Optimising BSF production efficieny through genetics

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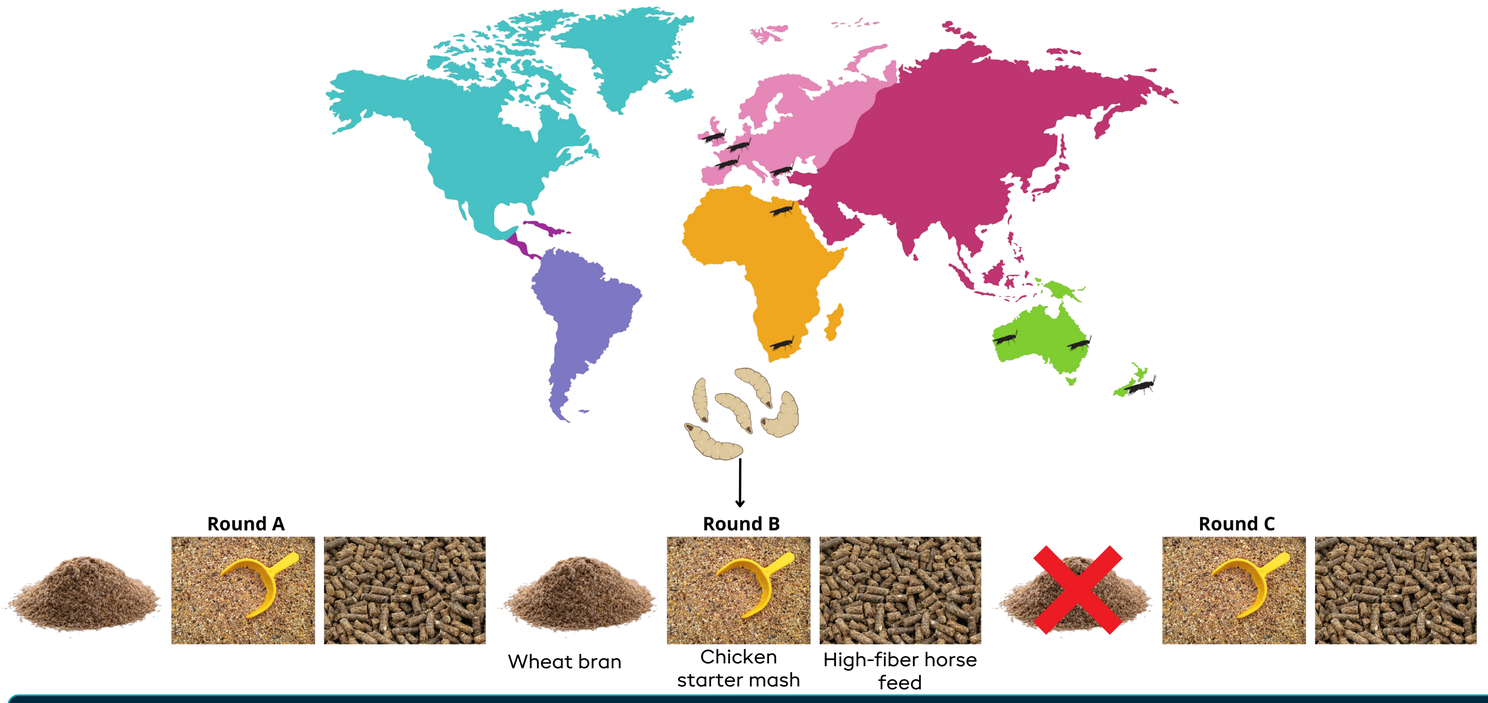
INTRODUCTION

