (as in the APPEND mode). A new file name can be entered directly in the file menu dialog or an existing file can be opened after the mode has been selected.

MODIFY FILE corrects current entries in the dog list when they are selected and entered in the NAME box; this mode is also used to enter sire/dam links, new titles, creating and editing records and notes, etc.

APPEND FILE can be used to add to an existing dog list by entering new names in the NAME box and then clicking the SAVE & CLEAR button or entering a carriage return.

While in the NEW FILE or APPEND TO FILE modes, and if the dog's sire and dam have already been added to the dog list, you can set these links immediately by selecting from the list and clicking the SIRE or DAM button, as appropriate. You can also add the titles and NOTES search data, i.e., AKC number, breeder, owner, etc. These sire/dam links and other data, how-

ever, must be entered before clicking the SAVE and CLEAR button.

It is possible to rapidly switch the file mode from the FILE Menu. When this option is clicked the file is saved using the old file name, and the old file is overwritten.

Lists of dogs should be saved in files with a suffix .PDG (default setting). The program does not accept long file names; you must limit the file name length to 8 characters in addition to the suffix .PDG. These dog list files are text files and can be reviewed by using a text editor such as NOTEPAD.

The program can be launched from a .bat file or using the Windows Start - Run button with the command line options:

pedigree.exe doglist.pdg /m      which will open doglist.pdg file  
in the MODIFY FILE mode

pedigree.exe doglist.pdg /a      which will open doglist.pdg file  
in the APPEND TO FILE mode

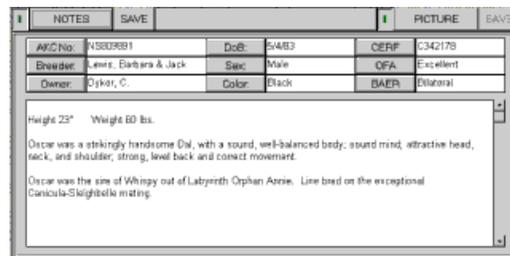
Any other flag or no flag will open the file as READ ONLY.

If you drag and drop doglist.pdg on to pedigree.exe in Explorer, the program will open with the file doglist.pdg loaded in the READ ONLY mode.

## Note Files -

If a green bar appears in the box next to the NOTES button, there is a note file for the dog entered in the NAME box that can be loaded and reviewed, or edited and resaved.

If the box is blank, clicking on the NOTES button, typing the entries, and clicking SAVE will create a data file and note for the dog currently in the NAME box.



AKC No.	Breeder	Owner	DOB	Sex	Color	CERF	OFA	BAER	Elizoral
N380981	Lens, Barbara & Jack	Ojker, C.	5/4/83	Male	Black	C342178	Excellent		

Height 23" Weight 60 lbs.

Oscar was a strikingly handsome Dil, with a sound, well-balanced body, sound mind, attractive head, neck, and shoulder, strong, level back and correct movement.

Oscar was the sire of Whispy out of Labyrinth Orphan Annie. Line bred on the exceptional Canicola-Skighibella mating.

When typing notes do NOT use the character ( ; ), ANSI (191). This special character is used as a delimiter in the dog's record (.REC) file and is reserved for that purpose.

If you want to use the SEARCH capability for Breeder, Owner, CERF, OFA, or BAER, it is important to fill in these data. Since the SEARCH method looks for exact matches, be sure that these data are entered in a uniform format that can be used to satisfy your search criteria. Date of Birth information can be entered in any recognizable format, e.g., Sept 21, 1997 or 9/21/97.

You can print the NOTES and subsidiary information by selecting Print Notes from the FILE menu.

## Merging Dog Lists -

Two different dog list files can be merged into a common file, but the program limit of 32,767 entries per list may not be exceeded. Duplicate entries will be eliminated, and the index numbers of the entries will be renumbered. Linkages to sire and dam entries will conform to those already set in the first of the merged files.

