

REVIEWER'S REPORT

Manuscript No.: IJAR- 58205

Title: Analyse de la diversité des ennemis naturels associés à *Spodoptera frugiperda* (J.E Smith), (Lepidoptera : Noctuidae), en campagne sèche et humide ouest du Burkina Faso.

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revision

Do not accept (*Reasons below*)

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

Reviewer Name: **ANAPANA GOPAL**

Reviewer's Comment for Publication.

General Comments

The manuscript investigates the diversity of natural enemies associated with the fall armyworm (*Spodoptera frugiperda*) in western Burkina Faso during both dry and wet cropping seasons. The study inventories parasitoids, predators, entomopathogenic fungi, and nematodes collected from maize fields during 2023, providing useful baseline information for biological control and integrated pest management (IPM). Eight parasitoid species and several important predator groups were identified, while entomopathogenic fungi and nematodes were observed only during the wet season. The topic is timely and highly relevant because *S. frugiperda* remains one of the most destructive invasive pests threatening maize production throughout Africa. Understanding indigenous natural enemies is essential for developing sustainable pest management strategies. The manuscript contains valuable field observations; however, several scientific, methodological, statistical, presentation, and language issues require minor revision before publication.

Content and Originality

Strengths

- Addresses an important agricultural problem.
- Focuses on sustainable biological control.
- Includes observations from both dry and wet seasons.
- Covers multiple groups of natural enemies.
- Provides baseline information for Burkina Faso.
- Practical implications for Integrated Pest Management (IPM).

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Weaknesses

- The scientific novelty is moderate because several previous studies have already documented parasitoids and predators of *S. frugiperda* in West Africa.
- The manuscript primarily represents a biodiversity inventory rather than hypothesis-driven ecological research.
- The authors claim an expanded inventory, but the specific advancement over previous studies is not clearly demonstrated.
- The research objectives could better emphasize ecological or management implications rather than simple species listing.

Literature Review

Strengths

- Includes important references on fall armyworm biology.
- Discusses Integrated Pest Management.
- Reviews previous reports from West Africa.
- Provides regional context for biological control.

Weaknesses

Recent Literature

Several important publications published after **2023** are absent.

Recent literature regarding

- conservation biological control
- landscape ecology
- ecological intensification
- molecular identification of parasitoids
- DNA barcoding
- climate effects on natural enemies

should be incorporated.

Research Gap

The research gap needs clearer definition.

The manuscript should explain

- why seasonal comparison is important,
- what unanswered ecological questions remain,
- how this study advances previous surveys conducted in Burkina Faso and neighboring countries.

Methodology

Strengths

- One-year field survey.
- Sampling conducted during two agricultural seasons.
- Laboratory rearing of larvae for parasitoid emergence.
- Identification performed with assistance from CABI.
- Standard FAO "W" sampling method adopted.

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Minor Concerns

1. Experimental Design

The manuscript lacks sufficient methodological detail.

Please clarify

- number of fields sampled,
- sampling frequency,
- total number of plants inspected,
- sampling effort per location,
- criteria for field selection.

2. Sample Size

Although parasitism percentages are reported, the manuscript does not clearly provide

- total eggs collected,
- total larvae collected,
- sample sizes for each season,
- replication at each study site.

Without these values, interpretation of parasitism rates is difficult.

3. Statistical Analysis

The manuscript reports descriptive percentages only.

No statistical comparison was performed between

- dry vs wet season,
- regions,
- parasitoid abundance,
- predator diversity.

Statistical analyses such as

- Chi-square test,
- Generalized Linear Models (GLM),
- ANOVA,
- diversity indices (Shannon, Simpson),
- multivariate analyses

would considerably strengthen the study.

4. Species Identification

The manuscript states that identifications were conducted by CABI.

However, additional information is needed regarding

- identification procedures,
- voucher specimens,
- deposition of specimens,
- molecular confirmation (if available).

5. Predator Assessment

Predators were merely recorded.

