General Review of five PEDIGREE ANALYSIS SOFTWARE programs

One of the most important aspects in conservation programmes for endangered breeds is to restrain the rate of inbreeding.
We will introduce you in five software programmes which may help you in a useful way to manage your population.
The presented programmes are focusing on different target groups and have different goals of interest.
Because of the complexity of the software we will give you some details for orientation. If you need software help to manage your herdbook or to monitor the changes in genetic variability and population structure you should test the software with regard to your own needs.

Animal Database ZVSN
is mainly a breeding program for the practical use in the field of conservation programmes, but with a lot of opportunities for recording characteristics and inbreeding analyses like identifying the genetical presence or inbreeding coefficients.
The target group are mainly Breed managers, herdbook keepers and persons responsible for population management in conservation programs.
Kurt Steiner can be adressed directly for support, data handling and data analyses.

Breeders Assistant
is a pedigree and record keeping software program for breeders but it has also a lot tools regarding inbreeding, mating and genetic tools like the prediction of genetic geno- and phenotypes.
It comes with nice data integration possibilities via *.csv (Excel) and *.xml and a attractive design, especially pedigree outputs, and reporting features. But it is a commercial program, the personal version (modular costs) is about 130 €.

ENDOG
is a Computer Program for Monitoring Genetic Variability of Populations Using Pedigree information.
Target group: Researchers or responsible persons for population management or teachers, students for population genetic analysis.
Primary functions carried out by ENDOG are the computation of the individual inbreeding (F) and the average relatedness (AR) coefficients.
Additionally, users can compute with ENDOG useful parameters in population genetics for the number of ancestors explaining genetic variability or for the genetic importance of the herds.
Moreover, the present version of ENDOG can compute F statistics from genealogical information.

Optimate
is a very fast Computer Program in a DOS prompt window for the registration and the simple working on genealogic data. It is a helpful tool for breeders to give information for mating and reducing inbreeding but the data integration is inconvenient.

PEDSYS
PEDSYS (Pedigree Database System) is a series of programs written for management and analysis of genealogical and demographic data. It is in my opinion more a research tool and the installation process is not very easy to understand. But it can be used on the most important operation systems. The last version is from 1999, so it seems to be out of development now.

ChromoSoft
is a Internet Database, configurable for every association and designed as a enclosed system. In this database, alternatively this online breeding book have all registered users access around the clock access to the stored total population - according to your personal user rights. This allows at any time calculations of mating and suitable proposes for mating. It also allows the services and birth notifications. The own business can be presented, pedigrees and inbreeding coefficients can be calculated.

Inter Herd
can be used for daily use in a dairy or meat-producing farm especially for data recording of breeding data and health information. It is running under Windows 98 or Windows ® XP ®. Detailed production and health data for each animal can be stored. In addition, there are daily management plans to manage the flock effectively. Further on, a long-term analysis is possible to observe the crop of the herd and avoid problems as well as understanding their causes. There is also the opportunity proceeding a financial analysis of the stock inclusively other cost-control functions.

Conclusion
The seven presented software programs are helpful tools to manage animal populations and to avoid inbreeding. The choice for a program depends significantly of your needs and your computer knowledge.

If you have to run a small population and you have limited budget, than **Optimate** may be the right tool. If you want to do genetical analyses and you are experienced in computing and statistics, than **PEDSYS** or **ENDOG** may be your favourites. If you have the responsibility for a conservation program and you are not very experienced in dealing with data and analysis of inbreeding than **ZVSN** with support might be your option. For a broader management of animal population including veterinary data and an adequate reporting and contact management paired with basic computer knowledge you might spend little money for **Breeders Assistant**.

Breeding clubs, or businesses with multiple locations can use the commercial software **Chromosoft** if they have a limited number on individuals. Via a browser services and birth notifications as well as proposes for mating can be calculated.

