BenguFarm™

GENETICS

ADVANCED LIVESTOCK BREEDING SOFTWARE

Users' Manual

Version 10-04-2026

Compiled by

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www.bengufarm.co.za

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Aim of this Manual AND Defining Breeding Objectives

The aim of this manual is to explain the functionality of BenguFarm GENETICS. This includes what the different window elements are, how to create breeding objectives and how to select animals to breed with and calculate optimal matings for this selection of animals, given a specific breeding objective.

PLEASE NOTE: To define/compile a breeding goal and breeding objectives is a complex and specialized field and does NOT fall within the scope of this manual. If you need assistance defining a breeding goal and objectives for your herd, please consult with a professional animal scientist specializing in animal breeding, such as an official from SA Stud Book, the Agricultural Research Council (ARC)

1. Notes

References to dam and sires are given as male and female animals. This is because BenguFarm GENETICS is intended to be used in the future with sheep too, where bull(s) and cow(s) will not apply.

2. Installation

Go to the BenguFarm website at: www.bengufarm.co.za > Download > Software. Download. The following must also be downloaded and installed:

- Crystal Reports Run-Time Engine for .Net Framework [117MB] (third-party software used for creating reports); and
- BenguFarm (TM) GENETICS Setup v01-04-2026 [37.5MB].

3. Run / Activate

BenguFarm GENETICS is run directly from within your herd management software. The method will depend on which herd management software you use:

3.1. BenguFarm BEEF (Cattle Management Software)

From BenguFarm BEEF, go to "Add-Ins > BenguFarm GENETICS Breeding Management module.

If this option is not available in BenguFarm BEEF, you will need to download and install the latest update of BenguFarm from the website at: www.bengufarm.co.za > Downloads > Updates.

3.2. BenguFarm SHEEP & GOATS (Sheep and Goats Management Software)

From BenguFarm SHEEP & GOATS, go to "Add-Ins > BenguFarm GENETICS Breeding Management module.
If this option is not available in BenguFarm SHEEP & GOATS, you will need to download and install the latest update of BenguFarm from the website at: www.bengufarm.co.za > Downloads > Updates.

4. Synchronizing Data

BenguFarm GENETICS uses its own database to hold data. Data must thus be synchronized with data in your herd management software, for example BenguFarm BEEF / SHEEP & GOATS. When BenguFarm GENETICS is opened, you will be asked if you want to synchronize the data. Select Yes to synchronize.

BenguFarm BEEF / SHEEP & GOATS Specific

When you select to synchronize, the *Specify Animal's Owner* window will be displayed. Here you must specify which contact in BenguFarm BEEF / SHEEP & GOATS, when specified as the owner of an animal in the animal information window, identifies animals of which you were/are the breeder and/or owner. This is then used in BenguFarm GENETICS to identify which animals you were/are the owner of and is necessary to be able to create trait graphs of your animals.

PLEASE NOTE:

- Before you synchronize your BenguFarm BEEF / SHEEP & GOATS data with BenguFarm GENETICS, make sure that all the AI bulls/semen stock is marked as "Breeding Bull (Herd Sire)" in BenguFarm BEEF. This will ensure that AI bulls/semen stock (with status = Non-active) will be included in the BenguFarm GENETICS database after synchronization with BenguFarm BEEF.
- All active animals in BenguFarm BEEF / SHEEP & GOATS will be imported to BenguFarm GENETICS as animals of which you are the owner, irrespective of the breeder and owner as specified at each animal in BenguFarm BEEF / SHEEP & GOATS.
- Only the animals in the herd you are working with in BenguFarm BEEF / SHEEP & GOATS will be written to BenguFarm GENETICS. Pedigree animals that lie in another herd in the same database will also be included.
- You must also select whether to import Breeding Value Indexes or the Breeding Values themselves. You are recommended to use indexes as the values are standardised (of same order) and it is thus earier to define breeding objectives and can also result in better results. Please note that for some sheep breeds, breeding value indexes are not available. In such a case the indexes option will be greyed out and you will not be able to select it.

5. Registration

You must register your BenguFarm GENETICS software before you can use it. The registration window will be displayed automatically if BenguFarm GENETICS is opened and it is not yet registered.

Menu: Options > Registration

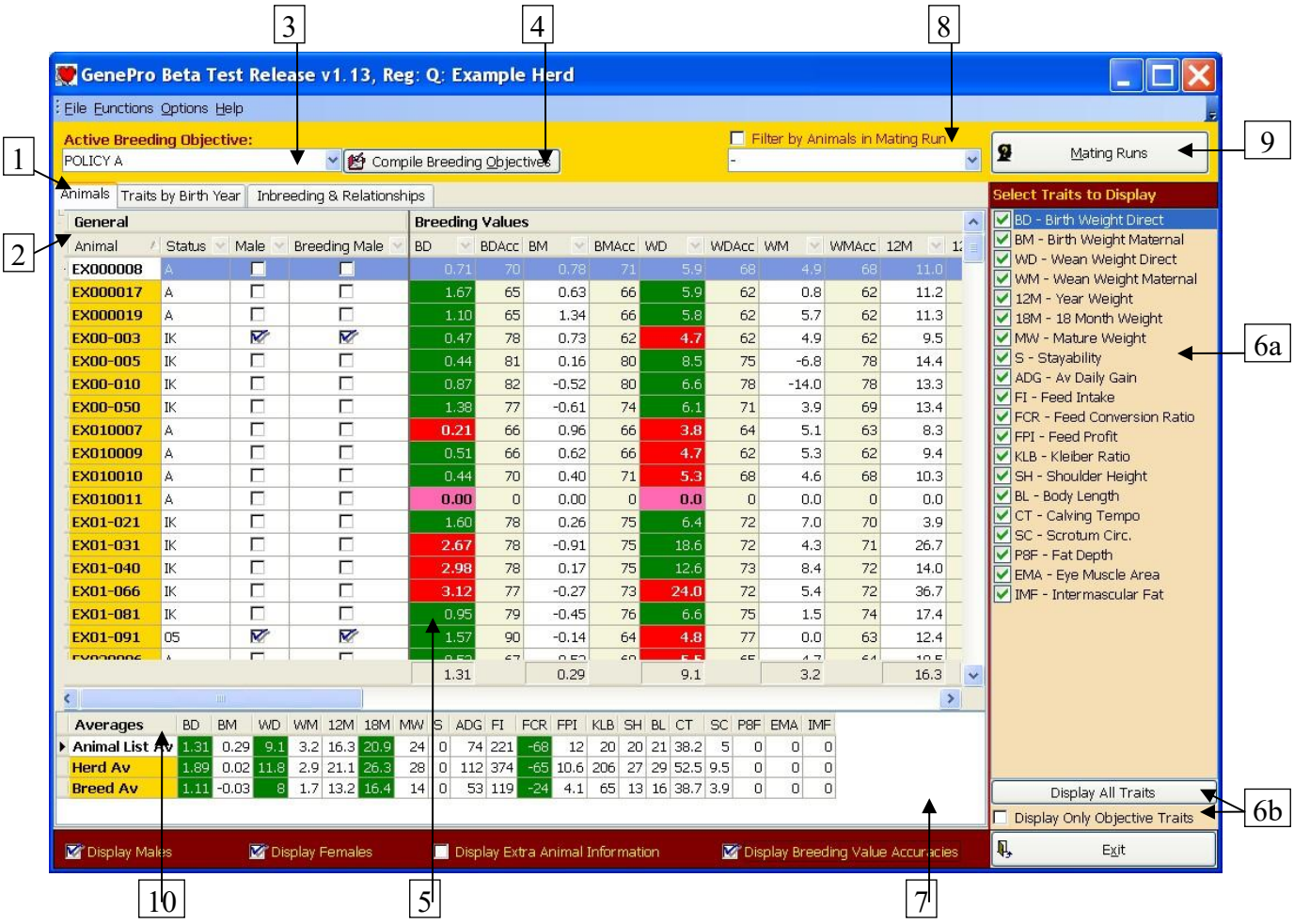
1. To register, please contact Philna Moulich 051 4100 910 or registration@benguelasoft.co.za. Supply her with your registered BenguFarm BEEF / SHEEP & GOATS username and account number (e.g. BPU0600) as well as the Computer Identification Code (code on the top left of the registration window). She will supply you with the registration code and access code which you should enter on the registration window.
   2. Type in the name of the entity to which the program will be registered (e.g. JA Nel or Bosveld Boerdery) in the Registered User field. **Please note: Make sure the entity and spelling is correct, because this name will be displayed at the bottom of report printouts.**
3. Philna/Leslie/Johan will supply you with the Registration Code and Access code. Type these codes into the *Registration code* and *Access* fields respectively. **Please complete the Registration Code in capital letters**.
4. To save the registration details, click on *Register*.

6. The Main Window

The main window is a view screen where you can list animals, view their breeding values, apply breeding objectives to the view and view various breeding value, inbreeding and relationship charts. All other functions in BenguFarm GENETICS are activated from this window.

6.1. Animals Tab

The animal tab is used to view, filter and sort active and breeding animals and their breeding values. You can also apply a breeding objective to see how these animal's breeding values compare to the trait objectives set in the breeding objective.