If you select a NEW folder for the merged dog list file (not the folder that contains either source file), then the merging routine will also copy all the associated record (.REC) and picture (.BMP) files into the new folder along with the new merged dog list. It will automatically rename these files to match the new list ordering. It is recommended that you use this method to minimize loss of records and/or the need for extensive manual editing and copying.

If, however, you choose instead to place the merged dog list into one or the other of the folders that already contains one of the dog lists that is to be merged with the other, you will need to manually copy and rename the associated files. If one of the dog list files to be merged is associated with all or most of the dog records and pictures or has the most recent information, then select this as the first of the files to be merged. This file will comprise the first part of the merged file and the assigned dog index numbers will not be changed. The second file selected for merging will be added to the end of the first file, duplicates will be deleted and the index numbers will be shifted by the number of dogs in the first list less the number of duplicates that were deleted.

If you choose to place the merged dog list file in a new folder, then the program will attempt to copy and renumber the records into the new folder. Records for dogs from the source file, file 2, will not be copied if there are duplicate records from the source file, file 1.

The source file, file 1, is the primary list for the record data: sire, dam, titles, registration, breeder, etc. These are the data that by default will be used to construct the merged list. However, since source file 2 may in some cases contain data which is more recent, it is possible to obtain a text file, duplicts.txt, which provides a line-by-line comparison of the duplicated records. The file, duplicts.txt, will be placed in the merged file folder. Not all duplicated records, but only those that are different, will be included in the duplicts.txt listing. The text file can be opened in a text editor such as Notepad and can be used to manually edit the merged doglist file to insure that this file contains the most recent information.

If you find that the pictures, medical, show, etc. records of the duplicates from source file 1 are not the most recent in every case, you can replace these by copying the corresponding files from the source file 2 folder. For these manually copied files, you will need to renumber the dog records (.REC) and pictures (.BMP) to conform to the new numbering indices of the merged file. To do this identify the dog's new index number by selecting it from the dog list. Then rename all associated files for that dog by replacing the old index number in the record filename with the new index number.

## **Deleting Dog List Entries -**

If you must delete an entry, you should first assure that there are no sire or dam links to the entry you want to delete. If there are, you will need to link these to the correct entry (or to the blank, list index number 1) while in the MODIFY FILE mode. An entry can be deleted by double clicking on the entry name in the list box and then clicking the DELETE button which will appear. When the file is saved from the FILE menu, the list of dogs will decrease by the number of entries deleted and the index numbers will be shifted accordingly.

Record files and picture files will be renamed to correspond to the correct dog.

**IMPORTANT:** Records and picture files that are associated with dog names that are deleted will also be deleted when the file is saved.

## **Options -**

Menu options selections including background color, font type and size, and file merging selections. Your current preferences and also the dog list files that have been created and saved will be entered in the file, PEDINI.INI, which will set up these same selections the next time the program is started.

If you select COLOR and then SELECT WALLPAPER, you can personalize the background display using a .BMP file of your own or one of the files in the WINDOWS directory.

## Organizing the Files -

If only one dog list is used then all the files and the PEDIGREE program can be kept in the same directory.

If more than one dog list is maintained for different breeds or breeding lines, then it is best to put the PEDIGREE.EXE, PEDIGREE.HLP, PEDIGR.INI, OBEDFIL.SET and TITLEFIL.SET files in a separate directory with separate subdirectories set up for each different dog list (.PDG files). The associated record files and pictures for each dog list should be put in their corresponding subdirectories.

This is necessary since records for dogs from different dog lists will share the same index numbers and therefore their record files will have the same file names. These records will automatically be placed in the same subdirectory with their corresponding dog list (.PDG file) when they are first created, so you will only need to make certain that the dog list files (.PDG files) you set up are not in the same subdirectory. When you scan in the dog pictures, scale them, convert to .BMP, and name them according to the convention (see: Picture Box), be sure to put them in the correct subdirectory.

## **Scanning the Pedigree -**

It is possible to quickly scan the pedigree of the dog selected in the Name Box when a file is opened for Read Only.

