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REVIEWER'S REPORT

Manuscript No.: IJAR-59034

Title: Performance of Reproduction of Two Crossed Cattle Breeds in the Marahoue Region in the Centre-West of Cote d Ivoire,

Recommendation:
Accept as it is .....
Accept after minor revision.....
Accept after major revision ...YES...
Do not accept (*Reasons below*) .....

Rating	Excel.	Good	Fair	Poor
Originality		□		
Techn. Quality			□	
Clarity			□	
Significance		□		

Reviewer's ID: JPR- 094

Detailed Reviewer's Report

Reviewer Report

1. Overall assessment

The manuscript addresses an **important and regionally relevant topic**: reproductive performance of N'Dama crossbred cattle produced using Montbéliarde and Holstein genetics in Côte d'Ivoire. The comparison between N'Damont and N'Damol F2 heifers has potential practical value for cattle genetic improvement and livestock development in the Centre-West region.

The study has a **potentially useful dataset**, particularly because it evaluates animals under field conditions and follows the animals from synchronization and artificial insemination through pregnancy and calving outcomes.

However, the manuscript in its present form has **substantial methodological, statistical, and reporting problems** that should be corrected before publication. Some conclusions are stronger than the data support.

2. Strengths of the manuscript

A. Relevant research topic

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The study addresses reproductive efficiency in crossbred cattle, which is important for improving cattle productivity in tropical regions.

B. Clear comparison

The manuscript clearly compares two crossbred groups:

N'Damont: Montbéliarde × N'Dama

N'Damol: Holstein × N'Dama

with 42 animals in each group.

C. Practical field-based study

The research was conducted under actual farm conditions at SIAM SA, Bouaflé, Côte d'Ivoire, rather than under highly controlled laboratory conditions. This increases its potential practical relevance.

D. Reproductive parameters are clinically relevant

The study evaluates several meaningful reproductive outcomes, including:

- gestation rate
- abortion rate
- calving rate
- prolificacy
- calf mortality

The definitions of these parameters are provided in the Methods section.

E. Standard reproductive technologies

The use of estrous synchronization followed by artificial insemination provides a reproducible approach for comparing the two genetic groups.

F. Potential regional significance

The results could be useful for breeding programs seeking combinations of **trypanotolerant N'Dama genetics with improved dairy/beef production characteristics**.

G. Attempt to compare results with previous literature

The Discussion compares the findings with studies from Côte d'Ivoire, Burkina Faso, Benin, Indonesia and other settings.

3. Major weaknesses / concerns

Major concern 1 — Statistical interpretation is incorrect

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This is the **most important problem**.

The manuscript states:

> "not statistically significant ($p < 0.05$)"

If the significance level is 5%, a result is generally considered statistically significant when **$p < 0.05$**. A result described as *not statistically significant* would normally have **$p \geq 0.05$**.

Similarly, the manuscript states:

> "highly significant difference ($p > 0.05$)"

This is also contradictory.

Recommendation: The authors must provide the **actual p-values**, test statistics, degrees of freedom where appropriate, and preferably confidence intervals.

Major concern 2 — Sample size is small

Only **84 heifers** were studied, with 42 animals in each group.

This may be adequate for an exploratory field study, but the study may have insufficient statistical power to detect moderate differences between breeds.

The authors should therefore avoid making broad claims about the superiority of one crossbred population.

Major concern 3 — Age of animals requires clarification

The manuscript says that the selected animals were **six-month-old heifers**.

However, the animals were subsequently subjected to reproductive synchronization and artificial insemination. This creates a major methodological question: **Were the heifers actually six months old at the time of insemination, or were they six months old when initially selected and inseminated later after reaching reproductive maturity?**

The timeline needs to be clearly presented.

Major concern 4 — Experimental timeline is insufficient

The manuscript does not adequately specify:

- date/season of animal selection
- age at first synchronization

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- age and body weight at insemination
- duration of flushing
- date of insemination
- date of pregnancy diagnosis
- duration of pregnancy monitoring
- calving period

These details are important for interpreting reproductive performance.