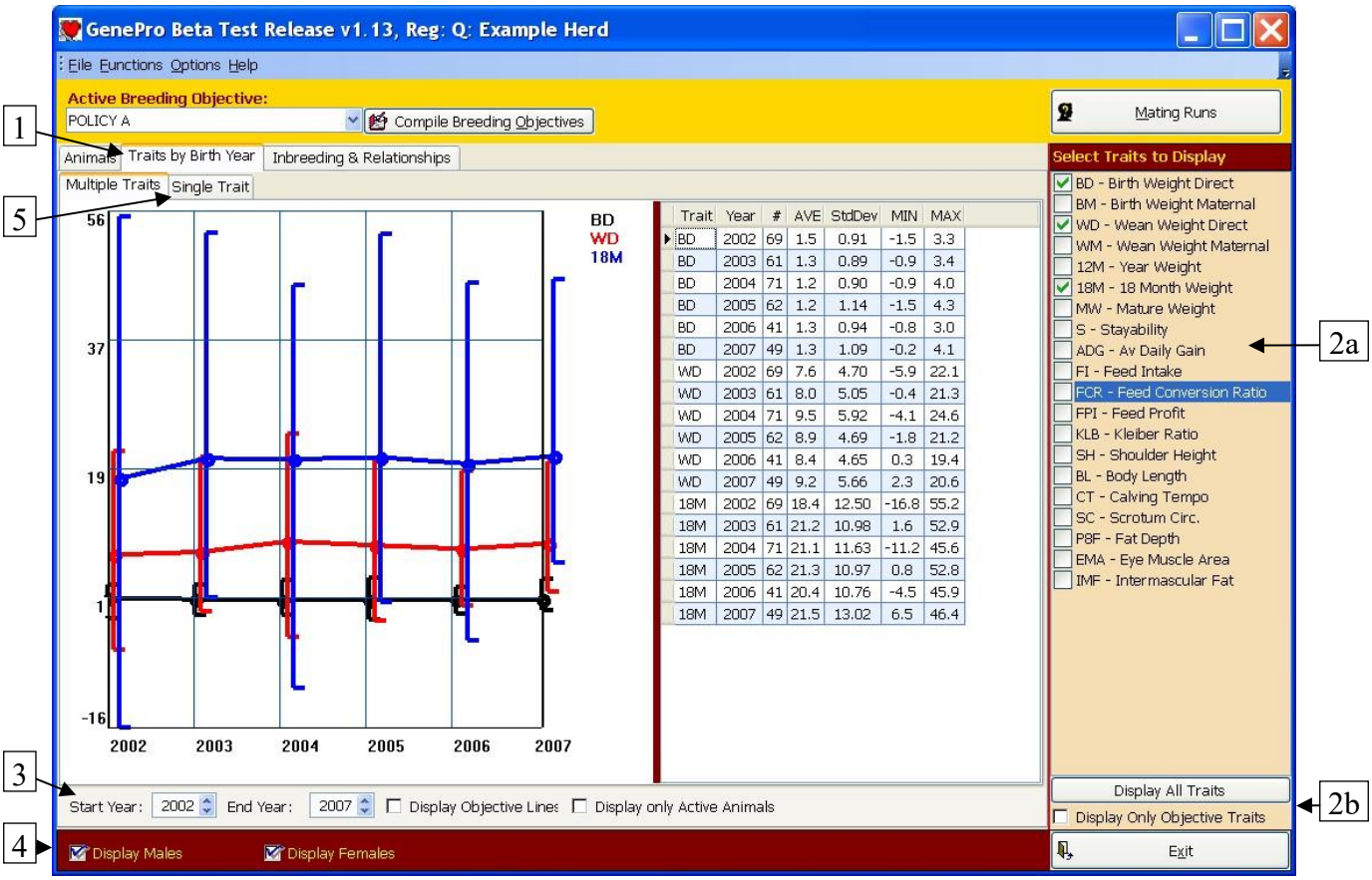


1. At the top of the window you can select whether you wish to view animals, trait graphs or inbreeding and relationship graphs.
2. All the active and breeding bulls are displayed by default. You may click on any column heading to sort data according to that column. To sort by multiple columns, hold down the SHIFT key and click on the applicable columns. Next to each column is also 'n down arrow. This is used if you want to filter the displayed data by a certain value in the applicable column. **PLEASE NOTE: Before you synchronize your BenguFarm BEEF data with BenguFarm GENETICS, make sure that all the AI bulls/semen stock is marked as "Breeding Bull (Herd Sire)" in BenguFarm BEEF. This will ensure that AI bulls/semen stock (with status = Non-Active) will be included in the BenguFarm GENETICS database after synchronization with BenguFarm BEEF.**

3. From this dropdown you can select which breeding objective is the active one. When selecting a breeding objective, the breeding values of the animals will be color coded according to the traits and ranges specified in the objective. See also: Step 5
4. Click here to open a window where you can add, edit and delete breeding objectives.
5. When a breeding objective is selected in step 3, the breeding values of the displayed animals will be color coded accordingly. Green breeding values are breeding values that fall within the objective range, red values not within the objective range and pink is where the applicable breeding value for the animal and trait is missing. A breeding value is marked as missing if the accuracy for that breeding value is 0. Breeding values of traits that are not selected in the breeding objective, have a white background.
6. (a) Here you may select for which traits the breeding values must be displayed.
   (b) Use these two options to show all the traits or just the traits that are part of the active breeding objective.
   See also: Step 3
7. In the maroon bar at the bottom of the window you can specify additional view options.
8. Select a mating run to show only the animals that are included in the mating run.
9. Click here to add, edit and delete mating runs.
10. Here you can view breeding value averages for all available traits. The first line displays the averages for the animals in the list above. The second and third lines display the herd and breed averages as supplied by the ARC from the applicable BLUP run.

6.2. Traits by Year Tab

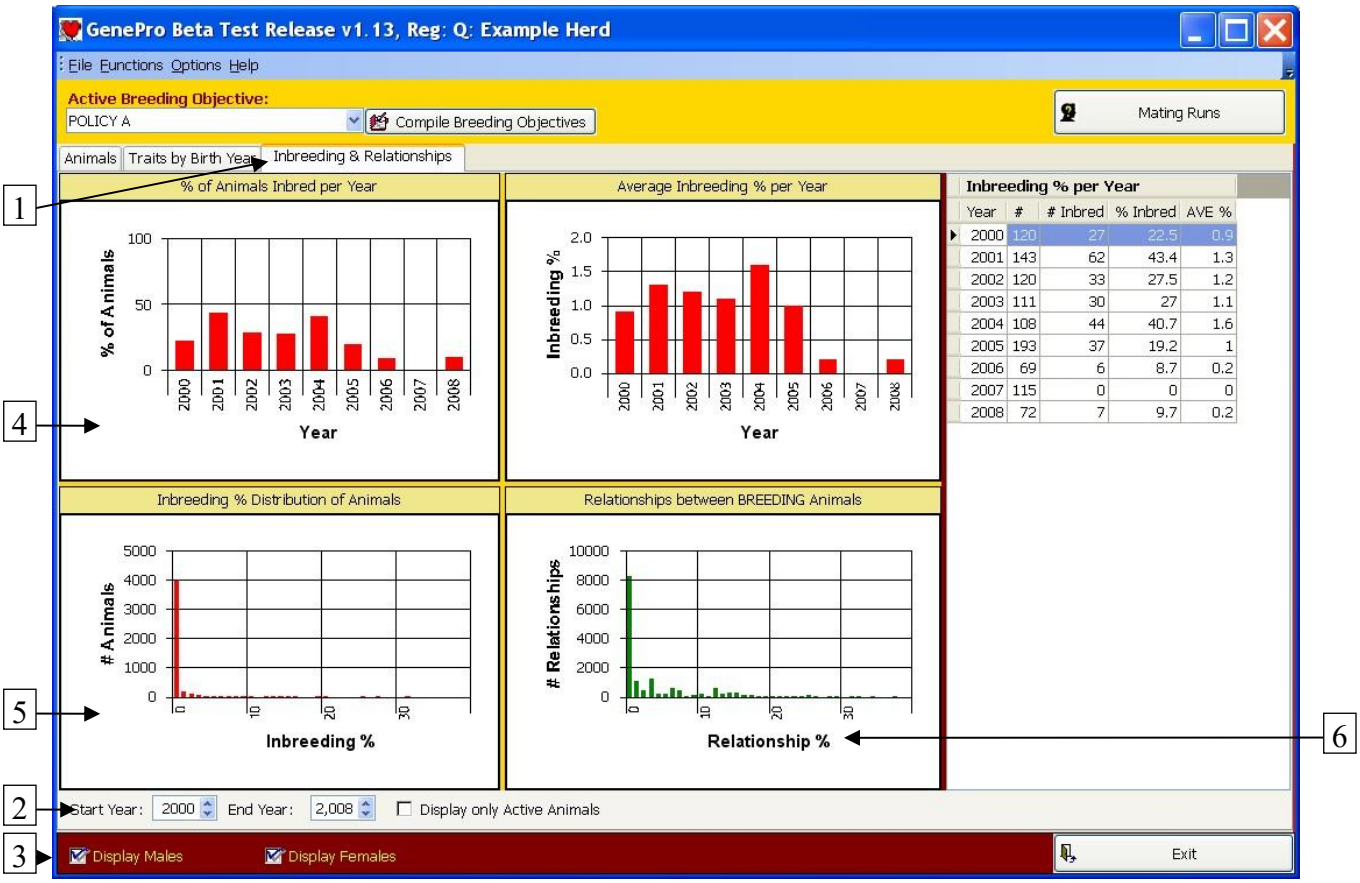
The traits by year tab is used to display a graph of average breeding values by year of birth. For each trait for each year of birth, the average breeding value of all calves born in that year is indicated by a circle. The maximum and minimum breeding values are displayed by a small horizontal line. These maximum and minimum lines are linked together with a single vertical line which gives the range of breeding values for animals born in the applicable year. By default all active animals is included in the graph together with all the inactive animals of which you have been the owner. See also: ***Section 4 -*** **Synchronizing Data*.***



1. Click on Traits by Birth Year tab to view the trait graphs.
2. (a) Here you may select which traits should be displayed in the graph.
   (b) Use these two options to show all the traits or only the traits that are part of the active breeding objective.
3. You may select for which birth years you want to show the graphs and whether to include only animals that are currently active. The Display Objective Lines option can be used to display lines for the minimum, target and maximum objectives for each trait as specified within the active breeding objective.
4. Here you can select to include only male and / or female animals in the graph.
5. Click on *Single Trait* to open a tab where you can view a graph of traits, one trait at a time.

