REARING OF *Euschistus heros* (FABRICIUS) (HEMIPTERA: PENTATOMIDAE) ON ARTIFICIAL DIETS IN SUCCESSIVE GENERATIONS FOR OPTIMIZED EGG PRODUCTION

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SUMMARY

The release of the egg parasitoid Telenomus podisi *(Ashmead) for the management of* Euschistus heros *(Fabricius) in soybean (*Glycine max *Linnaeus) is a biological control strategy currently employed in Brazil. Although mass rearing of the host has already been established in commercial systems, optimizing diet composition remains essential to increase efficiency and reduce production costs. This study aimed to evaluate the development of* E. heros *on five different diets: a natural diet consisting of beans and peanuts (T1); a lyophilized pod-based diet (T2); a mixture of peanuts and soybeans (T3); a combination of fresh pods and grains (T4); and a formulation based on grains and oils (T5). Experiments were conducted under controlled and standardized conditions. The following parameters were evaluated: duration and survival from egg to adult, female productivity (eggs per female), couple survival, and egg viability. In the parental generation (F0), diets T2 and T3 exhibited nymph and egg viability comparable to T1, with accelerated development. Diet T4 showed the highest egg viability and rapid nymph development, but also high mortality, indicating low attractiveness. Diet T5 was excluded due to significantly lower performance across all parameters. In the fifth generation (F5), T2 was eliminated due to its high production cost. No significant differences were observed in the duration of the nymphal phase between the remaining treatments (T3 and T4). For the other parameters, T4 yielded the best results, indicating high adaptability of the insect to this diet. T3 also produced good outcomes, comparable to or even surpassing those of the natural diet (T1). Therefore, diets T3 and T4 proved suitable for the mass rearing of* E. heros *after adaptation.*

Introduction

Soybean culture (*Glycine max* Linnaeus) occupies a significant area of the Brazilian territory (47,356.5 thousand hectares), representing an increase of 2.6% in relation to the 2023/24 harvest (Conab, 2024). Insect pests are among the main factors responsible for reducing the productivity of this crop. Among these, the brown stink bug, *Euschistus heros* (Fabricius) (Hemiptera: Pentatomidae), is considered a key pest in soybeans, causing direct damage to grains and seeds in both nymphal and adult stages (Pereira *et al*., 2021; Tessmer *et al*., 2022).

The use of the egg parasitoid *Telenomus podisi* (Ashmead) (Hymenoptera: Scelionidae) for the management of *E. heros* has shown promising results, as this pentatomid is the preferred host and the most frequent and abundant

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in soybean crops (Silva *et al*., 2018). Releases of *T. podisi* are recommended at the onset of stink bug occurrence in the field to enhance control efficiency (Bueno *et al*., 2020). In this context, *T. podisi* can keep stink bug infestations below the economic damage threshold.

However, several aspects require further investigation to ensure the viability of *T. podisi* as a biological control agent. The presence of this microhymenopteran in the field throughout the year is limited by the absence of hosts during the fall and winter. Therefore, to ensure the availability of natural enemies for release during peak pest periods, mass production of the parasitoid under laboratory conditions using host eggs is necessary. The availability of large quantities of *E. heros* eggs is essential to establish an effective biological control program. Accordingly, it is crucial to develop a suitable mass-rearing methodology for the stink bug under laboratory conditions, with emphasis on the formulation of a nutritionally adequate diet that ensures both the quality and quantity of eggs required for the multiplication of the parasitoid.

Currently, the most advanced studies in this area are those of Mendoza *et al*. (2016), who formulated an artificial diet composed of freeze-dried green beans, peanuts, sucrose, and preservatives as a food source for rearing *E. heros*, achieving excellent results across successive generations (Table 1). As a cost-effective alternative to this formulation, Hayashida *et al*. (2018) developed three artificial diets using easily accessible ingredients (Table I), also obtaining promising outcomes.

Therefore, the present study aimed to evaluate the development of *E. heros* when fed on the artificial diets proposed by Hayashida *et al*. (2018), compared with that of Mendoza *et al*. (2016) and a natural diet, across successive generations, in order to assess the adaptability of the insects to different dietary formulations.

Materials and Methods

The insect rearings and laboratory assays were conducted under controlled environmental conditions, including a photoperiod of 14 hours, relative humidity of 70± 10%, and temperature of 25± 1°C, at AGRIMIP (Research Group on Integrated Pest Management), FCA – UNESP (Botucatu).

