The Platform for Africa Dairy Genetics Gain (ADGG)

September 2020

Guide

For the selection of genetically superior bulls and cows from the genomic evaluation using Ethiopian data

General

Genetic progress occurs when top ranked animals on the basis of their ***genetic merit*** or ***estimated breeding value (EBV)*** are used as parents to breed offspring of the next generation. Identifying and selecting the top ranked animals, that is, bulls with high EBV, milking cows with high EBV or young cows with no milk records but with an EBV assigned using their genotypes is very important for improving productivity and profit.

This guide describes sequences of steps to be taken to identify and select genetically superior cows and bulls from ADGG's latest ***single-step genomic evaluation*** for the animal exhibitions and inclusion in the National Animal Genetic Improvement Institute's (NAGII) catalogues. This evaluation has used the Ethiopian dairy cattle data employing a repeatability animal model for milk yield. Solutions of the ***Genomic Estimated Breeding Values (GEBV)*** were extracted from the evaluation runs and standardized to milk index with a mean 100 and standard deviation of 10. Using these genomic indices for milk yield, dairy bulls and cows were ranked from the highest to lowest. The rankings obtained are helpful in making informed decisions on the selection of genetically superior animals. They are even more helpful when they are used in combination with other related information about the animals. To assist this exercise, a brief guideline is suggested to make best and effective use of the results of the latest genomic evaluation. These guidelines are provisional and will be improved and updated as and when necessary.

Identification of genetically superior bulls & cows for the animal parade

Cows

1. Ensure that cows selected belong to the following categories:
    i. have data and was in pedigree but may not have genotype (***code 1*** in result file)
    ii. have data and genotype but not in pedigree, (***code 2*** in result file)
    iii. have data, pedigree and genotype (***code 3*** in result file)
    iv. has genotype but no data and not in pedigree (***code 5*** in result file)

2. Check cows selected in (1) have <u>at least 3 test day (TD)</u> records per lactation and have consistent TD milk recording history (not highly variable, e.g., last month 5 liters and the following 25 liters etc.)

3. Set reliability >= 0.3 and of those, select the top ranked 70 to 80 cows based on their standardized milk index >=110 (i.e., at least 1 genetic standard deviation higher than the average).

4. Find out the exact location of the cows selected in (3) and check if they are alive, sold or changed herd etc.

5. Make a field visit to physically check the condition of the selected cows. During the field visit;

i. Conduct a simplified physical assessment of the cow's stature, udder conformation, legs and general health
ii. Score each cow: (very poor=1; poor=2; Fair=3; good=4, very good=5) for each of the above 4 traits.
This is important because these traits are not yet included in our evaluation, and most farmers value such conformation traits when they select breeding animals because of their associations with productive herd life.
iii. At this stage, identify and **keep only the list of those cows that fulfil these simple physical assessments**.
NOTE: only discriminate against cows that score really very poor to poor in these attributes.

6. Finally, from the list of cows you are left with at (5), engage with the farmers to get his/her permission to include the top selected cows in the show, if the farmer agrees, then enroll the top ranked cows for the bull and cow show.

Bulls

1. Ensure the bulls selected belong to the following category:
   i. represented only in the pedigree (***code 4*** in the result file)
   ii. have genotypes with or without pedigree (***code 5*** in the result file)

2. Set **reliability >= 0.5 for bulls with daughters** but >=0.20 for young bulls with only genotypes but no daughters . Then select the top 50 bulls based on their standardized milk index of at least >=102 (i.e., at least 0.20 genetic standard deviation higher than the average).

3. Find out the herd where the bulls selected in (2) are kept.

4. Make a field trip to visit the herds that keep the above selected bulls. During the field visit, conduct a simplified physical assessment of the bull's stature, conformation, temperament, legs and general health, testicles etc., by scoring each bull, (very poor=1; poor=2; Fair=3; good=4, very good=5) for each of the above 6 traits and the bull is entire.
Keep only the list of bulls that fulfill these simple physical assessments (i.e. those that score 3 and above) for the next and final step of selection.

5. Finally, from the list of bulls that will have fulfilled the physical assessment, select the top best ones for practical use. For the showing, engage with the farmers to get his/her permission to include the top 20 selected bull(s) for the show, if the farmer agrees, then enroll the top ranked bull for the bull and cow show.

NOTE: *The initial selection of candidates will be done centrally and then tasks given to field staff to visit farmers and pysically check the animals and verify their conditions and conformation characteristics. Given that some of the selected animals, may have since died, been sold or castrated etc., more bulls and cows will be initially listed than the 20 which will finally be exhibited for each gender category.*

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