6.3. Inbreeding & Relationships Tab

This tab displays inbreeding and relationship graphs of animals in the herd. Inbreeding percentages received in the ARC breeding value file will be used for animals where available. In not available, the calculated inbreeding percentages will be used. To recalculate inbreeding percentages, go to: *Functions > Recalculate Inbreeding Percentages*. To recalculate relationships between all active and breeding animals, go to: *Functions > Recalculate Relationships*. Inbreeding is the inbreeding percentage of the animal itself and relationships between a possible dam and sire pair is equal to the inbreeding percentage a calf born from such a mating will have. By default, all active animals is included in the graph together with all the inactive animals of which you have been the owner. See also: ***Section 4* - Synchronizing Data.**



1. Click on Inbreeding and Relationships for the applicable graphs.
2. You may select for which birth years you want to show the graphs and whether to include only animals that are currently active.
3. Here you can select to include only male and / or female animals in the graphs.
4. The first graph displays which percentage of animals born each year, are inbred. The second graph displays the average inbreeding percentage of animals born in the applicable year.
5. The third graph displays the inbreeding distribution of active and breeding animals in the herd. The horizontal axis is used for the inbreeding percentage and the vertical for the number of animals which have a corresponding inbreeding percentage.
6. The last graph displays the relationships between all active and breeding animals. The graph is a summary of relationships between male and female animals if all possible matings are done.

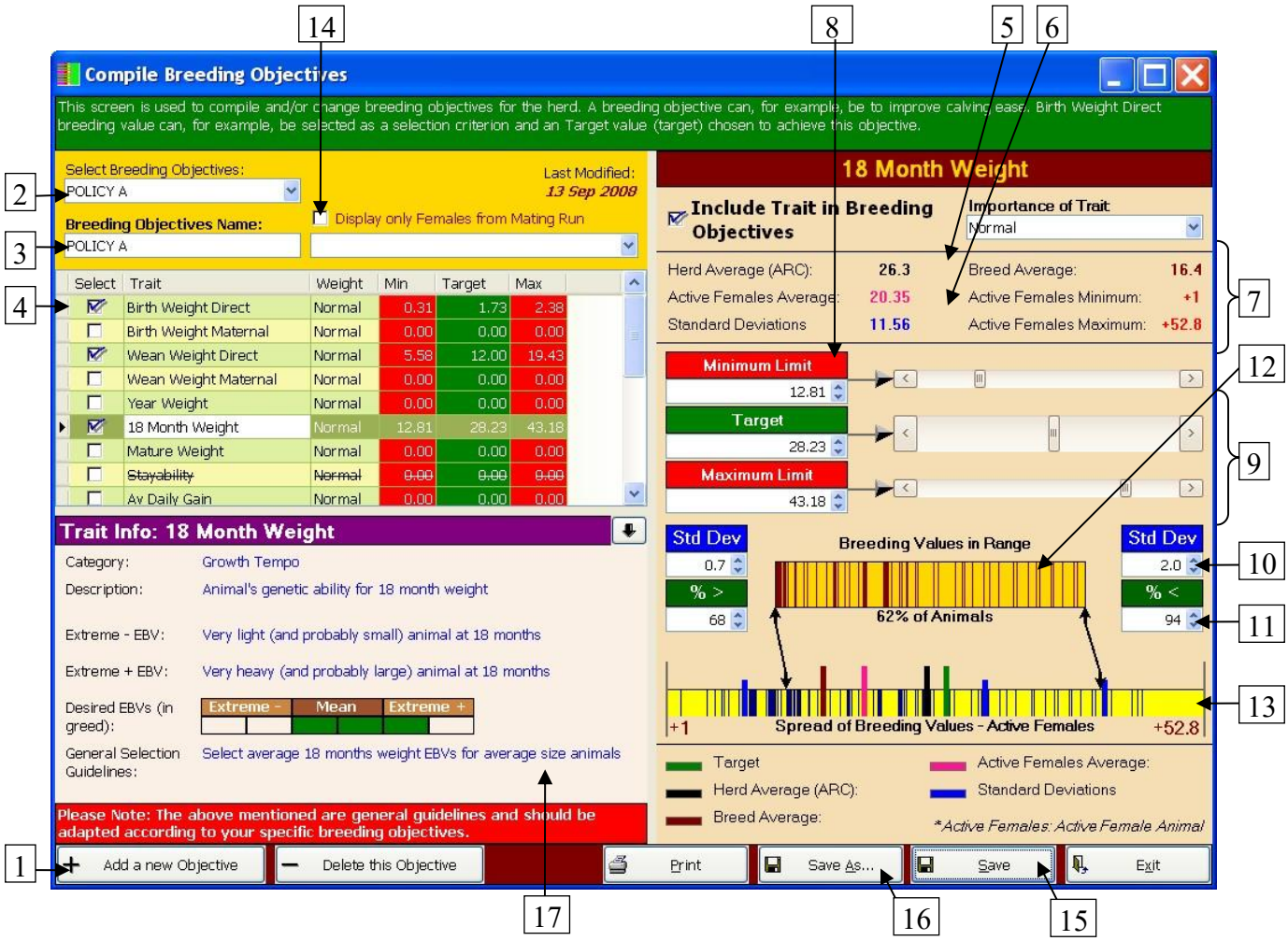
7. Compile Breeding Objectives

This window is used to create, edit and delete breeding objectives. A breeding objective is a set of goals to which you want to breed towards. To compile a breeding objective, you should:

- Select which traits to include in the objective;
- Set the target (optimal), minimum and maximum values for each trait; and
- Set a weight or relative importance for each trait in the breeding objective.

Once a breeding objective is defined, you can calculate optimum matings to try to accomplish the objectives by using the Mating Runs window.

Main Window Menu: Commands > Edit Breeding Objectives



1. Click on Add a New Objective to create a new breeding objective.
2. You may also select to edit an existing objective. Just select the existing objective from this list.
3. Here you can enter or change the name of the breeding objective.
4. This table displays the breeding objective. To add or remove a trait from the objective, click on the applicable trait.
5. Make a tick mark here to include the trait in the objective or remove the tick to exclude the trait.
6. Specify the weight (relative importance) of the trait in the breeding objective. A trait with a higher weight will enjoy preference when calculating matings to try to achieve the breeding objective.
7. The breed and active female averages are displayed here (Also see Step 14). The average, minimum, maximum and standard deviation of the selected breeding value for the active females are displayed and also the breed average as supplied by the BLUP analysis done by the ARC.
8. Here you can specify the minimum limit, maximum limit and target (optimal) values for the selected trait.
9. The minimum, maximum and target values can also be set be dragging the sliding bars to the left and to the right. The top bar is used to specify the minimum limit value, the centre bar for the target value and the bottom one for the maximum limit value.
10. You may also set the minimum and maximum objective by specifying it in terms of standard deviation. In the example the minimum objective is set to 0.7 standard deviations below the average breeding value for the active females and the maximum at 2.0 standard deviations above the average.
11. Another method of setting the minimum and maximum limit values is to specify them in terms of percentage of animals that are above the minimum and percentage of animals below the maximum

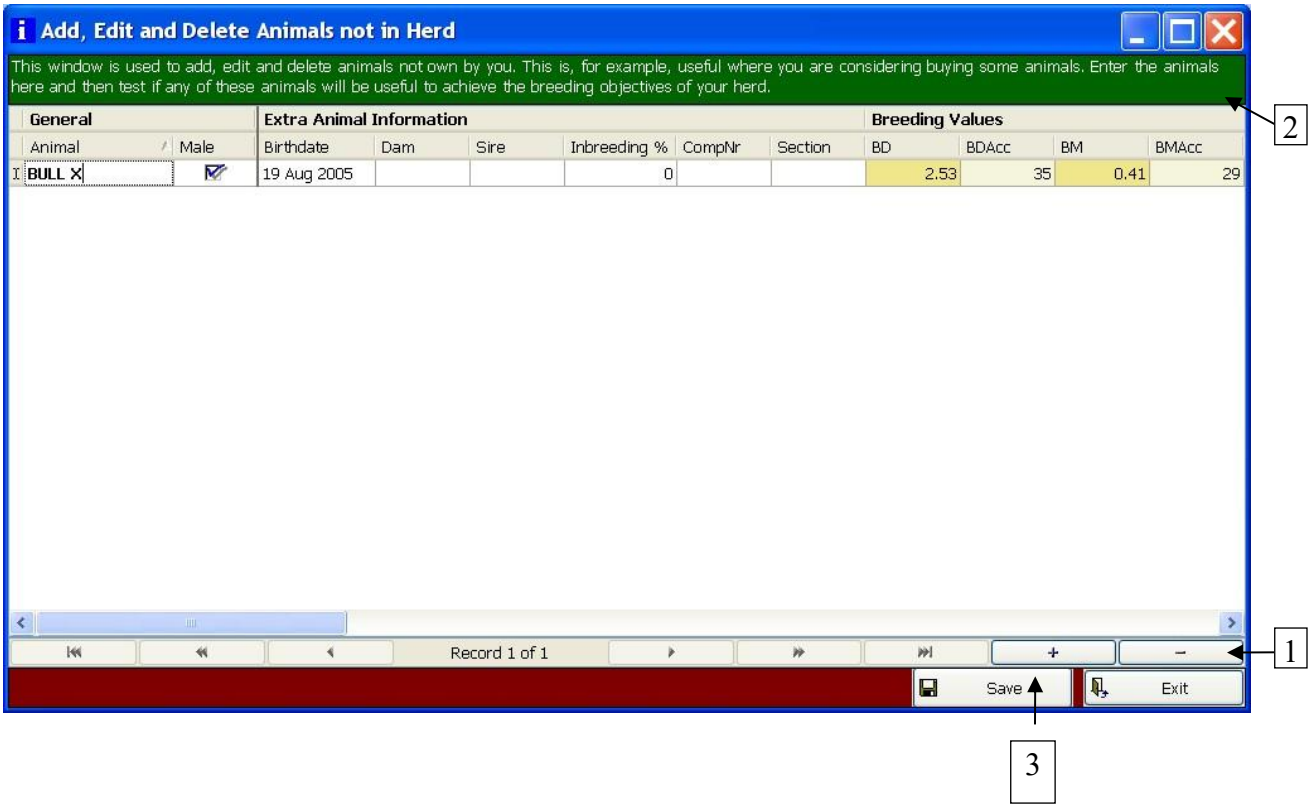
objective. In the example, 68 % of animals are above the minimum limit and 94% below the maximum limit. 62% of the animals are in between the minimum and maximum limits.