Rearing of Euschistus heros

Adult stink bugs were maintained in rectangular plastic cages (12.9 × 28 × 41cm) with lids covered in voile fabric to allow ventilation and gas exchange resulting from insect respiration. The bottom of each cage was lined with paper towels, on which a natural diet consisting of fresh bean pods (*Phaseolus vulgaris* Linnaeus) and peanuts (*Arachis hypogaea* Linnaeus) was provided.

Cages were set up with a population density of approximately 100 mating pairs. To facilitate copulation, oviposition, and movement, three strips (12 × 3cm) of raw cotton fabric were attached to the cage walls using adhesive tape. Egg masses were collected every 48 hours and transferred to plastic capsules (60mm in diameter) containing approximately 1ml of eggs to allow nymph hatching. This methodology was adapted from Hayashida *et al*. (2018).

Cage maintenance was performed three times per week and involved the replacement of the diet and the removal of dead insects, exuviae, and eggs. From the second instar onward, nymphs were transferred to rectangular plastic containers where the same natural diet was offered. Upon reaching adulthood, insects were sexed and placed into adult rearing cages. The entire rearing process was conducted under controlled environmental conditions: 25 ± 1°C, 70 ± 10% relative humidity, and a 14-hour photophase.

Artificial and natural diets

Five different diets were tested, as shown in Table I, corresponding to the following treatments: T1 (natural diet), commonly used in *E. heros* rearing laboratories; T2 (artificial diet proposed by Mendoza *et al*., 2016); and T3, T4, and T5 (artificial diets proposed by Hayashida *et al*., 2018). Anticontaminants were incorporated from a 2ml solution containing 10,000ppm nipagin, 800ppm sorbic acid, and 0.00765ppm tetracycline (Mendoza *et al*., 2016).

Development and egg production of Euschistus heros *in the parental (F0) and F5 generations*

To assess the biological performance of insects reared on different diets, three parameters were evaluated: egg-to-adult period, egg productivity per female, and egg viability. These assessments were conducted for both the F0 and F5 generations to determine insect adaptability to each diet across generations.

The egg-to-adult development of F0 insects was evaluated using 1L cylindrical plastic pots, each containing a 100mL plastic cup with a cotton-stoppered lid for humidity and three diet units measuring approximately 1.5 × 1.5 × 1.5cm. Each treatment included 20 replicates, with 100 eggs placed in each. Excess nymphs were removed to maintain 20 individuals per replicate. Nymph viability and development duration were recorded, considering the time at which more than half of the insects reached adulthood as the endpoint. Development

TABLE I
ARTIFICIAL AND NATURAL DIETS USED FOR THE MASS REARING OF *Euschistus heros*, WITH THE RESPECTIVE INGREDIENTS

Treatments	Ingredients
T1= Natural	Natural Diet: Raw Arachis Peanuts (*Arachis hypogaea* L.) in a Petri dish (Ø 90mm); 8 bean pods (*Phaseolus vulgaris* L.) arranged on the sides of the cage
T2= Freeze-dried green beans (Mendoza *et al*., 2016)	35g of crushed peanut seeds; 5g of sucrose; 35g of freeze-dried bean pods; 25ml of water; anti-contaminants
T3= Peanuts and soybeans (Hayashida *et al*., 2018)	35g of crushed peanut seeds; 5g of sucrose; 30g of crushed soybean seeds; 25 ml of water; anti-contaminants
T4= Fresh pods and grains (Hayashida *et al*., 2018)	35g of crushed peanut seeds; 5g of sucrose; 30g of ground green bean pods; 10g of crushed soybean seeds; 10g of crushed sunflower seeds; 10g of crushed wheat germ; anti-contaminants
T5= Grains and oils (Hayashida *et al*., 2018)	35g crushed peanut seed; 5g sucrose; 8ml water; 10g crushed soybean seed; 10g crushed sunflower seed; 10g crushed wheat germ; 1ml soybean oil; 1ml sunflower oil; 0.5ml sesame oil; 0.5ml olive oil; anticontaminants

Source: Mendoza et al. (2016); Hayashida et al. (2018).

time was expressed relative to a 35-day period (total days/35).

For the F5 generation, development was assessed using 400 ml round plastic pots, each containing one nymph, one diet unit (1.5 × 1.5 × 1.5cm), and one cotton-stoppered Eppendorf® microtube with distilled water. Thirty replicates were established per treatment, with 15 eggs initially placed in each and thinned to one nymph per replicate. Development was monitored for 35 days.

A larger number of nymphs were used in the F0 generation (20 per replicate) to ensure a sufficient population for F5 testing (1 per replicate).