No direct observations demonstrate that each predator actively feeds on *S. frugiperda*.

Therefore, several predators should be described as

"potential predators"

rather than confirmed biological control agents.

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Statistical Analysis

Minor Weaknesses

The manuscript lacks quantitative ecological analyses.

Missing analyses include

- diversity indices,
- richness estimation,
- abundance comparisons,
- confidence intervals,
- statistical significance testing,
- multivariate community analysis.

These analyses are expected for biodiversity studies.

Results and Discussion

Strengths

- Seasonal differences are clearly presented.
- Parasitoids are well described.
- Predator photographs improve manuscript quality.
- Discussion links findings with previous African studies.

Weaknesses

Overinterpretation

The manuscript occasionally suggests biological control effectiveness without measuring actual pest suppression.

Finding natural enemies does not necessarily demonstrate effective biological control.

This distinction should be emphasized.

Missing Ecological Interpretation

The discussion should better explain

- why some parasitoids occurred only during one season,
- ecological factors driving seasonal variation,
- host availability,
- climatic influences,
- habitat differences.

Biological Control Recommendations

Recommendations regarding biological control implementation should be presented cautiously because

- field efficacy,
- parasitism impact,
- population suppression,
- economic thresholds

were not evaluated.

Figures and Tables

Strengths

- Study area map is informative.
- High-quality photographs of parasitoids and predators.
- Biological illustrations improve identification.

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- Tables summarize findings effectively.

Weaknesses

Several improvements are recommended.

- Increase image resolution.
- Improve figure numbering consistency.
- Add scale bars where applicable.
- Use consistent scientific name formatting.
- Improve readability of tables.
- Ensure all photographs include complete taxonomic information.

Language and Presentation

Minor Issues

The manuscript requires professional English editing.

Observed issues include

- grammatical errors,
- inconsistent tense,
- punctuation mistakes,
- repeated wording,
- formatting inconsistencies.

Several French and English sections contain spacing and typographical problems.

Scientific Accuracy

Minor Concerns

Several predator species are described as natural enemies without quantitative evidence of predation.

The manuscript should distinguish between

- observed occurrence,
- documented predation,
- experimentally verified biological control.

Similarly, statements regarding the importance of certain parasitoids should be supported using quantitative comparisons.

References

Strengths

- Includes relevant literature.
- Appropriate regional references.
- Classical fall armyworm literature is cited.
- Biological control references are relevant.

Weaknesses

- Include more recent references (2024–2026).
- Update literature on biological control of *S. frugiperda*.
- Verify formatting consistency.
- Check DOI formatting.
- Standardize journal abbreviations.

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Specific Recommendations

Abstract

- Include sample size.
- Mention statistical analyses.
- Present major quantitative findings more clearly.

Introduction

- Strengthen the research gap.
- Include more recent biological control literature.
- Clearly define study hypotheses.

Methodology

- Provide complete sampling details.
- Include statistical analysis procedures.
- Clarify specimen identification methods.
- Report sample sizes explicitly.

Results

- Present statistical comparisons.
- Include diversity indices.
- Compare seasonal richness quantitatively.

Discussion

- Expand ecological interpretation.
- Compare findings with similar African studies.
- Avoid overgeneralization regarding biological control effectiveness.

Conclusion

- Emphasize practical implications.
- Mention study limitations.
- Recommend future research involving long-term monitoring, molecular identification of parasitoids, and field evaluation of biological control efficiency.

Overall Recommendation

This manuscript contributes valuable baseline information on the diversity of natural enemies associated with *Spodoptera frugiperda* in western Burkina Faso. The seasonal comparison and documentation of parasitoids, predators, fungi, and nematodes provide useful information for Integrated Pest Management programs. Nevertheless, the manuscript remains primarily descriptive and requires substantial improvements in experimental design description, statistical analysis, ecological interpretation, language quality, and discussion before publication. Addressing these issues would significantly enhance its scientific contribution and impact.

Final Decision

Minor Revision