12. This bar displays the distribution of breeding values that fall between the minimum and maximum breeding objectives. Each vertical line represents an animal.
13. This bar displays the distribution of breeding values of all the active females in the herd (Also see: Step 14). The pink line is the average of the active females, the blue lines the standard deviations from the average, the black line the herd average as supplied by the ARC, the maroon line the breed average as supplied by the ARC and the green line the target breeding objective as set by the user.
14. By default, the breeding values of all the active female animals are displayed at step 13. You can, however, select to display only female animals that are included in a specific mating run. To do this, make a tick mark next to *Show only Female Animals from Mating Run* and then select the mating run from this dropdown.
15. Click on *Save* to save the breeding objective.
16. Click on *Print* to print the breeding objective.
17. The trait info section provides a general description of the selected trait and gives **general** breeding objective selection guidelines. It is only visible when using Genetics together with BenguFarm BEEF while using breeding values (not breeding value indexes). **The guidelines should be adapted according to your specific breeding objectives.**

8. Add, Edit and Delete Animals not in Herd

As stated previously, the BenguFarm GENETICS database will be populated with active and breeding animals in your Herd Management Software's database. In some circumstances you may wish to add additional animals to BenguFarm GENETICS and then use them in breeding mating runs (breed with them). Typically, this would happen if you are considering buying a breeding male from another breeder or considering using another AI male. You then add this animal to BenguFarm GENETICS and use it in mating runs to do matings with. You can then see if this animal is compatible with your breeding objective. **PLEASE NOTE: This window will not allow you to edit animals that were copied from your herd management software's database during data synchronization**.

Main Window Menu: Commands > Add, Edit & Delete Animals

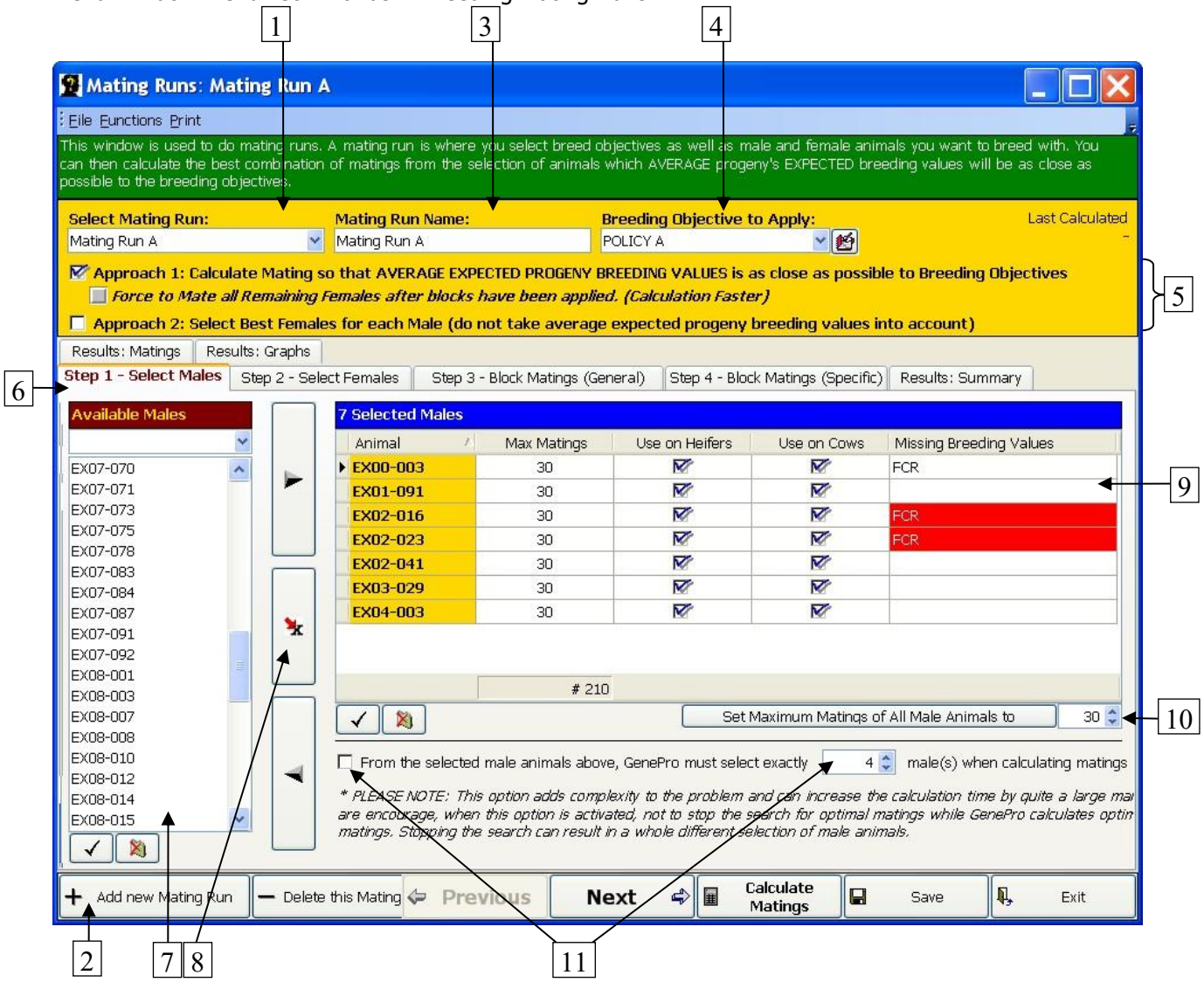


1. Click on the **+** to add a new animal and on the **−** to delete an existing animal.
2. Enter or edit the animal's details in the table in the main section of the window. **PLEASE NOTE: Remember to enter breeding value accuracies. BenguFarm GENETICS interprets breeding values with a 0 (zero) accuracy as missing breeding values. If you do not have the accuracies, you will have to make a guess.**
3. Click on *Save* to save the changes.

9. Mating Runs

This is the heart of BenguFarm GENETICS and is where optimal matings can be calculated for a selection of male and female animals, given a specific breeding objective and other parameters.

Menu Window Menu: Commands > Breeding Mating Runs



1. To load an existing mating run, select the applicable mating run from this list.
2. Click on *Add new Mating Run* to add a new mating run. A window will open where you can enter the name of the mating run and select whether you want to create a copy of an existing mating run.
3. You may change the name of the mating run here.
4. From the *Breeding Objective to Apply*, select the breeding objective you wish to use. Optimal matings will be calculated for this breeding objective. You can select another breeding objective or edit the existing breeding objective at any time. To edit, click on the small button with the book and pencil to the right of the dropdown.
5. Select optimal mating calculation approach:
   a. **APPROACH 1:** This is the default calculation method in BenguFarm GENETICS. With this approach, BenguFarm GENETICS calculate matings in such a way that the AVERAGE EXPECTED PROGENY BREEDING VALUES is as close as possible to the breeding objectives. In other words, each mating would not necessarily be with the best male for the applicable female. BenguFarm

GENETICS may select a male animal which will breed a progeny below the target to offset other matings that will breed a progeny above the target. The **average** of all these matings must be as close as possible to the target.

i. With approach 1, you have an option, namely "Force to mate all remaining females after blocks have been applied". When blocks on matings are applied (see items 10.3 & 10.4 below), it can happen that some females are blocked with all the males, or in other words, they cannot be mated with any male. The remaining females are those for which at least one male remains with which the female can be mated. By enabling the above-mentioned option, BenguFarm GENETICS will only give a solution if ALL of these remaining females can be mated. Typical a solution will not be available if too few males were specified by the user or too few matings allowed per male. This will imply that there isn't enough matings allowed from the male side to mate all females. By switching off the option, BenguFarm GENETICS will mate females up to a point where there aren't any males left. The resulting matings are those for which the average progeny projected breeding values are as close as possible to the breeding objectives. The remaining females are left unmated. Please note that the remaining females isn't necessarily the last females selected, but those that will cause the average expected progeny breeding values to be further from the breeding objectives.

b. **APPROACH 2:** In this approach, the average expected progeny breeding values are **not** considered. Instead, the program will try to select the best females for each male. The females are ranked from best to worse for every male. If only one male is selected, the best females for that male will be selected. If more than one male is selected, it can be that some of the top females for male A and male B is the same. In such a case, you cannot select the top females for each bull. The females that will then be selected will be the second-best selection, in other words, those combinations of male and females that will result in lowest sum of weighed ranking points for all the matings.