To evaluate parental (F0) reproductive performance, 30 mating pairs were established per treatment, with a maximum age difference of 72 hours between males and females. Each pair was housed in a 200ml transparent plastic cup, provided with one diet unit, one cotton-stoppered Eppendorf® tube with distilled water, and one piece of raw cotton fabric (3 × 5 cm) for oviposition. Containers were sealed with voile fabric and an elastic band. Egg masses were collected every 48 hours, and the total number of eggs, number of ovipositions, and eggs per oviposition were recorded. Parameters were expressed as percentages relative to the average of Treatment 1 (natural diet), as it served as the reference for comparisons. The experiment lasted 32 days, corresponding to the peak reproductive period of the insect (Silva, 2008). Pair longevity was expressed as a percentage of this period.

The F5 reproductive assessment followed the same methodology as the F0, with the following exceptions: 400ml pots were used instead of 200ml cups, and the number of replicates was reduced to 20 per treatment due to the lower number of adults obtained. All parameters and longevity were evaluated and analyzed in the same manner.

Egg viability in both F0 and F5 was assessed using 60mm plastic capsules, each containing 10 eggs. Twenty replicates were used per treatment. The number of emerged nymphs was counted, and results were expressed as percentages.

Statistical analysis

The data were tested for normality using the Shapiro-Wilk test ($p < 0.05$). When normality was not met, the non-parametric Kruskal–Wallis test ($p < 0.05$) was applied to analyze the egg-to-adult period (duration and viability) for F0 and egg productivity per female for both F0 and F5.

For the egg-to-adult period of F5 and egg viability (F0 and F5), Tukey's test ($p < 0.05$) was used, following arcsine transformation of the percentage data. All statistical analyses were performed using InfoStat software, version 2017.1.2 (InfoStat, 2017).

Kaplan–Meier survival analysis was applied to assess the survival of nymphs and adult pairs. Specific fertility was analyzed using a fertility life table, based on the Jackknife method as described by Maia *et al*. (2014).

Results and Discussion

Development and egg production in the parental generation

Regarding insect growth and development, diets corresponding to treatments T2 and T3 demonstrated performance equivalent to the natural diet, serving as alternative food sources capable of meeting the nutritional requirements of the brown stink bug until the adult stage (Figure 1).

As illustrated in Figure 1, insects fed on the artificial diets based on freeze-dried green beans (T2), peanuts + soybeans (T3), and fresh green beans (T4) exhibited accelerated development, suggesting that these treatments possess adequate nutritional quality. The grinding of green beans and grains may facilitate access to nutrients located in the inner structures of the seeds (Panizzi, 1997). However, despite the rapid development observed with T4 (fresh green beans), this treatment showed low nymph viability, indicating reduced attractiveness to *E. heros*. This may be attributed to a lower concentration of phagostimulants and the rapid deterioration of fresh material, which compromises the integrity of diet components (Mendoza *et al*., 2016).

The oil-based diet (T5) did not differ from the natural diet in terms of development time, but exhibited extremely low viability, which precluded further assessment of reproductive parameters.

Stink bugs reared on artificial diets produced fewer total eggs and oviposition events compared to those fed on the natural diet (Table II). The number of pairs surviving the 32-day period influenced the variation in egg production across treatments. Pairs fed on the natural diet and the T3 diet (peanut + soybean) displayed greater longevity than the others (Table II, Figure 2). This reduced fecundity may also be explained by the significant influence of adult nutrition on egg production, as lipid intake has been associated with increased oviposition rates (Panizzi, 1997).

Egg viability in treatments T2 and T3 was comparable to that of the natural diet. Interestingly, treatment T4 led to the highest egg viability among all diets (Table III), which reinforces the hypothesis that the low attractiveness of the diet did not compromise embryonic development. Nevertheless, the effects of artificial diets on egg viability warrant further investigation, aiming for more homogeneous data and validation over multiple generations. Additional studies