Major concern 5 — Important animal characteristics are missing

The authors should provide baseline information for each group, particularly:

- body weight
- body condition score
- age at insemination
- parity/history, if applicable
- health status
- vaccination status
- previous reproductive history

- nutritional status

Without these data, it is difficult to establish whether the two groups were genuinely comparable.

Major concern 6 — Artificial insemination protocol needs better documentation

The manuscript gives a synchronization protocol involving Delta PRID, PGF2α and PMSG.

However, the authors should clearly provide:

- exact doses
- route of administration
- manufacturer
- batch information where appropriate
- semen characteristics
- bull identification
- semen quality
- number of inseminations per animal
- inseminator experience
- timing relative to observed estrus

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These factors can substantially influence conception rates.

Major concern 7 — Possible inconsistency in estrus timing

The manuscript states that estrus appears approximately **40–46 hours after PRID removal**, but then says animals were inseminated **56 hours after removal**.

This needs clarification.

If insemination was performed at a fixed 56-hour interval, the authors should explain the rationale and provide the supporting protocol/reference.

Major concern 8 — Some causal explanations are speculative

The Discussion attributes abortion to:

> "an estrogen-progesterone imbalance"

and stress during insemination.

But the study apparently did **not measure estrogen or progesterone concentrations**.

Therefore, these should be presented as **possible explanations**, not established causes.

The same concern applies to the statement concerning anti-trophoblast antibodies.

Major concern 9 — Reference 13 requires verification

The reference:

> Smith, J., Jones, A., Doe, R. (2022)

is unusual and should be **independently verified before publication**.

The authors should provide the correct authorship, journal, volume, issue, pages and DOI if this publication actually exists.

This is a serious concern because an unverifiable reference undermines the credibility of the manuscript.

Major concern 10 — Definitions and calculations require checking

The manuscript defines calving rate as:

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Number of live calves born / Number of inseminated cows × 100

and prolificacy as:

Number of calves born / Number of cows that calved × 100.

The terminology and formulas should be checked against accepted animal-reproduction terminology.

The authors should also provide the **actual numerator and denominator** behind every percentage.

4. Key points requiring revision

Scientific/content issues

- Correct all statistical interpretations.
- Report exact p-values.
- Provide confidence intervals where possible.
- Explain the study timeline.
- Clarify the age of animals at insemination.
- Provide baseline body weight and body condition score.
- Provide exact hormone doses.
- Describe semen/bull information.
- Clarify the AI timing.
- Explain how pregnancy was confirmed.
- Provide actual numbers rather than percentages alone.
- Verify every reference.
- Remove or replace unverifiable references.
- Avoid unsupported causal claims.
- Strengthen the limitations section.

5. Significance of the study

Scientific significance: Moderate

The study provides comparative information on reproductive performance of two F2 crossbred populations in a tropical African production environment.

Practical significance: Good

The results may help livestock producers and breeding programs determine whether **N'Damont or N'Damol genetic combinations** have useful reproductive characteristics under local conditions.

Novelty: Moderate

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The topic is relevant and appears relatively under-documented for this particular **F2 N'Damont/N'Damol population in the Marahoué region**. However, related research on N'Dama and crossbred cattle has already been published, including the study cited by the authors from western Côte d'Ivoire.

Therefore, the novelty should be stated as **location-, population-, generation-, and management-specific**, rather than suggesting that reproductive performance of N'Dama crossbreds has not previously been studied.

6. Minor comments

Title

The title should be grammatically revised.

Current:

> *Performance of Reproduction of Two Crossed Cattle Breeds...*

Suggested:

> **Reproductive Performance of Two Crossbred Cattle Populations (N'Damont and N'Damol) in the Marahoué Region of Central-Western Côte d'Ivoire**

Language

The manuscript requires substantial English-language editing.

Examples include:

- "performance of reproduction" → **reproductive performance**
- "crossed cattle" → **crossbred cattle**
- "prolificacy rate" → terminology should be used consistently
- "gestation rate" and "pregnancy rate" should be standardized.

Figures

The manuscript refers to Figures 2–5, but the numerical data underlying the graphs should also be presented in tables.