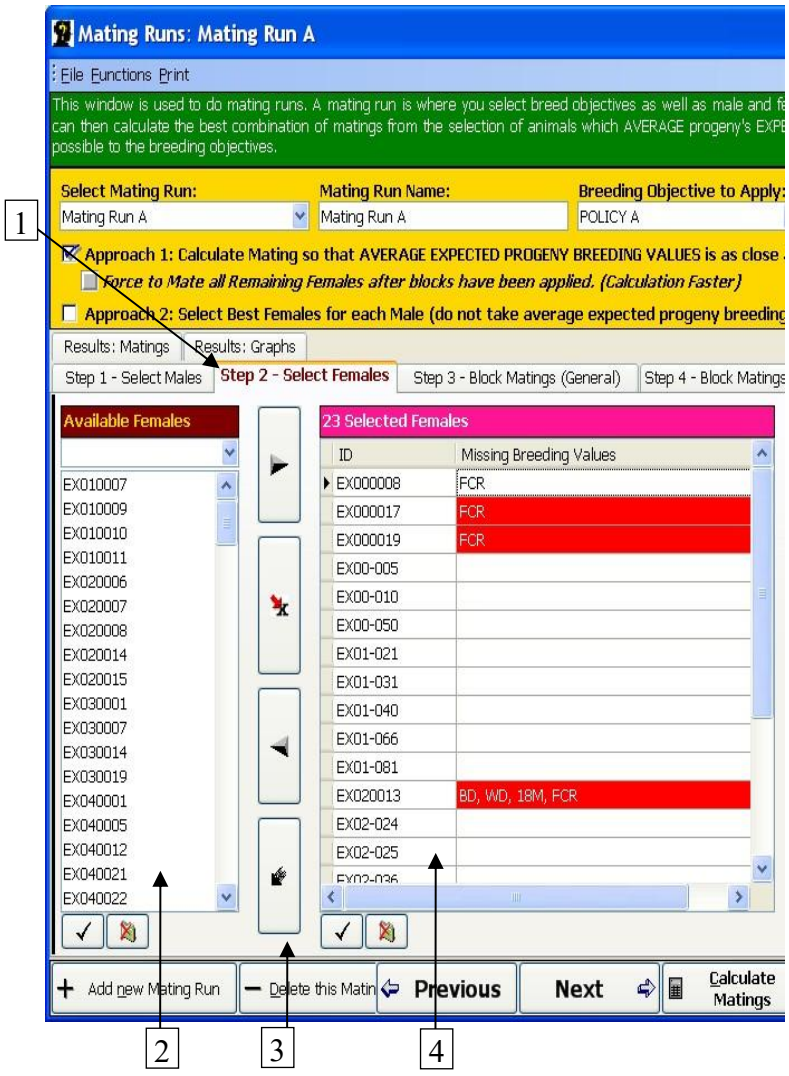
9.1. Adding Male Animals to Mating Run

6. Click on: *Step 1: Select Males*

7. This is a list of available males. All active males and breeding males will be displayed here. Select the males you want to breed with by clicking on the applicable animal. Multiple animals can be selected at once by holding in the Ctrl key and clicking on the animals you wish to add. You may also hold in the Shift key and use the arrow keys to select a range of animals.
8. Click on the right pointing arrow to add the males you have selected in step 6. The selected males will now be placed in the Select Males list to the right. The button with the X and red arrow is used to select male animals with the help of the group selection window. To remove males from the selected males list, click on the animal in the selected males list and then click on the left pointing arrow. The animals will now be moved to the available males list.
9. This is the Selected Males list. If the animal does not have breeding values for some or all of the traits in the breeding objectives, those traits will be listed in the "Missing Breeding Values" column. BenguFarm GENETICS will not consider male animals for mating if they have missing breeding values. Please note that a missing breeding value is defined as a breeding value for which the animal has an accuracy of zero (0). For each male you can specify 3 parameters, namely:
    a. Maximum Matings: The maximum number of matings this male can eventually be used in.
    b. Use on Heifers: This male can be used to mate with heifers (females with no progeny)
    c. Use on Cows: This male can be used to mate with a cows (females with progeny)
10. This function enables you to change the maximum number of matings of all selected males. Change the value to the desired value and then click on "Set Maximum Matings of all Male Animals to".
11. Here you can specify the exact number of male animals that must be used. You may for example have selected 30 male animals in the mating run, but on the farm you have only 5 camps to put the male animals with the females. You can then set the exact number of males to be selected to 5 and make a tick mark to the left of "From the selected male animals above, BenguFarm GENETICS must select exactly 5 males when calculating matings".

PLEASE NOTE: This option is only available with approach 1. Also, it adds complexity to the mathematical problem and can increase the calculation time by quite a large margin. When this option is activated, you are advised not to stop the search for optimal matings while BenguFarm GENETICS is busy to calculate optimal matings. Stopping the search can result in a whole different selection of male animals.

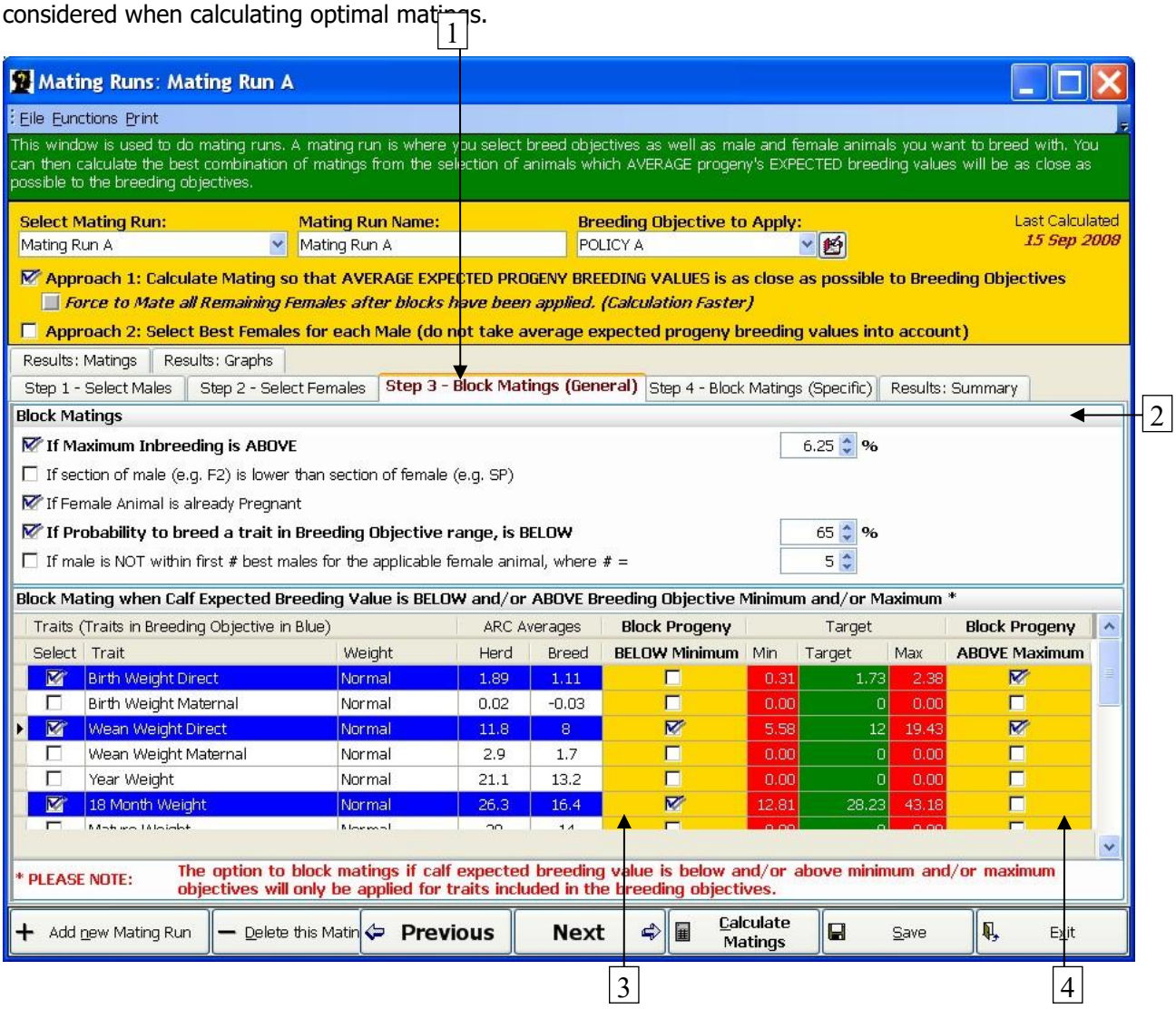
9.2. Adding Female Animals to a Mating Run



1. Click on: *Step 2: Select Females.*
2. This is a list of available females. All active females are displayed here. Click on the females you wish to add. Multiple animals can be selected at once by holding in the Ctrl key and clicking on the animals you wish to add. You may also hold in the Shift key and use the arrow keys to select a range of animals.
3. Click on the right pointing arrow to add the selected females selected in step 2. These females will now be placed in the Selected Females list. The button with the X and red arrow is used to select female animals with the help of the group selection window. To remove females from the selected females list, click on the applicable females and then click on the left pointing arrow. The last button is used to remove females from the selected females list with the help of the group selection window.
4. This is the Selected Females list.

9.3. Block Certain Matings (General)

This section is used to tell BenguFarm GENETICS which matings is not allowed and thus should not be considered when calculating optimal matings.



1. Click on: *Step 3: Block Matings*
2. The *Block Matings* section is used to block matings if they do not comply with certain parameters. You may specify one or more of the seven available parameters:
   a. Here you can change the maximum inbreeding percentage a calf can be. BenguFarm GENETICS will not consider matings where the inbreeding percentage is higher than the value set here.
   b. The next block is to block matings where the male animal's section (e.g. F2) is below that of the female (e.g. SP).
   c. Block mating if the selected female is already pregnant and thus could not be mated.
   d. Block matings where the **possibility that the expected breeding value of the calf to fall between the minimum and maximum limits selected in the breeding objectives of <u>any</u> trait in the applied breeding objective, is below a certain percentage**. Without given away algorithms for calculation of these possibilities, it can be mentioned that many factors can play a role in the eventual materialized breeding value of the calf. Although the projected breeding value of the calf, calculated as (breeding value of the male + breeding value of the female) / 2, can fall with the minimum and maximum breeding objectives, the possibility that it actually does, can be very low. You may select to block matings where the possibility is to low. The possibility will increase the wider you set the minimum and maximum breeding objective limits apart and the closer the

projected breeding value is to the centre point between the minimum and maximum breeding objective limits.