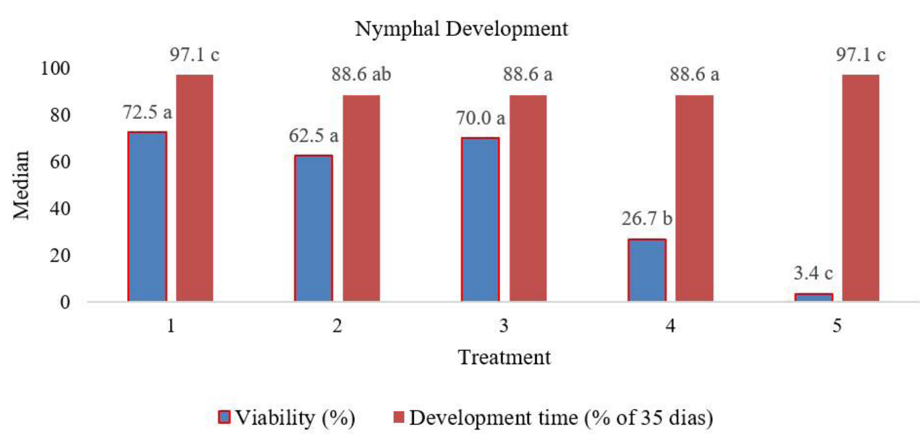

Figure 1. Evaluation of the egg-to-adult period of *Euschistus heros* parents fed different diets. Columns on the left indicate nymph viability (%), columns on the right indicate development time in relation to 35 days (%). Kruskal-Wallis (Viability: H= 21,88, df= 4, p<0.0001;Development time: H=65,33, df= 4, p<0,0001). Treatments: 1 – natural (beans + peanuts); 2 – artificial (freeze-dried green beans); 3 artificial (soybean + peanuts); 4 – artificial (fresh pods + grains); 5 – artificial (grains + oils). H: Kruskal-Wallis H statistic; df: Degrees of freedom.

TABLE II
BIOLOGICAL PERFORMANCE OF PARENTAL (F0) *Euschistus heros* COUPLES FED ON DIFFERENT DIETS

Treatments	Averages		
	Total eggs/female[1]	Total oviposition/female[1]	Longevity of couples (days)[1]
1	122.7 ±14.9 a	17.5 ±1.9 a	24.1 ±1.6 a
2	16.0 ±8.1 b	6.4 ±1.3 b	19.1 ±1.7 bc
3	53.0 ±10.3 b	10.7 ±1.8 b	21.3 ±1.4 ab
4	16.0 ±6.6 b	5.2 ±1.0 b	15.8 ±1.4 c
H	26.63	25.20	14.91
df	3	3	3
p	<0.0001	<0.0001	0.0018

[1]Means followed by the same lowercase letters in the column do not differ from each other according to the Kruskal-Wallis test ($p \leq 0.05$). Treatments: 1 – natural (beans + peanuts); 2 – artificial (freeze-dried green beans); 3 artificial (soybean + peanuts); 4 – artificial (fresh pods + grains). H: Kruskal-Wallis H statistic; df: Degrees of freedom.

TABLE III
EGG VIABILITY OF *Euschistus heros* FED ON DIFFERENT DIETS

Treatments	Averages (%)[1]	
	Parental	F5
4	67.0 ± 3.3 a	57.67 ± 4.23 a
1	49.5 ± 3.9 b	37.33 ± 4.15 b
2	48.5 ± 5.2 b	-
3	40.5 ± 5.2 b	37.67 ± 5.02 b
F	5.79	6.75
df	76	87
p	0.0013	0.0019
CV (%)	39.1	55.53

[1]Means followed by the same lowercase letters in the column do not differ from each other by the test of Tukey ($p \leq 0.05$). Treatments: 1 – natural (beans + peanuts); 2 – artificial (freeze-dried green beans); 3 artificial (soybean + peanuts); 4 – artificial (fresh pods + grains). F: ANOVA F statistic; df: Degrees of freedom; CV: Coefficient of variation.

exploring feeding activity and its relationship to reproductive success would also be valuable.

When focusing exclusively on the reproductive potential for mass rearing of *E. heros*, artificial diets yielded markedly lower results compared to the natural diet. However, Mendoza *et al*. (2016) demonstrated that insects exhibit dietary adaptation across generations, with a significant increase in egg production per female. Therefore, artificial diets corresponding to treatments T2, T3, and T4 emerge as promising alternatives for evaluating *E. heros* adaptability over successive generations.

Hayashida *et al*. (2018) further emphasized that artificial diets should not only meet the insect's nutritional demands but also be cost-effective and practical for routine production. The cost of producing these diets directly impacts the overall feasibility of the biological control program and, ultimately, the decision-making process of growers—an observation also noted by Camargos *et al*. (2017) in their study on *Diachasmimorpha longicaudata* (Hymenoptera: Braconidae).

Development and egg production in the F5 generation

Following the evaluation of the parental generation (F0) of *Euschistus heros*, treatments T2 and T5 were excluded from the F5 assessment due to the high production cost of T2 (associated with the freeze-drying process of bean pods) and the poor biological performance observed in insects reared on T5.

The egg-to-adult development time for the remaining diets (T1, T3, and T4) remained equivalent, demonstrating the insects' adaptability to dry diets (Table IV). This parameter is critical in mass-rearing systems, as shorter development periods enable earlier egg production by adult insects (Hayashida *et al*., 2018). Notably, the rejection initially observed in the parental generation for T4 (fresh pods + grains), likely due to lower phagostimulant content, was no longer observed in the F5 generation. Selection for individuals that accepted the diet likely contributed to the observed high survival rates under T4, equivalent to the natural diet (T1) (Figure 2D). This indicates generational adaptation to artificial diets, as also reported by Mendoza *et al*. (2016).

