

animals-1774048

Comparison of Random Regression Models with different or-der Legendre Polynomials for genetic parameter estimation on race completion speed of Arabian horses

Dear editor,

First of all, the authors thank reviewers for their valuable comments that improve the quality of this manuscript.

Revisions

For Reviewer 1

Reviewer Comment

L(2,2), L(2,3), L(3,2) and L(3,3) models of Legendre polynomial function for additive genetic, permanent environmental variances and heritability values were estimated

Please specify before what L(2,2), L(2,3), L(3,2), and L(3,3) mean.

Answer

The description of the Legendre polynomial functions were given before the phrase “L(2,2), L(2,3), L(3,2) and L(3,3) models of Legendre polynomial function for additive genetic, permanent environmental variances and heritability values were estimated”. Please see lines 138-148 in the text.

Reviewer Comment

233491 race speed (m/sec) records of 13764 Arabian horse raced taken from the Jockey Club of Turkey between 2005 and 2016 were used

You cannot start a sentence with a number

Answer

The sentence was reorganized as “The evaluated data was obtained from the Jockey Club of Turkey between 2005 and 2016 and consisted of the 233491 race speed (m/sec) records of 13764 Arabian horses.” Please see lines 127-128 in the text.

Reviewer Comment

0.2939±0.0746

Three digits are enough

Answer

Writing about the digits were corrected. Please see line 449 in the text.

Also, belong to this correction that numbers were corrected in Abstract section. Please see line 28 in the text.

Reviewer Comment

One of the important breeds in those is the Arabian horse which is the issue of this study

“Issue” does not suit properly, better study subject

Answer

The sentence was corrected as “One of the important breeds in those is the Arabian horse which is aimed in this study to estimate its genetic parameters.” Please see lines 45-46 in the text.

Reviewer Comment

The origin of the breed is thought to date back to ancient times, but modern populations described in pedigree records are no longer than 200 years old

I would improve that phrase

Answer

The phrase was improved as “The origin of the breed is thought to date to distant times, but the history of modern populations of the breed, described in pedigree records, is no longer than 200 years. The first European studs in Biała Cerkiew, Sławuta (Poland), Weil (Germany) and Babolna (Hungary) were established in the early nineteenth century while Arabian breeding in Great Britain and the USA started much later at the end of nineteenth century.” Please see lines 52-57 in the text.

Reviewer Comment

Thoroughbred is developed in England for racing and jumping.

Thoroughbred was developed in England for racing and jumping.

Answer

The change was done is → was. Please see line 75 in the text.

Reviewer Comment

In the light of these data, it can be said that Arabian horse breeding and races have an important role in the Turkish economy

I know that makes sense, but I don't consider that sentence can fit in a scientific article without a citation.

Answer

This sentence was deleted. Please see lines 84-86 in the text.

Reviewer Comment

But racing speed didn't evaluate before in Turkey conditions even finishing time, finishing position and earnings were evaluated

However, race speed has never been rated before in Turkey, as well as finish time, finish position, and earnings.

Answer

The sentence was replaced with “However, race speed has never been rated before in Turkey, as well as finish time, finish position, and earnings.” Please see lines 92-94 in the text.

Reviewer Comment

However, in order to estimate the genotypic value reliably, phenotypic values should be used, and effective factors should be determined correctly [17,18]. In addition, the chosen statistical method has a significant effect on the reliability of the result [19]. The statistical power of the studies has also been restricted by the statistical methods and computational resources that make it difficult to include all significant environmental factors in the analyses and potentially biasing estimate

Please, rewrite this sentence

Answer

The sentences were rewritten as “However, it is important to use phenotypic values and to determine the effective factors correctly in order to estimate the breeding value accurately and reliably [17,18]. It is also known that the statistical method used has a significant effect on the reliability of the results [19]. The statistical power of the studies is also limited by the statistical methods chosen because it must be ensured that all important environmental factors are included in the analysis and that the experimental error is estimated to a minimum.” Please see lines 99-105 in the text.