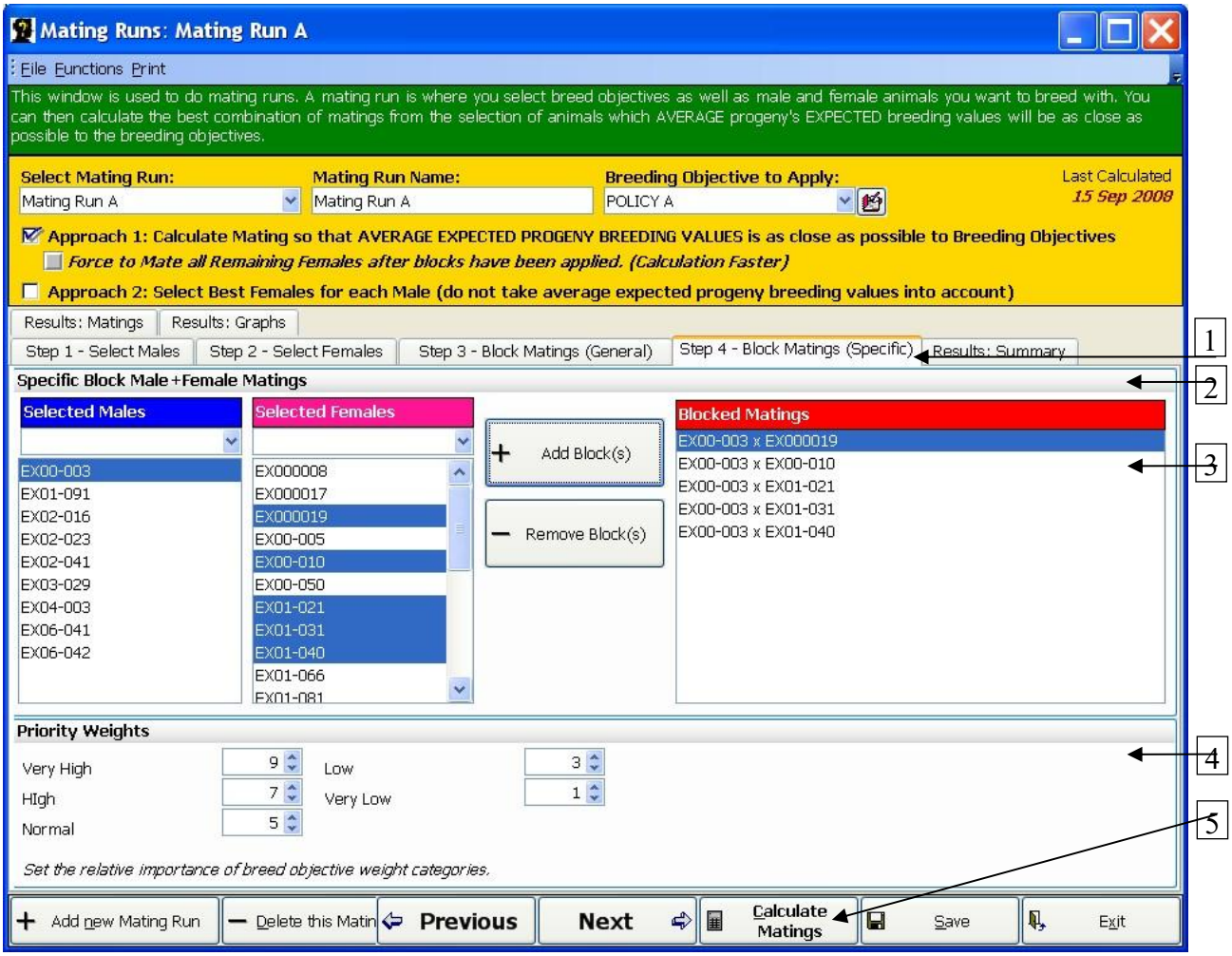
e. BenguFarm GENETICS selects a collection of matings so that the average expected breeding value of the calves is as close as possible to the optimal objective. For this reason, BenguFarm GENETICS may not select the first-choice bull for every female. The last setting, **Where the bull is not within the first number (#) best bulls for the applicable female animal**, is used to block matings where the bull is not within a set number of best bulls. If the setting is for example set to 5, the best 5 bulls for each female will be considered for mating, but not the 6th choice bull and higher. This setting is experimental and may be removed from later BenguFarm GENETICS versions.

f. Block a myostatin carrier bull from being used on a heifer. This option is only available when BenguFarm GENETICS is used with BenguFarm BEEF.

g. You may also block matings where the probability the resulting progeny would be a myostatin carrier is above specified threshold. Refer to green info button on screen for detailed explanation. As above, this option is only available when BenguFarm GENETICS is used with BenguFarm BEEF.

3. Block matings where the **expected breeding value of the calf is BELOW the minimum breeding objective** limit as specified in the applied breeding objective. The expected breeding value of the calf is calculated as (breeding value of the male + breeding value of the female) / 2. You can specify this block for each trait in the breeding objectives.
4. Block matings where the **expected breeding value of the calf is ABOVE the maximum objective** limit set in the applied breeding objective. You can specify this block for each trait in the breeding objectives.

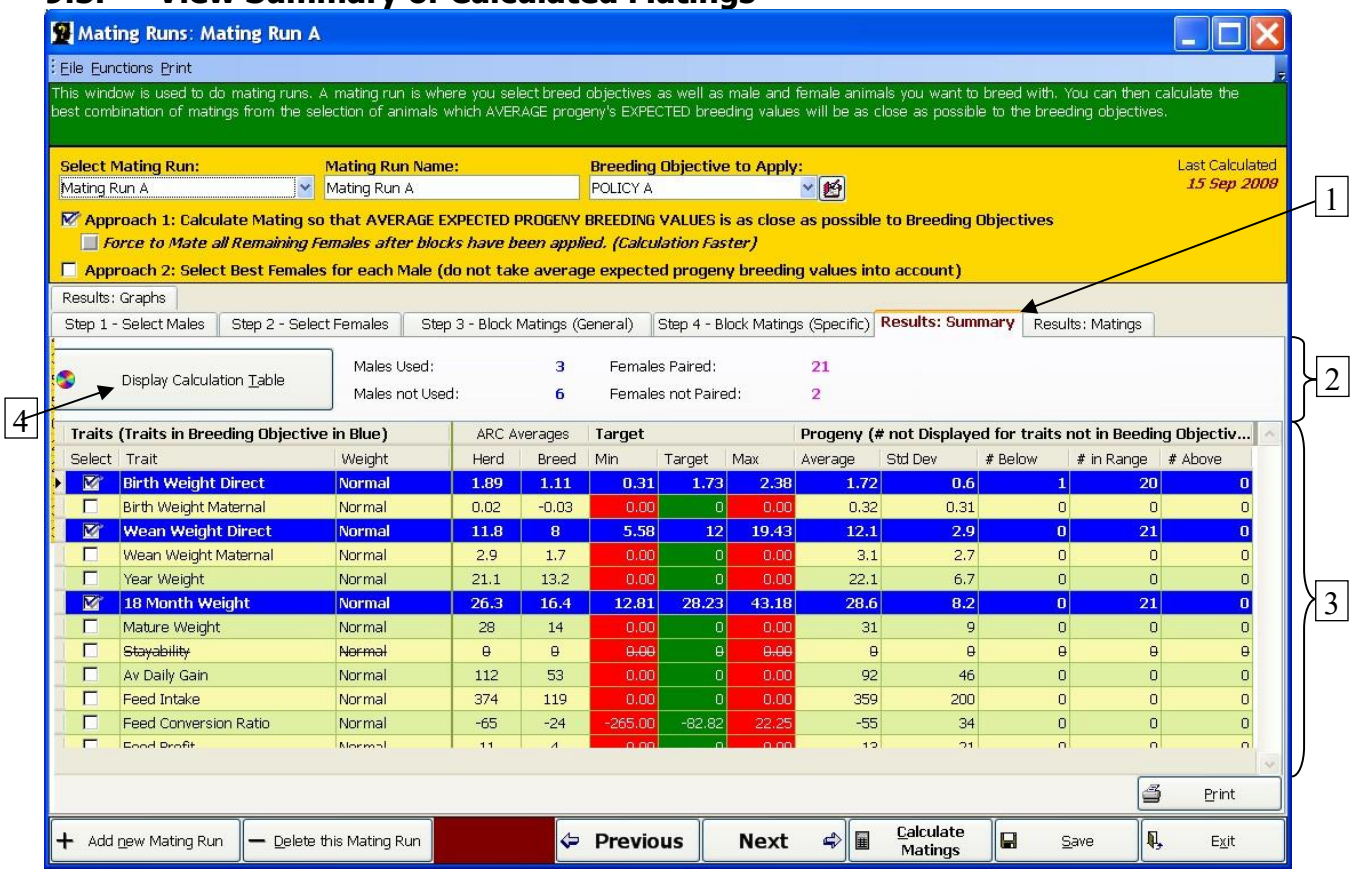
9.4. Block Matings (Specific), Objective Category Weights and Calculate



1. Click on: *Step 4: Calculate*
2. You may select to block specific matings, for whatever reason, by specifying these matings explicitly. To block specific matings, select the male animal from the Selected Males list, select the female animal(s) from the Selected Females list and then click on *Add Block(s)*. To remove an existing block, click on the blocked mating in the Block Matings list and then click on *Remove Block(s)*
3. This is the list of explicitly blocked matings.
4. In the breeding objective you can define the relative weight or importance of different traits in the breeding objective. A trait's weight can be very high, high, normal, low and very low. You may change the relative importance of these categories by changing their default values.
5. In this step BenguFarm GENETICS will use the information as entered in steps 1 to 4 and calculate optimal matings. If the average expected breeding value of the progeny is not close to the optimal as defined in the breeding objective, you may wish to:
   - Use other male animals to mate with
   - Allow more matings per male animal
   - Relax some of the mating blocks
6. If all of this still does not work, it can be an indication that the breeding objectives you have selected are unrealistic. You will then have to consider to either changing the breeding objectives and/or to buy other males for breeding and/or use other AI bulls.