Begin by selecting a name from the list. When you click on the Sire (or the Dam) button, the Sire (or Dam) will replace the selected entry in the Name Box and the new sire and dam will be placed in the corresponding boxes. Notes, pictures and records can be viewed for the ancestor that is currently entered in the Name box.

You can move backward by clicking the B button. You can move forward by clicking the F button.

The B and F buttons, which are enabled only in the Read Only mode, recall any of the 20 most recently accessed dogs whose names are stored in a list. When the list is filled with 20 names, the next dog accessed will be placed at the top of the list and the oldest access will be dropped from the list.

## Printing Pedigree or Progeny Files -

A pedigree file can be created for the dog entered in the NAME box by using the PRINT PEDIGREE FILE selection under the FILE menu.

The pedigree will include current entries and/or changes only if the file from which it is taken has previously been saved using the SAVE command under the FILE menu.

A question box is dropped and data may be entered to include on the pedigree output file. After the desired data entries have been made, clicking the OK button clears the question box. A file name (which should have a .TXT extension) should be entered when requested or the default name can be accepted. The pedigree file will be saved with the default file name PEDlxxxx.TXT (where xxxx is the ID number of the dog), and will be saved in the PEDFILES subdirectory of the current directory.

The pedigree text file can be edited using any ASCII text editor, but in most cases it will only appear normal if landscape orientation is selected, the font selected is a monospace font such as COURIER, and the selected font size is small enough so that lines do not wrap.

If you check the box "Create List File", a text file listing, LISTxxxx.TXT (where xxxx is the ID number of the dog), which is a list of the ancestors in the pedigree will also be created and will be saved in the PEDFILES subdirectory of the current directory. The list file is needed to use MS Word or MS Excel tem-

plates; it is also needed to produce HTML pedigrees for web publishing. The default setting (checked or unchecked) for generating list files is retained until it is reset by the user.

Similarly, selection of the PRINT PROGENY FILE option will create a 6-generation descendants list to a text file for the dog currently entered in the NAME Box. If you have a color printer and would like your printout to color code champions (titles preceding names), you can select among the colors: black, blue or red for printing these names.

The formatted pedigree or progeny files can be edited before printing, or they can be previewed and/or printed directly from this program. You will be cautioned to set the printer to landscape mode so that the printout can fit on a standard 11" x 8.5" page. More than one page may be needed for long progeny files. If you choose to print directly and a picture of the dog is available, it will be inserted in the printout. To print directly from the program you can choose to preview each page first, uncheck the preview only check box and then print each page in succession.

## **HTML Files -**

By selecting the option Create HTML Pedigree from the FILE menu, you can produce a 4- or 5-generation pedigree file in HyperText Markup Language (HTML). You must first open the list of dog names, select the dog for which you want to make the HTML file, and ensure that the selected name appears in the NAME box.

After the dog name has been selected, clicking on the menu option, Create HTML Pedigree, formats a 4-or 5-generation standard pedigree as a table with champions colored red. The file is saved in the HTMLFILES subdirectory of the current directory as PEDxxxxx.HTM, where xxxxx is the ID number of the selected dog. This file can be used alone, or it can be edited and inserted into another web page.

Other options for HTML pedigrees call the routine that computes the Wright's Coefficient of Inbreeding, COI. The COI for the selected individual and all the ancestors in the pedigree is printed as part of the HTML file. The COI computation uses 6, 8 or 10 generations for the selected dog provided that the pedigree data is sufficiently complete. Another option produces HTML pedigrees for the additive relationship and Relationship Coefficient of two dogs that are selected as sire and dam for Test Breeding. Genetic Risk evaluations are also produced using the HTML format.

If you select the inbreeding pedigree option, you can select the number of generations of pedigree data used to calculate the COI. You can generate the pedigree and COIs for all the ancestors that are displayed from this data set. This means that fewer generations of data will be used in computing COIs for great grandparents than parents, for example. Or you can have the COI calculations based on the same number of generations for each ancestor. The latter option can require considerably more time.