Reviewer Comment

To predict genetic parameters

To estimated

Answer

This sentence was deleted according to next comment. Please see line 105 in the text.

Reviewer Comment

To predict genetic parameters, there are many types of methods such as the sire model or animal model within the best linear unbiased prediction (BLUP), restricted maximum likelihood (REML), random regression (RR), and Bayesian methods

This sentence is absolutely wrong, it should be eliminated

Answer

This sentence was deleted. Please see lines 105-113 in the text.

Reviewer Comment

Only records up to the 10th race of a horse were used for genetic parameter estimation

Why that?

Answer

The sentence was improved as “Only records up to the 10th race of a horse were used for genetic parameter estimation because the first five races are enough to genetic parameter estimation [6].” Please see line 133 in the text.

Reviewer Comment

13.45 ± 0.002 , 14.22 ± 0.004 and 14.34 ± 0.002

For a matter of consistency, I would suggest using 3 digits

Answer

The corrections were done. Please see lines 197-205 in the text.

Reviewer Comment

In the study, the race track type, the race season and the age of the horse (in some situations horses starts to racing in different ages) were evaluated as fixed effects. There was statistically differences ($P < 0.001$) among race tracks type with mean and standard error for race tracks type were 13.45 ± 0.002 , 14.22 ± 0.004 and 14.34 ± 0.002 for sand, synthetic sand and grass, respectively. All types were found statistically different on speed. There was statistically differences ($P = 0.029$) among seasons for winter, spring, summer and autumn with the mean and standard error of 13.83 ± 0.004 , 13.84 ± 0.003 , 13.83 ± 0.003 and 13.84 ± 0.003 , respectively. The speed was higher for spring than winter and autumn. There were no statistical difference among ages ($P = 0.160$). The descriptive statistics were 13.91 ± 0.003 , 13.73 ± 0.003 , 13.87 ± 0.004 , 13.89 ± 0.005 , 13.86 ± 0.005 , 13.83 ± 0.007 , 13.84 ± 0.009 , 13.89 ± 0.022 , 13.80 ± 0.014 , 13.92 ± 0.019 , 13.80 ± 0.020 , for ages from 3 to 12, respectively

That part is interesting however I would suggest putting on results and just briefly mentioned on M&M

Answer

This part moved to beginning of the Results section. Please see line 194-205 in the text.

Reviewer Comment

Owaga and Satoh [32] found circular curve for additive genetic variance for calving interval of Japanese Black cows which was too different from our findings

I would remove that.

Answer

This sentence was deleted. Please see line 387-389 in the text.

For Reviewer 2**Reviewer Comment**

This is an interesting paper which was aimed to compare the fitting performance of the random regression models applied to the different order orthogonal Legendre polynomials on some physiological parameters in Arabian racing horses. The reviewer became acquainted with the comment of the second (third ?) previous reviewer which greatly simplifies the task. In my opinion the manuscript in the present form with all corrections made during the revision process can be published in the present form.

Answer

All the authors thanks to reviewers valuable contributions that made this manuscript more attractive.

For Reviewer 3**Reviewer Comment**

Why classical methods for estimating genetic variances, such as AI-REML or EM-REML, were not performed to compare with the recommended Random Regression Models?

Answer

In the text (Lines 114-116) it was mentioned that “the random regression models developed for repeated data in recent years are used extensively in determining the breeding values for the economic characteristics of different animals”

We used Random regression to taken into consideration the repeated races.

Reviewer Comment

The abbreviations in all figures and tables, e.g., 2-2, L(2,2), should be clearly explained in the legends.

Answer

All tables and Figures were corrected. Please see line 213, 251, 277, 306, 333, 348, 356, and 367 in the text.

Comment to the editor

Dear editor,

All authors thank the referees for their valuable comments. We are sure that the suggested corrections make the article much better quality.

We revised the manuscript for all corrections proposed by the reviewer 1.

Reviewer 2 proposed no change for the manuscript.

For the reviewer 3, the reviewer gave two comments. The first one was a question and it was answered without correction. The second comments was corrected.

And also,

The invoice should be corrected as

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