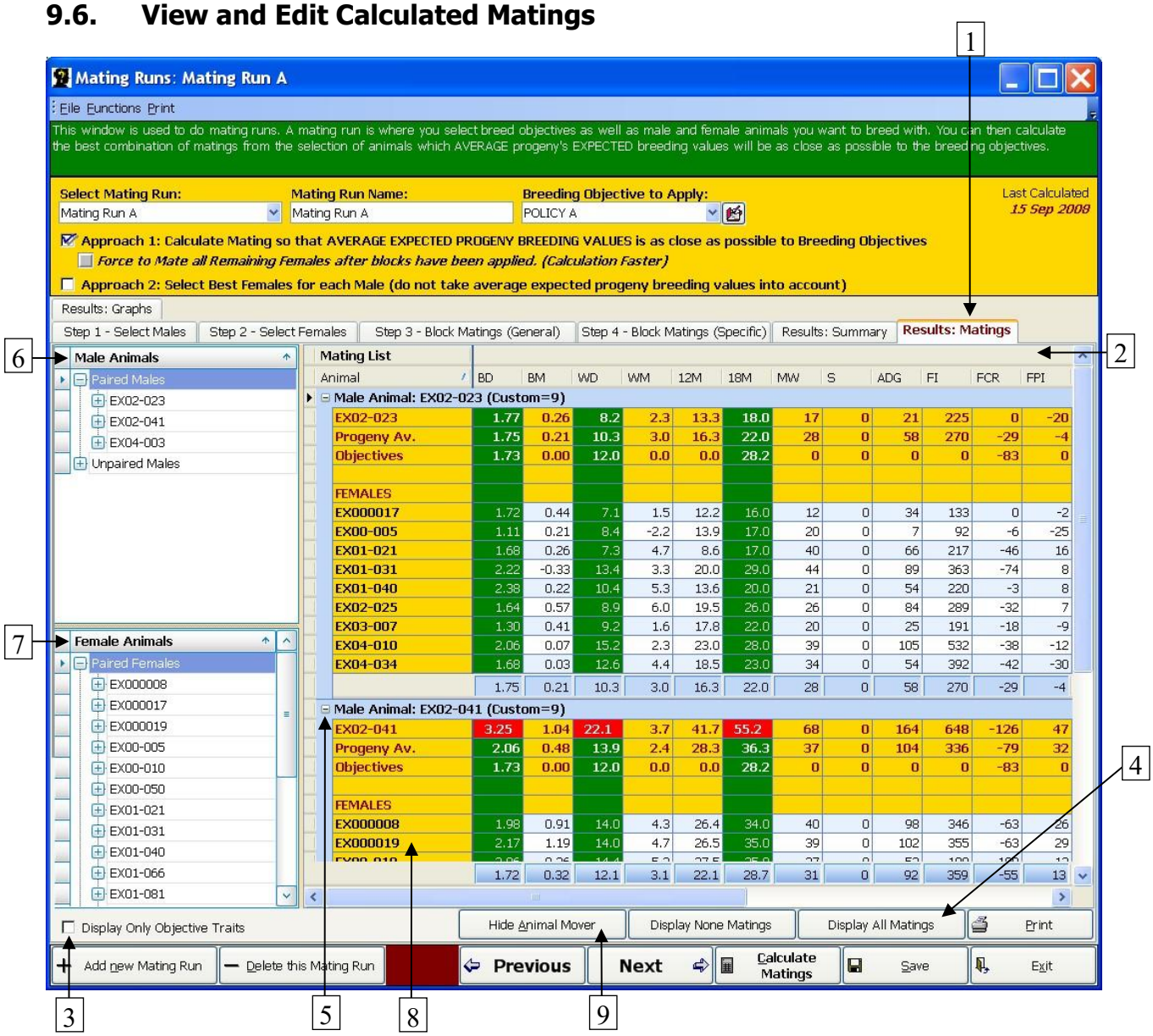
PLEASE NOTE: The first time the calculation is done, can take some considerable time. This is because the relationships between animals are probably not calculated yet. BenguFarm GENETICS will calculate and save relationships so that the calculation of relationships can be skipped the next time. After the relationships are calculated / previously saved ones loaded, a window with a Stop sign will appear. At this stage optimal matings are calculated. BenguFarm GENETICS uses a third-party linear programming (LP) component to do these calculations. Because of the complexity of the problem, this step can take considerable time. An optimal solution would be where the objective function of the LP is equal to 0. That said, because of the constraints to the mating problem, a 100% optimal solution is not necessarily possible. Given the males, females and blocks you defined, an optimal solution could quite possibly be where the objective function is far away from 0 (zero). Taken all this into account, you may not want to wait for the LP to finish its calculations. To stop the search for an optimal solution and display the best solution found up till that point, click the Stop button.

9.5. View Summary of Calculated Matings



1. Click on: *Results: Summary*
2. A summary of the number of animals used are displayed here. In the example, of the seven males selected, three were used and of the 71 females selected, 52 were included in matings. The other 16 females not included can be because of several reasons, such as missing breeding values, to high relationships with the male animals, expected breeding values of the calves that falls outside the minimum or maximum values as defined in the applied breeding objective, the possibility to breed the trait(s) are to low or there is just not enough matings allowed per male.
3. This table contains all the traits. The traits included in the applied breeding objective have a blue background and the minimum, target and maximum breeding objectives are displayed. Then, for the calculated matings, the average expected breeding values of the progeny is displayed, the standard deviation (Std Dev) and the number of the progeny of which the expected breeding values are below the minimum value, in range and above the maximum value. In the example we can see that the average of the progeny for Birth Weight Direct and Wean Weight Direct are close to the optimal values, but for 18 Month Weight there is quite a difference.
4. Click here to show the calculation table. The calculation table will display a color-coded table of the matings, including first choice males, reasons why certain matings were blocked and eventual selected males. You may print the calculation table by *Print Priority List* from the *Print* menu.

9.6. View and Edit Calculated Matings



1. Click on: *Results: Matings*
2. The matings are displayed in the table in the main section of the window. The table is divided in separate sections, a section for each male. The applicable male is displayed on the first yellow line of each section. The next line displays the average expected breeding values for the progeny of the applicable male and then the breeding objectives are displayed. The females with which this male is mated, are displayed in the lines that follow. The breeding values next to each male is the male's actual breeding values. The breeding values displayed next to the female animals are the projected breeding values of the progeny if the female is mated with the corresponding male. The values in the inbreeding column is the actual inbreeding percentage of the applicable animal. The relationship column, display the relationship between the female and the corresponding male.
3. Make a tick mark next to *Show Only Objective Traits* to view the male actual breeding values and expected breeding values for only the traits that are included in the applied breeding objective. Green values are values that are in between the minimum and maximum breeding objectives, red values are outside the range. White breeding values are breeding values of traits that are not included in the breeding objective.

4. Use the *Display All Matings* and *Display None Matings* buttons to hide or show the females mated with each bull.
5. You may also click on the "+" next to each male animal to view the females mated with this male, or on the "-" to hide the females.
6. This is a quick list, without further details, of all the paired and unpaired males, together with the females the paired males were mated with.
7. The same list as the one at step 6, just from the females' viewpoint.

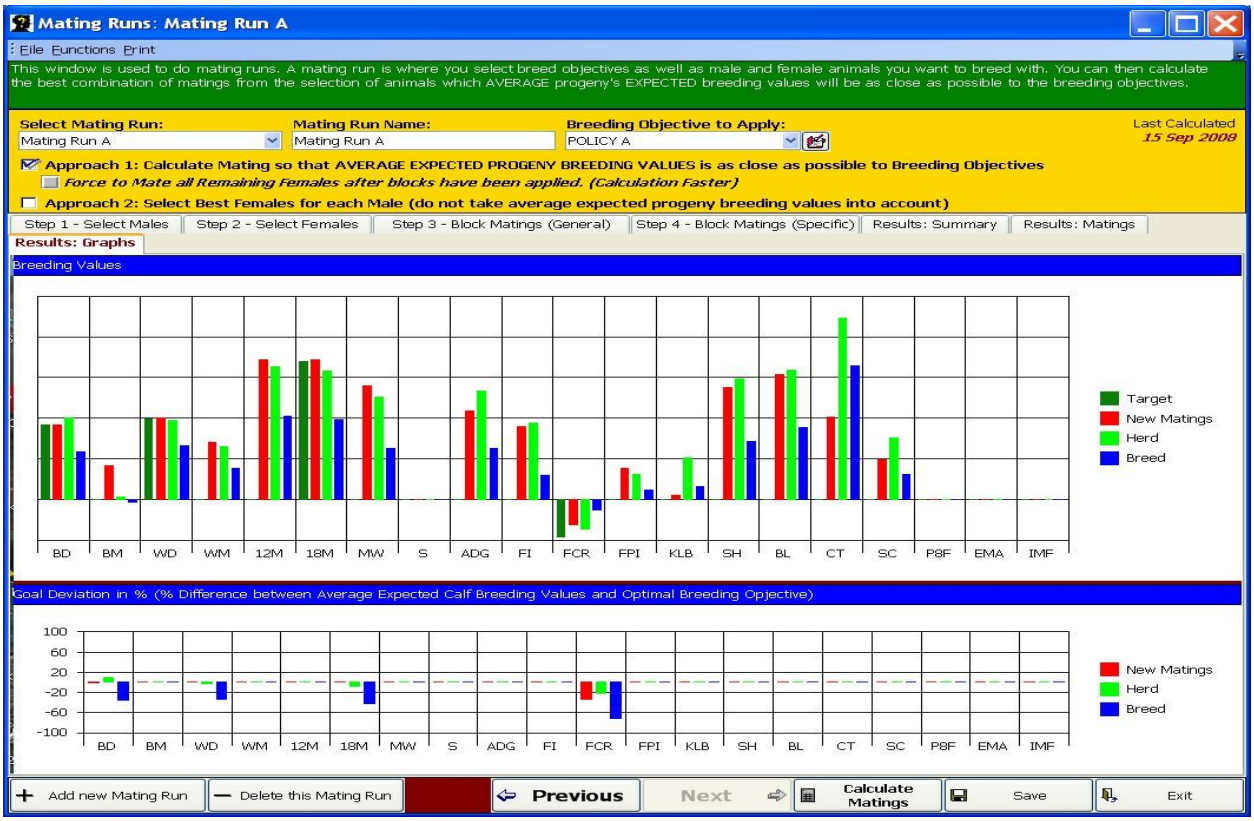
Move Female Animals to other Male Animals

8. If you left click on any female, a *Move Mating To* window (not shown in example) will appear. This will have the same layout as the mating window (See Step 6). The only difference is that it is only for the female animal you have clicked on. The male animal displayed will be the male over which the mouse cursor is currently hovering over. By moving the mouse over another male, the male will change together with the expected progeny breeding values of the female. The expected progeny breeding values being displayed, will now be those if though the female is mated to the male over which the mouse is hovering. Left click again to move the female from the existing male to this newly selected male.

   To unpair a female, right click on the applicable female. A small menu will appear (not shown). Select "*Move Female to Unpaired Females*"
9. Click on *Hide Animal Mover* to hide the *Move Mating To* window. You may also press *Esc* to hide this window.