In Figure 2C, higher mortality was observed between 10–20 days of life for insects fed artificial diets, corresponding to the first three nymphal instars, as is also seen with natural diets (Costa *et al*., 1998; Oliveira *et al*., 2016). Figure 2D shows lower survival rates in insects reared on T3 (peanut + soybean), likely attributable to nutritional differences compared to pod-based diets (T1 and T4).

Insects fed on the natural diet exhibited elevated adult mortality during the first 10 days (Figure 2E), negatively impacting overall survival averages (Figure 2F). These findings suggest a degeneration of biological traits across generations in populations reared on the natural diet. Conversely, artificial diets did not exhibit this degeneration and even increased average longevity, further supporting the adaptive potential of *E. heros* to artificial diets (Mendoza *et al*., 2016).

Due to the low survival of T1 insects affecting reproductive output measured by standard analysis, egg production was evaluated using life and fertility tables, with results visualized via specific fertility and survival graphs (Figure 3). Across all treatments, peak reproductive output occurred between the start of week 2 and the end of week 3 of adult life, consistent with the findings of Hayashida *et al*. (2018). Despite higher mortality, females on the natural diet still demonstrated high fertility, as previously observed by Mendoza *et al*. (2016), possibly due to resistance in individuals that survived to adulthood.

Insects fed on T3 showed lower fertility but greater consistency in oviposition, with reasonable pair survival. Hayashida *et al*. (2018) similarly reported reduced longevity and