The proprietary software **InterHerd** works on Access basis, taking full access to the data, but not to the formulars. This enables a further adjustment with various options for experienced users. Multilingualism and import possibilities for data should be stressed, as well as the possibility of further management modules to be coupled. The software is shared via Distributors (AIMS in Germany, otherwise see http://www.interagri.org/E/distributors.htm). Prices are depending on quotes.

Pedigree Software Programms (Technical details)							
Name	**Target group**	**Cost**	**Language**	**Server System**	**Progamming language**	**Data records (tested)**	**Speed**
ENDOG	Researchers or responsible persons for population management, teachers, students for population genetic analysis	free	englisch	Windows 95/98/2000/NT/XP	Visual Basic; Results in MS Access DB	75.000	75 000 records <5min (512MB RAM, 1.8GHzCPU)
OPTIMATE	Breed manager, herdbook keeper	free; complete version costs 55,-Euro	german	Windows (Prompt Mask), Windows 95/98/2000/NT/XP	Clipper, DOS-Surface	99.999	50-100MB RAM are recommended
ZVSN	Breed manager, herdbook keeper	Basic version about 200,-Euro; data integration and support about 30,-Euro	german	Windows 98 upwards/ MacOS 8.6 upwards	File Maker	30.000	32 MB RAM upwards
PEDSYS	Research tool	free	english	Unix, Windows, Mac OS	Fortran	30.000	
Breeders Assistant	Breeders, Rare Breed Breeders	Modular, personal edition Breeders Assistant (generic) e.G. 130,- Euro	english	Windows 95/98/2000/NT/XP		1.000.000	64MB RAM upwards
Chromosoft	Breed manager, breeder for rare breeds, herdbook keeper	Basis Version 366 € + 366€ for analysis tools, 3 users	german	online modul via browser	html, php		Depending on internet access
InterHerd	Farmers, herdbook keeper	Depending on quotes	german	Windows 98/2000/XP			

Pedigree Software Programms (General overview)					
Name	**General Features**	**Usability**	**Experiences/ bugs**	**Download**	**Training/ Support**
ENDOG	A Computer Program for Monitoring Genetic Variability of Populations Using Pedigree Information	after installation simple (pay attention to the right allocation of correct data fields)	Watch for correct input data, male=1; female=2	http://www.ucm.es/info/prodanim/html/JP_Web_archivos/Endog45.zip	
OPTIMATE	A Computer Program for registration and simple working on genealogic data. A helpful tool for breeders to give informations for mating and reducing inbreeding.	uncomfortable DOS orientated programm, fast calculation of gene rates	easy understandable and easy to install, interesting for small population, mass data input is uncomfortable	http://www.tiho-hannover.de/einricht/zucht/optimate/index.htm	The program is out of development now. Questions to: Tierärztliche Hochschule Hannover Institut für Tierzucht und Vererbungsforschung Tel.: 0511 - 953 8582
ZVSN	The animal database ZVSN is mainly a breeding programm for the practical use in the field of conservation programmes, but with opportunites for recording characteristics and inbreeding analyses.	Programm comes out of practical use, but a general affinity for computers is indispensable		http://www.zuchtbuchprogramm.com/index.php	Programming help function, Training possible, support with data integrating and special programming adaptions and live support via internet
PEDSYS	PEDSYS (Pedigree Database System) is a series of programs written for management and analysis of genealogical and demographic data	very unconvinient to install, Status of 1999		ftp://www.sfbr.org/pub/pedmgt/pedsys	ftp://www.sfbr.org/pub/pedmgt/pedsys/PSManual.pdf
Breeders Assistant	Breeders Assistant is a pedigree and record keeping software program for breeders.	can integrate and export data e.g. via *.csv or *.xml, very comfortable design and data in- and output		http://www.tenset.co.uk/	Tutorial Guide
Chromosoft	Chromosoft is s Internet database, alternatively a online breeding book , especially interesting for breeding associations or clubs which want to input their data from different sites	Easy to undestand		demo version see www.chromosoft.com	
InterHerd	Is a Access based software for the daily administration of breed and health data and additionally for financial management. It is not a pure pedigree system			www.interagri.org	