Statistical software

The manuscript reports **R version 2.10.1**.
The authors should verify this version and provide sufficient statistical-method details to allow reproducibility.

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7. Recommendation to Editor

Recommendation: Major Revision

I **do not recommend acceptance in the present form**, mainly because of the statistical inconsistencies, incomplete methodological information, questionable/unclear references, and several unsupported interpretations.

However, I also **do not recommend outright rejection**, because the study has a potentially useful dataset and addresses a relevant livestock-production question.

Suggested editorial decision:

Major Revision

Reviewer recommendation text

Reviewer Report

The manuscript entitled "Performance of Reproduction of Two Crossed Cattle Breeds in the Marahoué Region in the Centre-West of Côte d'Ivoire" addresses a relevant topic concerning the reproductive performance of N'Damont (Montbéliarde × N'Dama) and N'Damol (Holstein × N'Dama) F2 heifers. The comparison of these two crossbred populations under field conditions is potentially valuable for cattle genetic improvement and livestock development in Côte d'Ivoire.

The main strengths of the manuscript are its practical relevance, clear comparison of two crossbred populations, field-based experimental design, use of artificial insemination and estrous synchronization, and assessment of several important reproductive parameters. The study may provide useful information for breeding programs in tropical environments.

However, substantial revisions are required before the manuscript can be considered for publication. The most important concern is the statistical interpretation. The manuscript describes results as "not statistically significant ($p < 0.05$)" and "highly significant ($p > 0.05$)," which are contradictory to conventional statistical interpretation. The authors must recheck the statistical analyses and report the actual p-values and appropriate statistical information.

The sample size of 84 animals is relatively limited, and the authors should discuss the statistical power and limitations of the study. The age of the animals also requires clarification because the Methods section indicates that the heifers were six months old, while they were subsequently subjected to reproductive synchronization and artificial insemination. The exact age at insemination and the complete experimental timeline should therefore be provided.

Additional methodological information is needed concerning body weight, body condition score, health status, nutritional management, exact hormone doses, semen characteristics, bull identification, insemination timing and pregnancy diagnosis. The authors should also provide the actual numbers of animals corresponding to each reported percentage.

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Several interpretations in the Discussion appear speculative. For example, estrogen-progesterone imbalance and anti-trophoblast antibodies are proposed as possible causes of abortion, although these factors do not appear to have been directly measured in the present study. Such statements should be appropriately qualified or supported by additional evidence.

Reference 13, listed as Smith, J., Jones, A., and Doe, R. (2022), should be carefully verified and corrected if necessary. All references should be checked for accuracy and traceability.

The manuscript also requires considerable language and terminology editing. The title and expressions such as "performance of reproduction" and "crossed cattle" should be revised to standard scientific terminology.

Overall recommendation

The manuscript contains potentially useful and regionally significant findings, but important methodological, statistical, and presentation issues must be addressed. I therefore recommend:

MAJOR REVISION

The manuscript may be reconsidered after the authors have corrected the statistical analyses, clarified the methodology and experimental timeline, verified the references, revised unsupported interpretations, and substantially improved the presentation and English language.

This would be my **reviewer recommendation: Major Revision**, rather than Reject, because the underlying study has publishable potential if the authors can satisfactorily address these issues.

Yes. If you are acting as the **reviewer**, "Major Revision" should be justified by **specific manuscript problems that affect scientific validity**, not merely language or formatting. Below is a line-by-line justification based on the submitted manuscript. The most serious problems are the **statistical contradictions, unclear animal age/timeline, incomplete methodology, unsupported causal explanations, and questionable reference**.

Detailed Reviewer Comments — Issue + Reason

Line(s)	Issue identified	Reason / Why it requires revision
L5–8	**Age of heifers stated as 6 months**	Six-month-old heifers are described as being selected for artificial insemination. The manuscript must clarify whether they were actually inseminated at six months or selected at six months and inseminated later after reaching reproductive maturity. This is essential for interpreting reproductive performance.
L11–16	**Statistical interpretation is contradictory**	The manuscript says the gestation difference was "not statistically significant ($p < 0.05$)" and later calls mortality significantly different with "$p > 0.05$." These statements are statistically inconsistent and require reanalysis and correction.
L17–18	**Conclusion appears stronger than the results**	The manuscript refers to "remarkable genetic potential" and a considerable asset, although several parameters were reportedly not significantly different. The conclusion should be based strictly on statistically supported findings.