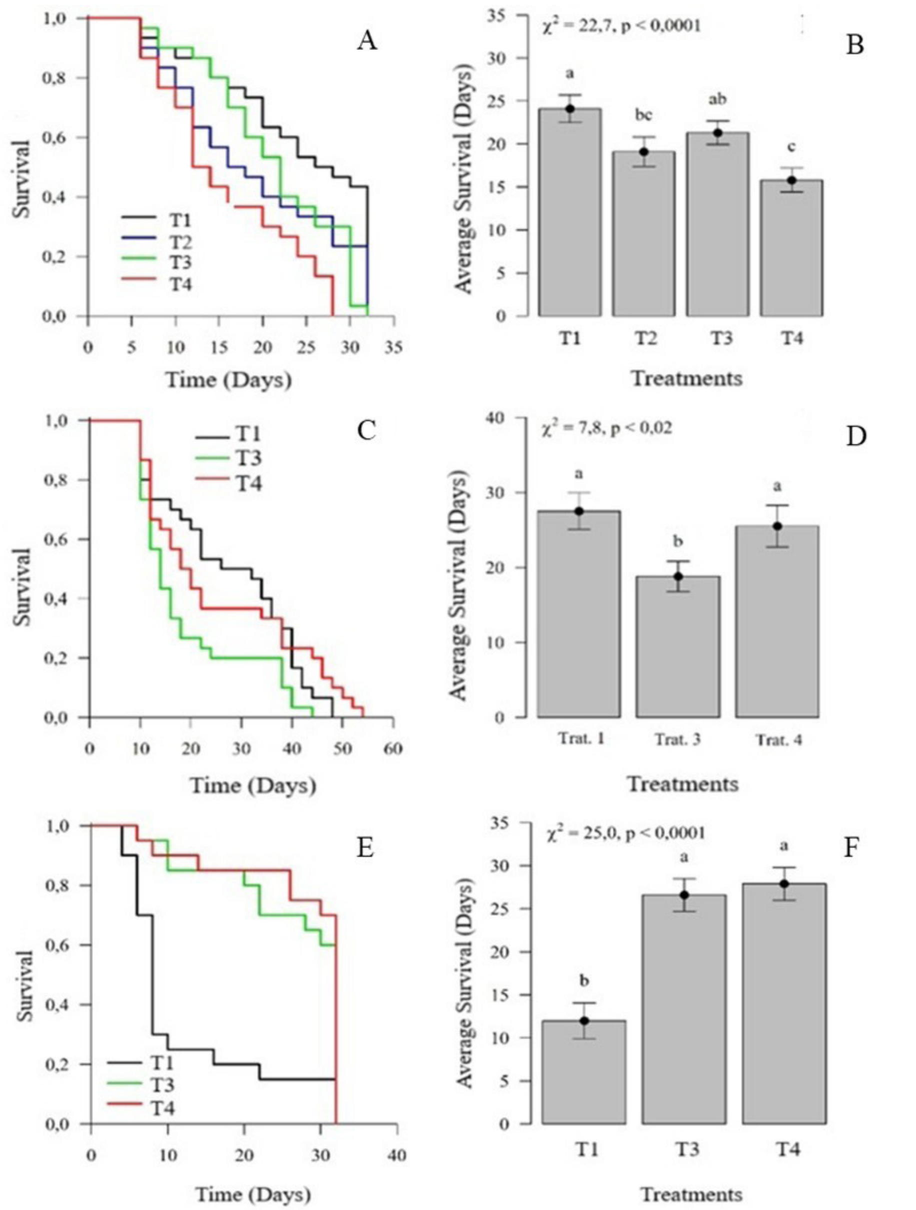

Figure 2. (A) Survival x days of parental couples. (B) Average survival in days of parental couples of *Euschistus heros*. (C) Survival x days of F5 nymphal development. (D) Average survival in days of F5 E. heros nymphs. (E) Survival x days of F5 couples. (F) Average survival in days of F5 *Euschistus heros* couples. Columns with the same lowercase letters do not differ from each other according to the Kaplan-Meier test (p<0.05). Treatments: 1 – natural (beans + peanuts); 2 – artificial (freeze-dried green beans); 3 artificial (soybean + peanuts); 4 – artificial (fresh pods + grains).

TABLE IV
DURATION OF THE EGG-ADULT PERIOD OF F5 OF *Euschistus heros* FED ON DIFFERENT DIETS

Treat	Averages (% of 35 days)		
1	114.86	±	3.85 n.s.
3	113.33	±	2.73 n.s.
4	126.98	±	5.11 n.s.
CV	10.52		

Tukey test (F= 3, df= 22, p= 0.0705). Abbreviation: n.s., not-significant. Treatments: 1 – natural (beans + peanuts); 3 artificial (soybean + peanuts); 4 – artificial (fresh pods + grains). CV: Coefficient of variation; F: ANOVA F statistic; df: Degrees of freedom.

productivity for parental pairs on this diet. These findings support the notion that T3 exhibits generational adaptability, with improved couple viability compensating for its lower productivity. Moreover, T3 is a low-cost and easy-to-produce diet, a crucial advantage for biological control programs.

Treatment T4 (fresh pods + grains) resulted in high pair survival and the highest fertility among all treatments, indicating superior nutritional quality and strong adaptability to the phagostimulant properties of this diet, similar to diets with freeze-dried pods and anticontaminants described by Mendoza *et al*. (2016).

Regarding egg viability (Table III), the F5 results mirrored those of the F0 generation: T3 remained equivalent to T1, and T4 continued to show the highest viability. These outcomes reinforce the nutritional potential of T4, likely due to its more diverse nutrient profile. Long-term studies on feeding activity and adaptation are warranted to provide more consistent data and better quantify generational progress.

As demonstrated by Mendoza *et al*. (2016), insects fed on natural diets or diets lacking anticontaminants tend to show biological degeneration across generations, with reduced survival and reproductive capacity. In contrast, artificial diets supplemented with nipagin, sorbic acid, and tetracycline may preserve these traits, promoting multigenerational adaptation.

Menezes *et al*. (2014), in their study on Tenebrio molitor diets and their impact on the development of Podisus nigrispinus, emphasized the importance of a diet that supports a high net reproduction rate and short generation time. These criteria are critical for boosting host and control agent populations alike in biological control programs. These aspects were observed in *E. heros* reared on T4, which promoted high survival, fecundity, and egg viability. Although T3 did not perform as strongly, its economic viability remains a key asset.

Further research is needed to evaluate the effects of these diets on Telenomus podisi, as diet-induced changes in the host may also impact its natural enemies (Menezes *et al*., 2014; Mendoza *et al*., 2016).

Monitoring *E. heros* feeding behavior on different diets may provide insights into their effectiveness. Techniques such as Electrical Penetration Graph (EPG), previously used with this pest on soybean plants (Lucini and Panizzi, 2018), or