It is also possible to generate a Genetic Risk Pedigree in HTML format. Such a pedigree will list the probabilities for affected and carrier status of the selected dog and its ancestors.

The VIEW menu option for the HTML file will attempt to locate the default web browser program and launch that application to preview the pedigree. If you move or replace your default browser program, this program may be unable to locate the browser to view the HTML pedigree. To reset the browser location you must delete the PEDIGR.INI file.

The routine for formatting the HTML file will insert the selected dog's picture and personal information, e.g., Date of Birth, Breeder, Owner, etc, if these data have been entered for the selected dog. The page background color and picture will be the same as that selected for the opening program form and can be set under the menu - options - color - select color dialogue.

To set both the background color and background picture for the HTML page, first select the color you want and click OK on the color dialogue. Then re-open the dialogue and select the background picture and again click OK. The background color sets the color in the pedigree table. The picture is the wallpaper for the remainder of the HTML page.

Alternatively, you can opt to produce a bare-bones HTML pedigree with little formatting. This option will usually produce pedigrees that can be printed on a single page.



as discussed in the template documentation.

Note that the usual procedure for using MS Word templates is to start a new document and then select the desired template. Using the call from the pedigree program menu you will actually be constructing the pedigree on the template (.dot file) rather than as a new document (.doc file). If you merely want to print out the pedigree, this poses no problem. On the other hand, if you want to save the pedigree that you have constructed, it can be done in two ways:

1. You can save the pedigree directly as a new template (with a new name so as not to overwrite and thereby destroy the old template), or

2. Choose "Select All" and then "Copy" from the MS Word menu. Then start a new document and "Paste" from the MS Word menu.

The second approach is recommended since the resulting .doc pedigree will use far less space than the .dot pedigree resulting from the first method.

## **HTML Registry -**

The HTML registry is a convenient way to organize and access your HTML pedigree files. These files are stored in a subdirectory, Htmfiles, of the folder that contains your dog list.

The registry can be accessed from the main page menu-files-View HTML Registry and then selecting the category of HTML files you want to review. The available pedigrees are listed by the dog's name (or identification number in the case of relationship or test mating pedigrees). Select the dog's name from the list and then click on View to open the file in your browser. The file can also be deleted by selecting it from the list and clicking on the Delete button.

## Printing Show Entry Forms -

Show entry forms can be printed for the dog entered in the NAME box by using the PRINT SHOW ENTRY selection under the FILE menu.

Selecting this menu item will bring up the selections: PREVIEW ONLY and PRINT ENTRY. Unless the show data have already been entered, select PREVIEW ONLY and enter the data for your dog in the appropriate slots (four forms for data entries are provided). After all the required data have been entered, save and then print to preview the entry on the screen. If the data is correct, you can set up your printer to landscape orientation and then once again select PRINT SHOW ENTRY and then PRINT ENTRY.

Once data have been saved for the specified dog, it should only be necessary to update show, date, fee and entry class for subsequent entries. Data for the dog indexed as number 2, for example, will be saved in the Entry Data section of the file: 0002PEDI.REC.

This printing routine requires that the Arial font be available and that all the entry data fit within the margins of your printer. If font substitutes are made by the Windows operating system or if there is insufficient space inside your printer's margins, the form will not print properly.

## **Picture Box -**

If a picture of the dog in the NAME box exists in the proper format and with the properly indexed filename in the current directory, a green bar appears next to the PICTURE button and the PICTURE button is enabled. Clicking on that button will load the picture. It is automatically unloaded when a new dog name is selected for the NAME box.

The scanned color or grayscale picture must be in the BMP (Windows) format with a size of about 200 x 200 pixels depending on your screen display resolution and must be named according to this convention: (three number index with leading zeroes, if required) & PICT.BMP, e.g., 0002PICT.BMP is the filename for the picture file for the dog with index number 2.

If the photo has been scanned in another format it should first be converted to BMP format before it can be used in the Pedigree program.