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Line(s)	Issue identified	Reason / Why it requires revision
L24–32	**Background contains broad economic claims**	Claims regarding employment, GDP, exports, population and animal-protein imports require accurate, traceable primary sources. The cited institutional references should be verified.
L37–42	**Novelty claim needs stronger justification**	The authors state that reproductive performance remains insufficiently documented, but they need a more systematic literature review demonstrating exactly what is unknown about F2 N'Damont and N'Damol animals.
L45–50	**Study-area description incomplete**	Geographic information is provided, but the manuscript should provide the study period and relevant farm-management characteristics. Without the study period, climatic and reproductive results cannot be properly interpreted.
L64–66	**Sample size justification absent**	There are only 42 animals per group. No sample-size or power justification is provided. The authors should explain whether this number was predetermined and whether it provides sufficient power for the reproductive outcomes examined.
L71–78	**Hormone doses incomplete**	Products are named and some formulation information is given, but the actual administered doses of PGF2α and the other hormonal products should be clearly stated.
L72–83	**Unnecessary/inconsistent material description**	Several materials are listed, including foam sponges, although the protocol describes a PRID device. The role of each material should be clearly explained and irrelevant items removed.
L93–94	**Animal age problem repeated**	Again, animals are described as six months old. The age at synchronization and insemination must be explicitly reported.
L96–99	**Flushing protocol inadequately described**	The manuscript states that energy and protein density was increased but gives no actual ration composition, nutrient levels, quantity or feeding schedule. Therefore, the intervention cannot be reproduced.
L101–106	**Synchronization protocol needs clarification**	The timing is provided, but exact doses, administration routes and justification for the protocol are insufficient.
L103–106	**Potential timing inconsistency**	Estrus is reported at 40–46 h after PRID removal, but insemination is stated to occur at 56 h. The authors need to explain whether insemination was fixed-time or based on observed estrus.
L108–110	**Estrus detection not adequately standardized**	Several signs are listed, but it is unclear who assessed estrus, how frequently animals were observed and whether observers were blinded to genetic group.
L112–115	**Semen information insufficient**	The manuscript does not provide bull identification, semen quality, breed-specific bull information, semen batch or number of inseminations. These can influence conception rates.
L117–120	**Pregnancy diagnosis requires more detail**	Pregnancy diagnosis by transrectal palpation is stated, but the qualifications of the examiner, confirmation method and subsequent pregnancy monitoring procedures are not sufficiently described.
L121–126	**Definitions/calculations require verification**	The formulas for gestation, abortion, calving, prolificacy and mortality should be checked against accepted reproductive

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		terminology. Actual numerators and denominators should be provided alongside percentages.
L128–131	**Statistical methodology inadequate**	The manuscript only states that a G-test was used. It does not provide the actual test statistics, degrees of freedom, exact p-values or confidence intervals. The suitability of the test for each outcome should also be justified.
L128	**Very old R version reported**	R 2.10.1 is extremely old. The authors should verify whether this is correct and provide sufficient details to ensure reproducibility.
L134–136	**Major statistical error**	The difference is reported as "not statistically significant ($p < 0.05$)." This is internally contradictory. The actual p-value must be checked and the conclusion rewritten.
L142–144	**Abortion comparison lacks statistical result**	A difference between 23.80% and 9.52% is presented, but no p-value or confidence interval is reported. The reader cannot determine whether the observed difference is statistically meaningful.
L155–156	**"Identical" may be misleading**	The two groups are said to have identical prolificacy rates of 61.90%, but the underlying animal/calving numbers should be shown to verify the calculation.
L161–162	**Major statistical contradiction**	The mortality difference is called "highly significant," while $p > 0.05$ is reported. This must be corrected before publication.
L166–174	**Unsupported explanation of gestation difference**	The authors attribute the difference partly to adherence to insemination protocol, but it is unclear whether protocol adherence differed between the two groups. This should not be presented as a causal explanation without evidence.
L170–172	**Interpretation of AI timing needs clarification**	The statement concerning insemination "more than ten hours after onset of estrus" needs careful explanation because the actual protocol appears to use a fixed 56-hour interval after PRID removal.
L181–189	**Unsupported hormonal mechanism**	Estrogen-progesterone imbalance is proposed as the cause of abortion, but hormone concentrations were apparently not measured. Therefore, this is speculation and should be presented only as a possible hypothesis.
L190–192	**Questionable/unverified citation**	The cited "Smith, Jones & Doe (2022)" reference requires verification. If it cannot be independently verified, it should be removed and replaced with a genuine, directly relevant reference.
L193–196	**Comparisons involve different populations**	Results from Zebu, Azawak, Goudali and other cattle populations are compared with the present crossbreds. Differences in breed, environment, management and synchronization protocol should be acknowledged before making comparisons.
L197–201	**Unsupported inference regarding climate adaptation**	The manuscript concludes that similar prolificacy demonstrates better management of climatic stress/adaptation. This cannot be established from reproductive percentages alone without