Pedigree Software Programms (Features)						
ENDOG	OPTIMATE	ZVSN	PEDSYS	Breeders Assistant	Chromosoft	InterHerd
(F) individual inbreeding Wright 1931	Pedigrees for 4 generations	Genetical presence	Pedigree Management (8 programs)	It includes fully customizable printed pedigrees, text, image, HTML and circular pedigrees.	Chromosoft is a record keeping software, interesting for keepers at different locations	Flock management software, no Pedigree Software!
(AR) Average relatedness, Goyache-Gutierrez	Calculation of inbreeding coefficient from 2 up to 11 generations	Inbreeding coefficient	Finds common ancestors for selected probands	Many features for linechasers, kennel/cattery management and comprehensive record keeping.	Data input is made by Internet, which means different persons can input birth notifications from different stations	In combination with the Modul InterTrace is a full traceability is possible
Inbreeding per Generation	calculation of inbreeding for a planned mating	Extensive and praxis orientated data input management (Arrangement, ancestors, offspring, inbreeding, distribution	Identifies pedigrees and assigns individuals to them	calculation of Wright's inbreeding coefficient.	Search & professional search	The focus lays on health and financial management
Pedigree Content	Coefficients of relationships between groups and individuals	animal-project-person relationships, achievement census, assesment	Determines contribution of founders to subsequent generations	range of Reports available including ancestor and descendant analyses	Saving of the search results	Daily event list with health checks and planned measures
Founders	Detection of the most important ancestors	Rich search mask with the possibility to refine the search (upt to 20 steps)	Transforms pedigree data into Master File format	contracts/agreements area	Description and advertisement site for breeding associations	Lactat part of the milk is presentable as a graphics
Partial Inbreeding	Listing of all offsprings for every individual	Print with layouts for adress reports, genetical presence, inbreeding coefficients	Calculates inbreeding, kinship coefficients (Quaas-Henderson)	store all animal details, contacts, show records, litters, vet records, vaccinations, accounts and appointments/tasks.	Administration tool for birth and services notifications	Graphics of fertility
Generation intervals	Extensive checks of plausibility	grouping functions, interim grouping	Constructs extended pedigrees for specified probands	genetics tools e.g. prediction of genotypes (coat color genetics, carried traits + diseases via simulation of Mendelian genetics)	Calculation of the inbreeding coefficient of all known ancestors, virtual offsprings etc.	
Offspring analysis	Lots of characteristics can be recorded		Creates Pedigree/Draw formatted file from PEDSYS records	calculation of inheritance probability of specific genes	Pedigree visualisation	

Pedigree Software Programms (Features)						
ENDOG	OPTIMATE	ZVSN	PEDSYS	Breeders Assistant		
Subpopulations	Descriptive statistics and frequency distribution for every animal and individual can be computed		Assembles data for EGO, FA and MO on same record	modelling of polygenic traits and various statistical analyses		
Coancestry	Export to *.csv or *.doc		Genetic Management (7 programs)	matings		
Breeding Animals	Print report		Simplifies genotypic structure by combining alleles	Gene Frequency Analysis		
Individual Pedigree			Calculates gene and genotype frequencies from phenotypic data	Covariance Analysis between relatives		
Population Structure by Herds			Generates a Phenotype/Genotype map file	Inbreeding: The depth at which the furthest ancestor was found, How many generations of ancestors, Total number of ancestors found, Total number of unique ancestors,Total number of ancestors common to both sides of the pedigree		
Supplying fathers, Grandfathers			Infers unknown genotypes from genotypes of relatives	backup and restoring opportunities		
			Simplifies extended pedigrees for genetic analysis			
			Generates a peeling sequence from an indexed pedigree file			
			Tallies offspring genotypes by parental mating type			