Pictures in one of the formats: .DIB, .WMF, .GIF, can be loaded into the picture box (PICTURE - OPEN PICTURE menu) when the dog's name is displayed in the name box. If the autosize option in the picture menu is checked, the picture will be scaled to fit the display. When saved, it will be indexed to the selected dog and saved in the current directory as a .BMP file.

## Opening and Saving Pictures -

A picture of the dog entered in the NAME box that is not already indexed to that dog can be opened and displayed.



If the picture file is in the appropriate format (.dib, .bmp, .wmf, .gif) and is the proper size for display (depending on the screen resolution, the picture should be about 100 to 250 pixels in both height and width), it can be opened for use with the PEDIGREE program. Selecting AUTOSIZE PICTURE will assure that the picture is scaled to fit the display. If the dog list is opened in the Modify mode, clicking on SAVE PICTURE will copy the picture to the current directory and will rename the file so that it is indexed to the selected entry.

Depending on the color depth of your display, color quality may deteriorate. If the 256 color mode is in use, the picture will be saved as an 8-bit BMP file which will often lead to compromise in color quality. Greater color depth will generally give better results and avoid the usual competition for the windows palette. MS Visual Basic sometimes saves BMP files in a format that most graphics programs cannot open. Generally, this is caused when your display is set to the 16-bit, high color mode. Not all graphics programs can open a 16-bit picture file. Opening the file using the Paintbrush program and saving the file again from that program usually fixes the problem.

## Entering Titles -

If the dog's title status has changed, you can type the new titles directly in the boxes adjoining the NAME box and then click SAVE and CLEAR.

An easier approach uses the selections from the PRE-TITLE and the POST-TITLE boxes. Select the Pre-Title and the Post-Title (select the blank if there is no title) and click the Insert Title button, or simply double-click any of the available selections individually. Double-clicking a title will add that title at the end of the previous titles. Double-clicking the blank will clear all titles. Typing a frequently used name in the top box if it is not already in the list will allow that title to be used multiple times until another selection of titles is made.

A new entry typed in the top box of the selection list will be added to the list of titles and will be saved to a file (TITLEFIL.SET or OBEDFIL.SET) when the project is saved using the SAVE command under the FILE Menu.

These title selection lists are text files and can be deleted, edited, or added to manually using the WINDOWS Notepad program. The title abbreviations that are included with these files are the AKC recognized titles and are defined as follows:

### Titles Appearing Before a Dog's Name (TITLEFIL.SET)

- \* CH - Champion
- \* FC - Field Champion (Field Trial/Lure Coursing)
- \* AFC - Amateur Field Champion
- \* NAFC - National Amateur Field Champion
- \* CT - Champion Tracker

- \* NFC - National Field Champion
- \* OTCH - Obedience Trial Champion
- \* HC - Herding Champion
- \* DC - Dual Champ (CH & FC)
- \* TC - Triple Champ (CH, FC & OTCH)

#### Titles Appearing After a Dog's Name (OBEDFIL.SET)

- \* CD - Companion Dog
- \* CDX - Companion Dog Excellent
- \* UD - Utility Dog
- \* UDX - Utility Dog Excellent
- \* TD - Tracking Dog
- \* TDX - Tracking Dog Excellent
- \* VST - Variable Surface Tracker
- \* JH - Junior Hunter
- \* SH - Senior Hunter
- \* MH - Master Hunter
- \* HT - Herding Tested
- \* PT - Pre-Trial Tested
- \* HS - Herding Started
- \* HI - Herding Intermediate
- \* HX - Herding Excellent
- \* JC - Junior Courser
- \* SC - Senior Courser
- \* NA - Novice Agility
- \* OA - Open Agility
- \* AX - Agility Excellent
- \* MX - Master Agility
- \* JE - Junior Earthdog
- \* SE - Senior Earthdog
- \* ME - Master Earthdog

## Wright's Coefficient of Inbreeding -

### References:

1. Genetics for Dog Breeders, by Frederick B. Hutt, W.H. Freeman, pub., 1979, p 206.
2. Genetics Of the Dog, by Malcolm B. Willis, Howell Book House, pub., 1989, pp 320- 332.