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Line(s)	Issue identified	Reason / Why it requires revision
		appropriate environmental or physiological measurements and a suitable comparison.
L202–208	**Cause of calf mortality is assumed**	Mortality is attributed to poor hygiene and neonatal diarrhea, but the study does not appear to provide diagnostic confirmation or systematic health records establishing this causal relationship.
L206	**Incorrect/unclear interpretation of "acceptable range"**	The manuscript states that 15.38% mortality is within an acceptable range of 18–25%. A value below that range cannot logically be described as being "within" it without clarification of what the cited range represents.
L212–216	**Conclusion overstates evidence**	The conclusion claims "remarkable genetic potential" and a "considerable asset," although the study has a small sample and several outcomes lack properly reported statistical evidence. The conclusion should be moderated.
L225–269	**Reference quality and verification**	Several references are institutional reports, theses or older studies, while at least one citation appears questionable. All references should be checked for authenticity, completeness, relevance and DOI/publisher information where available.

The 5 strongest reasons for "Major Revision"

If you need to give the **editor a concise justification**, I would emphasize these five issues:

1. Statistical results are internally contradictory — CRITICAL

The manuscript reports **"not statistically significant ($p < 0.05$)"** and **"highly significant ($p > 0.05$)"**. These errors directly affect the interpretation of the main findings.

2. Experimental age/timeline is unclear — MAJOR

The animals are described as six-month-old heifers selected for AI, but the manuscript does not establish their age at synchronization/insemination or explain the complete reproductive timeline.

3. Statistical methodology is insufficiently reported — MAJOR

Only a G-test and significance threshold are mentioned. Exact p-values, test statistics, degrees of freedom, confidence intervals and the basis for selecting the statistical approach are missing.

4. Several biological explanations are speculative — MAJOR

Hormonal imbalance, stress, anti-trophoblast antibodies, climatic adaptation and poor hygiene are presented as explanations without adequate direct measurements or diagnostic evidence.

5. Reference reliability requires checking — MAJOR

Reference 13, particularly, needs verification. A questionable or unverifiable citation is a serious issue in a scientific manuscript.

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Why NOT "Minor Revision"?

I would **not recommend Minor Revision** because the problems are not limited to grammar, formatting, figures or minor clarifications.

The problems affect:

study design reporting → reproductive timeline → statistical analysis → interpretation of results → biological conclusions → reference reliability.

Therefore, the authors may need to **reanalyse the data and substantially revise the Results, Discussion and Conclusion**, which meets the usual threshold for **Major Revision**.

Reviewer justification:

The manuscript addresses a relevant and potentially useful topic; however, major revisions are required because of contradictory statistical interpretations, inadequate reporting of the experimental timeline and reproductive methodology, insufficient statistical details, unsupported causal explanations, and the need to verify questionable references. The underlying study may have publication potential, but the scientific validity and interpretation of the findings cannot be adequately assessed until these issues are resolved.