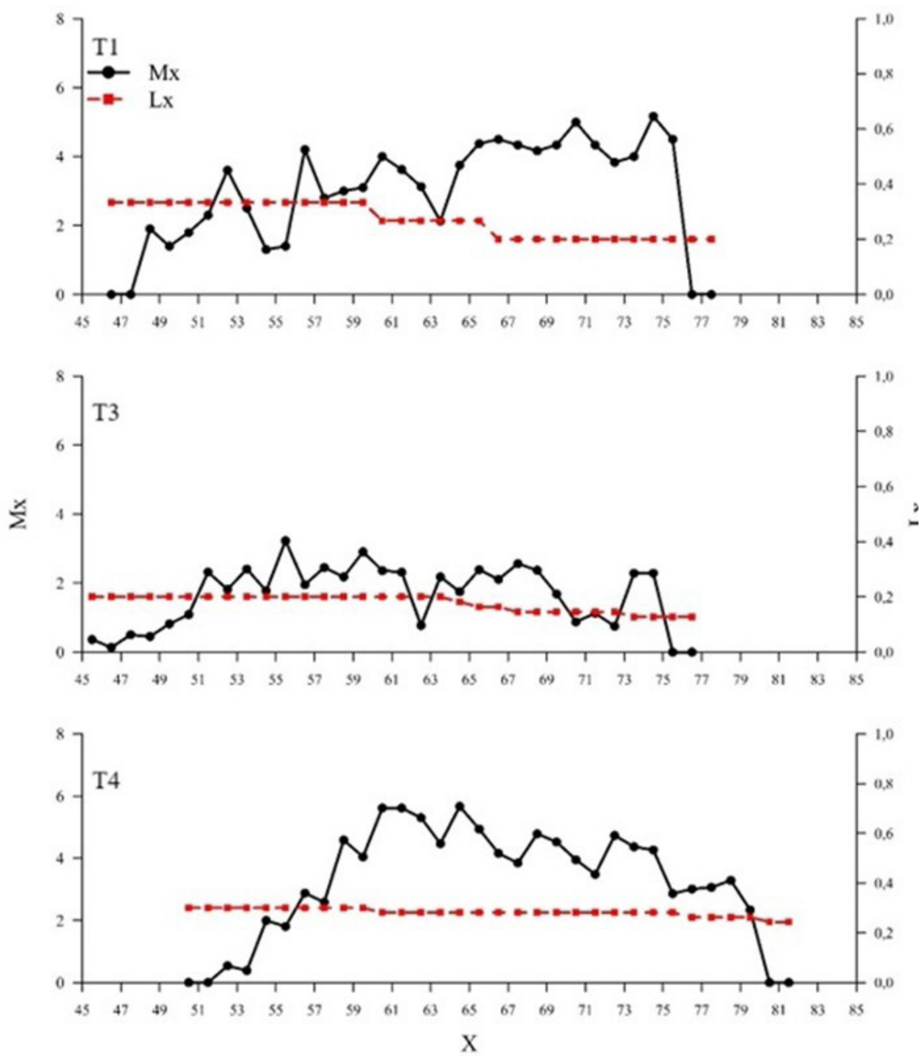

Figure 3. Specific fertility and survival of F5 couples of *Euschistus heros* fed different diets Mx: Specific fertility; Lx: Survival. Jackknife (Maia *et al*., 2014). Treatments: 1 – natural (beans + peanuts); 3 artificial (soybean + peanuts); 4 – artificial (fresh pods + grains).

non-invasive marking methods, may be useful—provided that they do not interfere with insect development (Rando *et al*., 2016).

Conclusions

The artificial diets based on freeze-dried green beans and peanuts (T2) and peanuts combined with soybeans (T3) demonstrated high acceptance by *Euschistus heros* in the initial generation, effectively meeting the nutritional requirements for nymphal development.

In contrast, the diet composed of fresh pods and grains (T4) was initially unattractive to the insects. However, with the progressive selection of individuals that accepted this diet, *E. heros* exhibited a notable capacity for adaptation over successive generations, showing enhanced biological performance in the F5 generation.

The diet formulated with grains and oils (T5), in addition to its low palatability, failed to meet the insects' nutritional demands, resulting in prolonged developmental cycles and low female fecundity, thereby making its application in mass-rearing systems unfeasible.

Although the peanut and soybean-based diet (T3) yielded results inferior to the other treatments in the F5 generation, it offers important practical advantages. Specifically, this diet is less expensive and easier to produce, and it also simplifies the labor involved in the mass rearing of *E. heros*.

Further research is required to better assess the effects of these diets on the parasitoid Telenomus podisi, as well as to clarify the feeding behavior of *E. heros*, which could support improvements in diet formulation through more effective phagostimulant incorporation.