Wright's coefficient is the most commonly used measure of the degree of inbreeding. The coefficient,  $F_x$ , tells us the proportion of genes for which the inbred animal is likely to be homozygous. (Reference 2). To be more precise,  $F_x$ , when calculated for a limited number of generations, tells us the relative level for which the inbred animal is homozygous compared with the average level of homozygosity for the breed as a whole.

$F_x$  is calculated as the sum of  $1/2$  raised to the power of  $(n + n' + 1)$ , where  $n$  is the number of generations from the sire back to some ancestor common to both the sire and the dam,  $n'$  is the number of generations from the dam back to the same common ancestor, times the factor,  $(1 + F_A)$ , and the summation is over the separate contributions of each different common ancestor.

$$F_x = \sum (1/2)^{n+n'+1} (1 + F_A)$$

$F_x$  is the coefficient of inbreeding of the animal, X

$F_A$  is the coefficient of inbreeding of the common ancestor, A, when that animal is itself inbred

In many cases, it is advantageous to first calculate an approximate coefficient (reference 1) as:

$$F_x = \sum (1/2)^{n+n'+1}$$

This formulation is a simplified computation which disregards possible inbreeding of the common ancestors. The coefficient is a measure of the degree of relationship between the dog's sire and dam. A mating of brother to sister, for example, yields an inbreeding coefficient of 25%.

It is important to observe that the COI will be zero if there are no common ancestors on both the sire's and dam's sides of the pedigree. This is true regardless of the number of times that the same ancestor appears in the background of the sire (or the dam) alone.

## Coefficient of Relationship -

### References:

1. Genetics for the Animal Sciences, by L.D.VanVleck, E.J. Pollak, E.A.B. Oltenacu; W.H.Freeman, pubs., 1987, pp 199 et seq.
2. E.J. Pollack, private correspondence: Computer implementation of Quaas-Henderson procedure.

The total genetic covariance between two individuals consists of several parts. The most important of these is the additive relationship which is a measure of the fraction of genes shared by the two individuals. It is a measure of the covariance of the breeding values of the two relatives. It is important in devising weighting factors for records of relatives in genetic evaluation.

The additive relationship,  $R_{YZ}$ , has a simple relationship to Wright's coefficient of inbreeding,  $F_x$ .  $R$  can easily be calculated for two animals by first calculating the hypothetical COI of an animal produced by mating the two individuals (regardless of the sex of these assumed parents). The additive relationship between the two animals is then calculated as twice the COI of the hypothetical offspring.

$R_{YZ} = 2 F_x$ , where  $F_x$  is the coefficient of inbreeding of the hypothetical offspring of individual Y and individual Z.

The additive relationship has a minimum value of zero and a maximum value of two.

The Coefficient of Relationship is a measure of relationship that has a minimum value of zero and a maximum value of one. It is equivalent to the correlation between breeding values of the two animals, For noninbred animals, the coefficient of relationship is the same as the additive relationship. In general, the coefficient of relationship is:

$$R_{YZ} / [ (1 + F_Y)(1 + F_Z) ]^{1/2}$$

where  $F_Y$  and  $F_Z$  are the inbreeding coefficients of animals Y and Z, respectively.

The additive relationship and the Relationship Coefficient of two dogs that are selected as sire and dam for a Test Breeding can be computed and a pedigree generated in HTML format. Open the dog list for Append, select Set Up Test Breeding under the Options menu, and enter the dogs' names as sire and dam of the test breeding (regardless of the sex of the two dogs). Click Save and Clear, then select under menu File - Create HTML pedigree - Relationship pedigree.

## COI Batch Calculations -

From the Options menu select COI Batch Job to compute the coefficients of inbreeding for a subset of the dogs from the dog list file that is currently open.

To compute COIs for an ordered set of dogs:

1. Enter the ID number of the first dog of the set followed by a carriage return in the Start ID box of the top frame, Sequential Subset. The name of the first dog will appear in the Start Dog Name box.