9.7. View Result Graphs

In this tab you can view the results graphically. There are two graphs. The first graph displays the target, average expected progeny breeding values and ARC herd and breed average values. The second graph displays the percentage (%) difference from the target (optimal) objective for each trait in the breeding objective. The red bars are the percentage differences of the new matings from the target objective for each trait, the green the difference of the ARC calculated herd averages from the target objectives and the blue bars the difference of the ARC breed averages from the target objectives.


Mating Runs: Mating Run A
File Functions Print
This window is used to do mating runs. A mating run is where you select breed objectives as well as male and female animals you want to breed with. You can then calculate the best combination of matings from the selection of animals which AVERAGE progeny's EXPECTED breeding values will be as close as possible to the breeding objectives.
Select Mating Run:
Mating Run A
Mating Run Name:
Mating Run A
Breeding Objective to Apply:
POLICY A
Last Calculated
15 Sep 2008
Approach 1: Calculate Mating so that AVERAGE EXPECTED PROGENY BREEDING VALUES is as close as possible to Breeding Objectives
Force to Mate all Remaining Females after blocks have been applied. (Calculation Faster)
Approach 2: Select Best Females for each Male (do not take average expected progeny breeding values into account)
Step 1 - Select Males
Step 2 - Select Females
Step 3 - Block Matings (General)
Step 4 - Block Matings (Specific)
Results: Summary
Results: Matings
Results: Graphs
Breeding Values
BD BM WD WM 12M 18M MW S ADG FI FCR FPI KLB SH BL CT SC P8F EMA IMF
Target
New Matings
Herd
Breed
Goal Deviation in % (% Difference between Average Expected Calf Breeding Values and Optimal Breeding Opjective)
100
60
20
-20
-60
-100
BD BM WD WM 12M 18M MW S ADG FI FCR FPI KLB SH BL CT SC P8F EMA IMF
New Matings
Herd
Breed
Add new Mating Run
Delete this Mating Run
Previous
Next
Calculate Matings
Save
Exit

9.8. Print Reports (Print Menu)

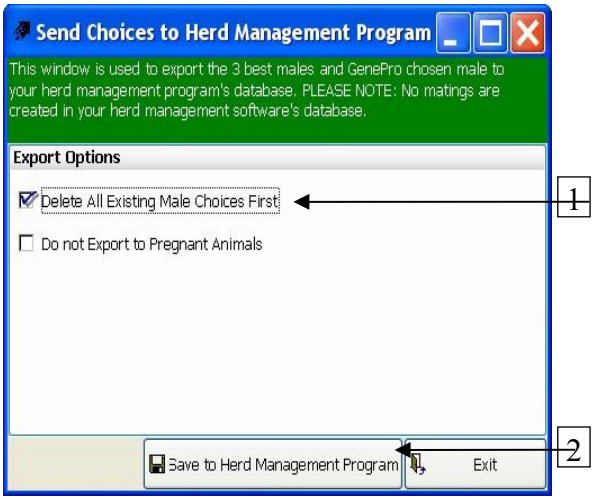
There are two mating run reports that can be printed.

a. **Priority Lists:** Select *Print Priority List* from the *Print* menu. This will print all the females together with the males the female was mated with, starting at the first-choice male down to the last choice male, for up to 10 males. It will indicate the male BenguFarm GENETICS selected together with reasons why the other males were not selected.
b. **Mating Lists:** Select *Print Mating Lists* from the *Print* menu. This will print the matings, grouped by male. For each male, the females this male should be mated with, is printed. The expected EBVs for the calves are printed, as well as the average projected EBVs, the target breeding objective and herd and breed average EBVs as supplied by the ARC.
c. **Result Summary:** Select *Print Result Summary* from the *Print* menu. This will print a window similar to the summary view of calculated matings. It will also list all the general mating blocks that have been applied.

9.9. Send Choices to Herd Management Software's Database

This function will export the 3 best males and BenguFarm GENETICS chosen male to your herd management program's (BEEF or SHEEP & GOATS) database. PLEASE NOTE: **No mating records are created in your herd management software's database by this function.**

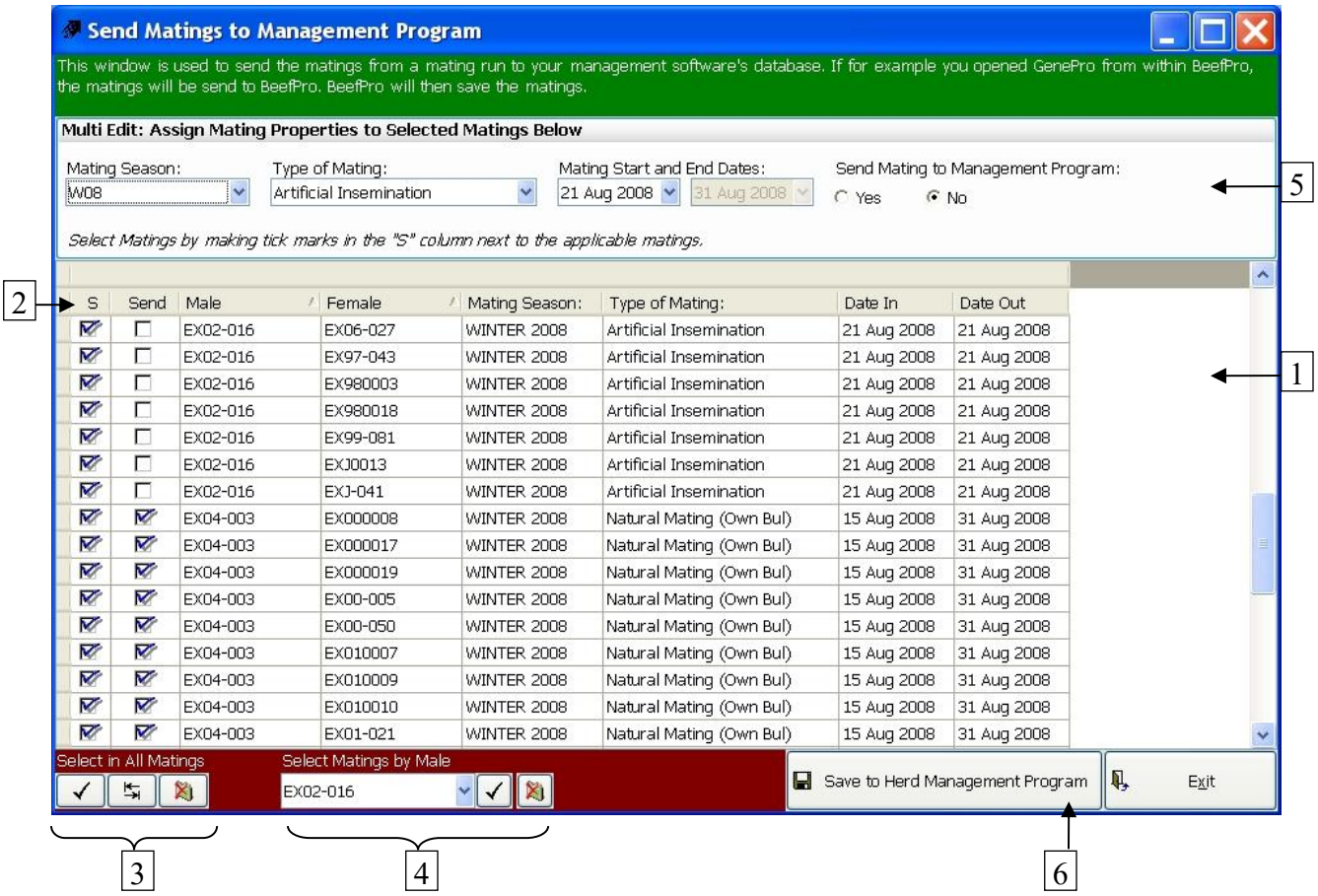
To activate, select *Send Choices to Herd Management Program* from the *Functions* menu.



1. Select the *Delete All Existing Male Choices First* if you want BenguFarm GENETICS delete all existing choices from the herd management program's database. If not selected, the choices from the current mating run will just be added to the herd management program's database. If an animal already has choices, these will be overwritten by the new choices. If you do not want to export choices to animals that are currently pregnant, check the *Do not Export to Pregnant Animals* option.
2. Click on Save to Herd Management Program to export the choices.

9.10. Send Matings to Herd Management Software's Database

When you are satisfied with the matings, you may export the matings directly to your herd management software's (BEEF or SHEEP & GOATS) database. To do this, select *Save Matings to Management Program* from the *Functions* menu. **PLEASE NOTE: If you have saved the matings to your Management Program and then discover you have made a mistake, you will have to edit or delete the matings from within your herd management software (BEEF or SHEEP & GOATS).**



1. All the matings are displayed in the main section of the window. For each mating, you may now change the mating season (calving season), mating type and mating dates. You can change these values directly in the table. Make a tick mark in the Export column next to the records that must be exported to your herd management software's database. You may, for example, wish not to export the artificial inseminations and rather enter them by hand into your herd management software's database at the time you actually do the inseminations. If you select to export them now, you should choose a default date(s) when the inseminations will be done and then you will have to remember to change the insemination dates from within your herd management software to the actual insemination dates once the inseminations are done.
2. It is quite possible that you would want to change the data of a specific column to a similar value for all or a group of matings. This would be time consuming if you must do it one mating at a time. You can edit several matings at once by making tick marks in the "S" column next to the matings you wish to change.
3. These three buttons can assist you in selecting the mating records. The first button selects all the records, the second inverts the current selection and the third button deselect all records.
4. You may also select or deselect mating records on a per male animal basis. First select the male animal. Click on the first button to the right to add to the current selection, all the matings this male animal is involved in. The second button to the right is used to deselect all the matings the selected male animal is involved in.
5. By changing any value here, the corresponding value will change at each mating record that has a tick next to it in die "S" column.
6. Click on *Save to Herd Management Program* once all the mating attributes have been entered/changed and you want to save the matings to your herd management software's database. **PLEASE NOTE: As mentioned earlier, if you have saved the matings to your herd management software's database and then discovered you made a mistake, you will**

have to edit or delete the matings from within your herd management software (BEEF or SHEEP & GOATS).