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CRIANZA DE *Euschistus heros* (FABRICIUS) (HEMIPTERA: PENTATOMIDAE) CON DIETAS ARTIFICIALES EN GENERACIONES SUCESIVAS PARA LA OPTIMIZACIÓN DE LA PRODUCCIÓN DE HUEVOS

Pedro Hiroshi Passos Ikuno, Marcelo Akira Koga Júnior, Daniel Mariano Santos, Daniel de Lima Alvarez, José Romário de Carvalho, Bruno Alexis Zachrisson Salamina y Regiane Cristina de Oliveira

RESUMEN

La liberación del parasitoide de huevos Telenomus podisi *(Ashmead) para el manejo de* Euschistus heros *(Fabricius) en cultivos de soja (*Glycine max *Linnaeus) es una estrategia de control biológico actualmente utilizada en Brasil. Aunque la cría masiva del hospedador ya ha sido establecida en sistemas comerciales, la optimización de la composición de la dieta sigue siendo esencial para aumentar la eficiencia y reducir los costos de producción.*

El objetivo de este estudio fue evaluar el desarrollo de E. heros *en cinco dietas diferentes: una dieta natural compuesta por frijoles y maní (T1); una dieta basada en vaina liofilizada (T2); una mezcla de maní y soja (T3); una combinación de vaina fresca y granos (T4); y una formulación a base de granos y aceites (T5). Los experimentos se realizaron en condiciones controladas y estandarizadas, y se evaluaron la duración y supervivencia del período de huevo a adulto, la productividad (huevos por hembra), la supervivencia de la pareja y la viabilidad de los huevos.*

En la generación parental (F0), las dietas T2 y T3 mostraron una viabilidad de huevos y supervivencia de ninfas comparables a T1, con un desarrollo acelerado. La dieta T4 presentó la mayor viabilidad de huevos y un rápido desarrollo de ninfas, aunque con alta mortalidad, lo que indica una baja atracción. La dieta T5 fue descartada debido a un desempeño significativamente inferior. En la quinta generación (F5), T2 fue eliminada debido a su elevado costo de producción. No se observaron diferencias significativas en la duración de la fase ninfal entre los tratamientos restantes (T3 y T4). En las demás variables evaluadas, T4 presentó los mejores resultados, indicando una alta adaptabilidad del insecto a esta dieta. T3 también mostró resultados favorables, comparables o incluso superiores a los de la dieta natural T1. Por lo tanto, las dietas T3 y T4 resultaron adecuadas para la crianza masiva de E. heros *después de un proceso de adaptación.*

CRIAÇÃO DE *Euschistus heros* (FABRICIUS) (HEMIPTERA: PENTATOMIDAE) COM DIETAS ARTIFICIAIS EM GERAÇÕES SUCESSIVAS VISANDO À OTIMIZAÇÃO DA PRODUÇÃO DE OVOS

Pedro Hiroshi Passos Ikuno, Marcelo Akira Koga Júnior, Daniel Mariano Santos, Daniel de Lima Alvarez, José Romário de Carvalho, Bruno Alexis Zachrisson Salamina e Regiane Cristina de Oliveira

RESUMO

A liberação do parasitoide de ovos Telenomus podisi *(Ashmead) para o manejo de* Euschistus heros *(Fabricius) em cultivos de soja (*Glycine max *Linnaeus) é uma estratégia de controle biológico atualmente utilizada no Brasil. Embora a criação massal do hospedeiro já esteja estabelecida em sistemas comerciais, a otimização da composição da dieta continua sendo essencial para aumentar a eficiência e reduzir os custos de produção. O objetivo deste estudo foi avaliar o desenvolvimento de* E. heros *em cinco dietas diferentes: uma dieta natural composta por feijão e amendoim (T1); uma dieta à base de vagem liofilizada (T2); uma mistura de amendoim e soja (T3); uma combinação de vagem fresca e grãos (T4); e uma formulação composta por grãos e óleos (T5). Os experimentos foram conduzidos sob condições controladas e padronizadas, sendo avaliados os seguintes parâmetros: duração e sobrevivência do período de ovo a adulto, produtividade (ovos por fêmea), sobrevivência do casal e viabilidade dos ovos.*

Na geração parental (F0), as dietas T2 e T3 apresentaram viabilidade de ovos e sobrevivência de ninfas comparáveis à T1, com desenvolvimento acelerado. A dieta T4 resultou na maior viabilidade de ovos e rápido desenvolvimento ninfal, embora tenha apresentado alta mortalidade, indicando baixa atratividade. A dieta T5 foi descartada devido ao desempenho significativamente inferior. Na quinta geração (F5), a dieta T2 foi eliminada devido ao elevado custo de produção. Não foram observadas diferenças significativas na duração da fase ninfal entre os tratamentos remanescentes (T3 e T4). Nos demais parâmetros avaliados, T4 apresentou os melhores resultados, indicando alta adaptabilidade do inseto a essa dieta. A dieta T3 também apresentou resultados satisfatórios, comparáveis ou até superiores aos da dieta natural (T1). Portanto, as dietas T3 e T4 mostraram-se adequadas para a criação massal de E. heros *após o processo de adaptação.*