2. Enter the ID number of the last dog of the set followed by a carriage return in the Stop ID box. The name of the last dog will appear in the Stop Dog Name box.

3. The number of COI runs to be computed will automatically be entered in the No. of Runs box.

4. Enter the number of generations of pedigree data that should be used for each dog (3, minimum, to 14, maximum) or accept the default of 10 generations. This number should be entered in the box under Generations.

5. Click the Start button to initiate the batch computations. Depending on the speed and available memory of your computer, the number of generations, and the number of runs, the job may take a few minutes or several hours. Progress can be judged by observing the percent completed entry in the Progress box and also by noting the countdown in the No. of Runs box.

To compute COIs for a random set of dogs:

1. Enter the ID number of the first dog of the set followed by a carriage return in the Start ID box of the bottom frame, Random Subset.
2. Enter the ID number of the last dog of the set followed by a carriage return in the Stop ID box.
3. The number of COI runs to be computed for randomly selected dogs must be entered in the No. of Runs box. Dog IDs will be drawn using random selection within the span between the start and stop IDs. For small spans and a large number of runs the same dog may be selected more than once.
4. Enter the number of generations of pedigree data that should be used for each dog (4, minimum, to 20, maximum) or accept the default of 10 generations. This number should be entered in the box under Generations.
5. Click the Start button to initiate the batch computations.

After completion of the batch job, the results by default will be saved as a text file, Batchxx.txt. If you select the .csv option you will be asked to select the field delimiter for the output data. You will be given the option to preview the file or you can open and/or print it later using Notepad (or Excel if you choose the .csv option with a comma as the field delimiter).

You can also view a histogram of the COI results for the subset of dogs by clicking on the Graph button.

## Genetic Risk Pedigree -

You may select up to three genetic risk traits that are found in your breed or breed line. These hereditary diseases or defects should be added to your preferences by selecting Preferences under the Options menu.

With a dog list open for Modify, select a dog from the list and click on the Name button so that the dog's name is displayed. If you have information about the dog's status with respect to each of the genetic risks that you have chosen, place the appropriate letter in the Genetic Risk Factors boxes:

A - the dog is known to be **AFFECTED** for this defect,

C - the dog is known to be a **CARRIER** for a defective gene but is not affected,

U - the dog is **UNAFFECTED** but could be a carrier,

N - the dog is **NEITHER** affected nor a carrier,

P - the dog is known to have **PRODUCED** an affected offspring but its carrier/affected status is not known.

after typing the appropriate letters in the risk boxes, click on the Save and Clear button. If no entries are made in the risk boxes, the dog will be considered a typical representative of the breed with the breed-average affected and carrier probabilities.

By selecting Genetic Risk Pedigree from the File menu, a pedigree can be created in HTML format for the dog that has been selected from the list and whose name appears in the Name box. This pedigree must be viewed using a web browser that can be launched by selecting View HTML Pedigree from

the File menu. This pedigree will color-code the ancestors for which genetic risk profiles have been entered. The probabilities that the selected dog or its ancestors is affected or is a carrier are printed under the names.

When you select this option, you will need to select the desired trait from the preferences you have chosen, the number of generations to consider in generating the risk probabilities (only 5 generations will be displayed), the mode of transmission of the selected trait (autosomal recessive or sex-linked), and the average breed incidence of affecteds.

For autosomal recessive traits the percent carriers and percent clear are computed using Hardy-Weinberg assumptions based on the the average breed incidence that you enter.

$$p^2 = a$$

where a is the average breed rate, p is the gene frequency and  $p^2$  is the rate of affecteds.

For sex-linked traits the distribution of affecteds between males and females is as follows:

$$0.5 p + 0.5 p^2 = a$$

where a is the overall average breed rate, p is the rate of af-

affected males and  $p^2$  is the rate of affected females.

Many hereditary traits are simple autosomal recessives, and a very small number are sex linked. However, many genetic diseases are, in fact, polygenic, and although a risk profile for such defects may be of interest, it cannot be expected to provide accurate results.