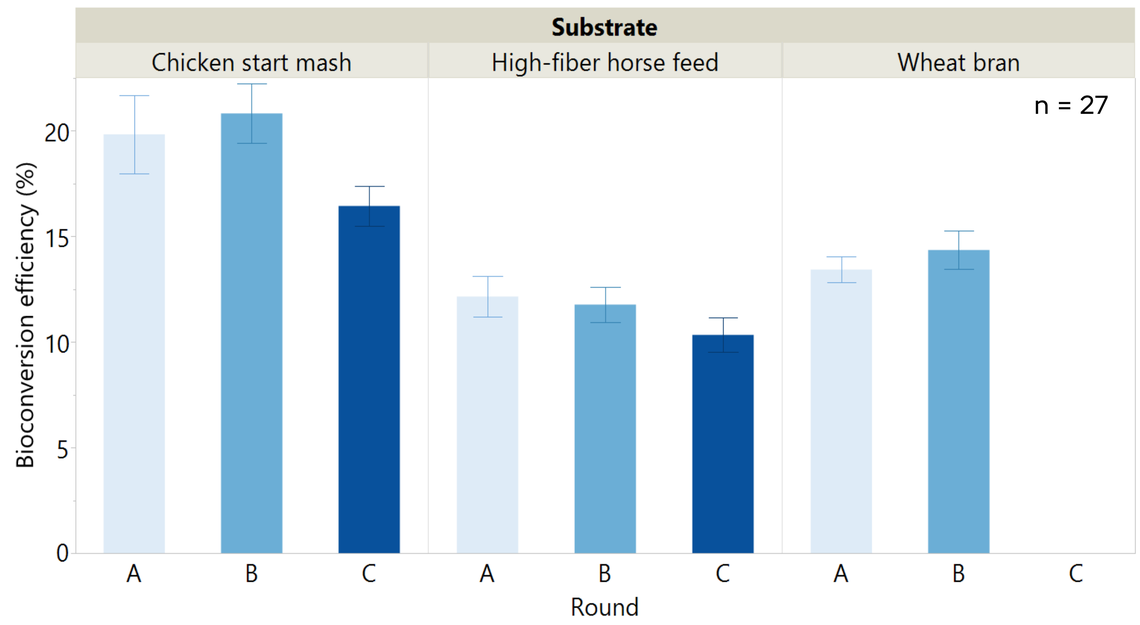
Black soldier fly (*Hermetia illucens*) performance is influenced by its genetic background, with significant variability observed across strains and rearing conditions. This study investigates the impact of genetic background and diet on key performance metrics, including bioconversion efficiency and survival rates, by evaluating multiple BSF strains on diverse feed substrates. The findings aim to enhance strain optimisation and advance the commercial application of BSF in sustainable feed production.

EXPERIMENTAL SETUP

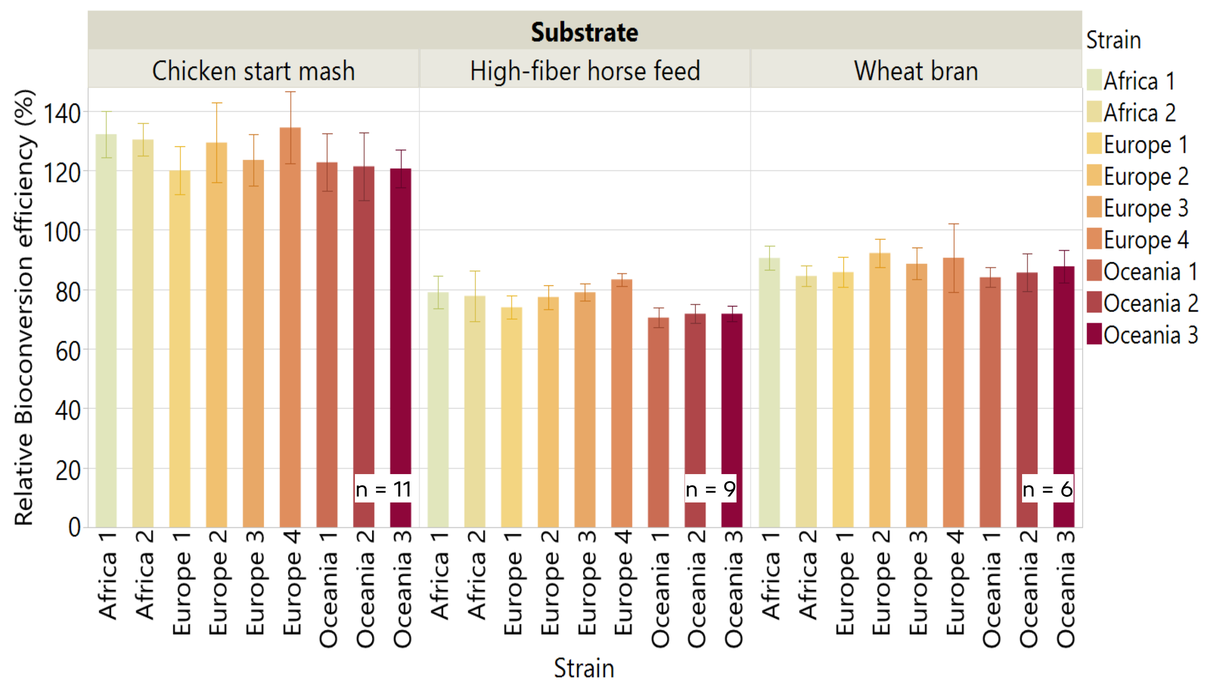


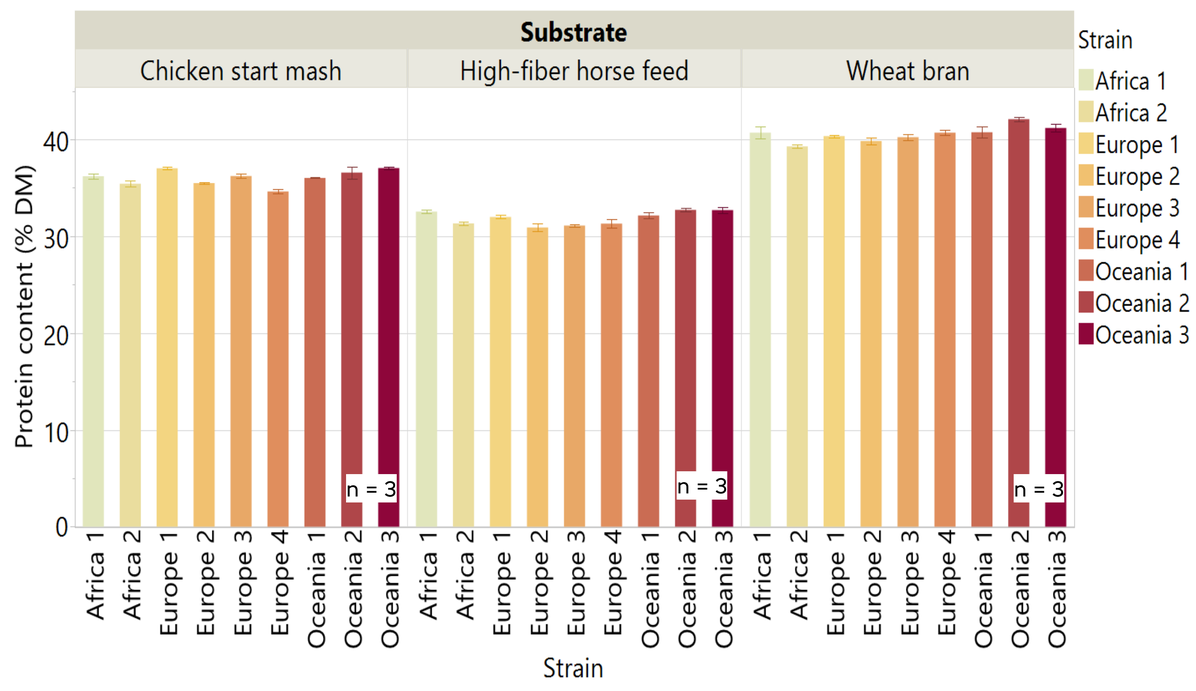
The performance of genetically distinct BSF strains from Africa, Europe, and Oceania was evaluated over three rounds on three feed substrates: high-fiber horse feed, wheat bran, and chicken starter mash. Strains were genetically characterized based on 15 microsatellite markers covering 5 of the 7 chromosomes, and larvae reared under controlled conditions (27°C, 60% RH). Key metrics, including bioconversion efficiency (BE) and protein content, were measured. BE was compared across rounds, relative BE was calculated for strain comparisons per feed, and in the first round, feed effects on protein content were assessed.

RESULTS



- Significant differences in bioconversion efficiency between rounds and generations (A-B: 5 generations, B-C: 4 generations)
- When accounting for the generational effect, European strains show significant differences in bioconversion efficiency compared to Oceanian strains, likely due to their longer domestication process
- Larvae grown on wheat bran have significantly higher protein content than those fed with chicken starter mash or high-fiber horse feed





CONCLUSION

- Differences in generations, or the variation in generational intervals between trials, can affect the experimental results in BSF larvae
- Generally, BSF larvae exhibit higher bioconversion efficiency on a high-protein feed compared to a high-fiber diet or a wheat bran diet
- BSF larvae have the highest protein content when reared on a wheat bran diet

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