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Biology and Life Table of *Melanaphis sorghi* (Theobald, 1904) (Hemiptera: Aphididae) on Sweet Sorghum Hybrids (*Sorghum bicolor*)

D.G. dos Santos[1], G.S. de Avellar[1], R.A.C. Parrella2, N.M. dos Santos[3], N.C.R. Damasceno[2], B.L.S. Silva, K.A.S. Rezende[2], A.C.M. Redoan[2], S.M. Mendes[2]*

[1]Department of Biosystems Engineering, Federal University of São João del Rei (UFSJ), São João del Rei-MG, Brazil. Dom Bosco Campus - LANEC - Praça Dom Helvécio, 74 Bairro; Fábricas, São João del-Rei -MG, Brazil; Douglas Graciel dos Santos: https://orcid.org/0000-0002-6991-181X and Guilherme Souza de Avellar: https://orcid.org/0000-0003-0517-5208.

2Brazilian Agricultural Research Company (Embrapa), Rodovia MG 424, Km 45, P. O. Box 285, Sete Lagoas, MG, 35701-970, Brazil.; Rafael Augusto da Costa Parrella: https://orcid.org/0000-0001-6599-7487; Nathalia Cristine Ramos Damasceno: https://orcid.org/0000-0002-6685-4848; Kelly Aparecida Souza Rezende: https://orcid.org/0009-0001-7995-758X; Ana Carolina Maciel Redoan: https://orcid.org/0000-0003-2808-6216 e Simone Martins Mendes: https://orcid.org/0000-0002-9773-9017.

3Department of Entomology, Federal University of Lavras (UFLA), Aquenta Sol, Lavras - MG, 37200 000, Brazil; Nathan Moreira dos Santos: https://orcid.org/0000-0003-2403-6449 and Bárbara Luísa Soares Silva: https://orcid.org/0009-0007-9582-1520.

*** Correspondence to**
Simone Martins Mendes, Embrapa Milho e Sorgo, Rodovia MG 424, Km 45, P. O. Box 285, Sete Lagoas, MG, 35701-970, Brasil. Telephone: (31) 3027-1136 / (31) 92161864, E-mail: simone.mendes@embrapa.br

ABSTRACT

The aphid Melanaphis sorghi is an economically significant pest of sorghum (Sorghum bicolor), a crop with potential for bioenergy production and food use. This study evaluated the biology and life table of M. sorghi on ten sweet sorghum hybrids to identify resistant and susceptible genotypes. The biological parameters assessed included pre-reproductive, reproductive, and post-reproductive periods, longevity, fecundity, and daily nymph production. Additionally, life table parameters were calculated, such as the net reproductive rate (R_0), intrinsic rate of increase (R_m), finite rate of increase (λ), and population

doubling time (DT). The results showed that genotype 202224B017 was the most susceptible, with the highest values of R_0 (18.92 ± 0.48 females), R_m (0.40 ± 0.00 females/day), and λ (1.49 ± 0.00), along with the shortest population doubling time (DT = 1.74 ± 0.01 days). In contrast, genotype CMSXS5039 exhibited greater resistance, with the lowest values of R_0 (2.34 ± 0.08 females), R_m (0.11 ± 0.00 females/day), and λ (1.12 ± 0.01), as well as the longest DT (6.11 ± 0.27 days). Survival analysis indicated that CMSXS5039 had the lowest proportion of surviving nymphs (0.20), while 202224B017 had the highest (0.78). These findings suggest that CMSXS5039 possesses mechanisms that hinder aphid development and reproduction, whereas 202224B017 favors pest population growth and is considered more susceptible.

Keywords: *Sorghum aphid; Bioenergy sorghum; Plant resistance; Resistant genotypes.*

INTRODUCTION

Sweet sorghum (*Sorghum bicolor L. Moench*) is an alternative crop for ethanol production and has gained prominence in the agricultural sector and bioenergy industry due to its multiple applications, high yields, short growth cycle, and fully mechanized seed-based cultivation (Okonkwo & Okwu, 2024). Characterized by its high sugar content, rapid growth, and adaptability to diverse environmental conditions, this crop is valued for both human and animal nutrition as well as biofuel production (Kumar et al., 2024). With yields of around 65 tons per hectare, sweet sorghum has emerged as a robust biomass source, significantly contributing to renewable energy generation (Umakanth et al., 2024). Additionally, its ability to produce juice representing up to 78% of total biomass, of which 15–23% consists of fermentable sugars, makes it a promising feedstock for bioethanol production (Umakanth et al., 2024; Dhuha & Zulfa, 2023).

The versatility of sweet sorghum allows its use for both forage and fuel, providing farmers with additional income opportunities, particularly during sugarcane off-seasons (Umakanth et al., 2024). However, despite its advantages, the crop faces significant challenges, including pest infestations that can compromise productivity and economic viability. Among the insect pests infesting sweet sorghum (Sorghum bicolor), the sorghum aphid, *Melanaphis sorghi* (Theobald, 1904) (Hemiptera: Aphididae), represents a significant threat due to its damaging potential. Since its detection in 2013, this pest has spread rapidly, causing substantial yield losses and significant economic impacts. Currently, *M. sorghi* has affected a large portion of sorghum production in the U.S., being present in 25 states, underscoring its status as a major threat to the crop (Uyi & Toews, 2024).

Infestations by *M. sorghi* cause direct damage to plants, reducing not only productivity but also sorghum quality, directly affecting growers' profitability (Uyi & Toews, 2024). In response, integrated pest management (IPM) strategies, combining insecticides, resistant cultivars, and cultural practices, have become essential to mitigate the pest's effects (Uyi & Toews, 2024). Recent research has sought to enhance IPM strategies by investigating *M. sorghi*'s genetic diversity and developing resistant cultivars for more effective control measures (Vasquez et al., 2024).

The biology and life table of *M. sorghi* are critical for developing effective management strategies. This pest exhibits high reproductive rates, particularly under optimal temperatures (25°C), where each female can produce an average of 79.06 nymphs (Peña-Martínez et al., 2024). Its life cycle comprises nymphal

stages (including alate nymphs), followed by winged or wingless adults, with parthenogenesis as the primary reproductive mode (Zambrano-Gutiérrez et al., 2021).

Life table analyses of *M. sorghi* demonstrate that its reproductive and longevity are significantly modulated by abiotic and biotic factors, including thermal regimes and host plant suitability. The maximum reproductive period (33.2 days) is observed at 10°C, whereas exposure to extreme temperatures (>40°C) induces acute mortality (Peña-Martínez et al., 2024). Furthermore, screening for antixenotic or antibiotic traits in sorghum genotypes has identified resistant cultivars that impair *M. sorghi* fecundity (Avellar et al., 2021). These findings provide a foundation for optimizing integrated pest management (IPM) protocols, including the deployment of resistant germplasm alongside complementary control measures (Sampaio et al., 2022). The synergistic integration of these strategies can significantly suppress pest population dynamics in sweet sorghum production systems.

In this context, the present study aims to investigate the biological parameters and construct life tables for *M. sorghi* across ten sweet sorghum hybrids. The research will evaluate the pest's fecundity and survival fitness to elucidate host-pest interactions. These findings will support genetic improvement programs and inform the development of targeted strategies to mitigate *M. sorghi* infestations in sweet sorghum production systems.

MATERIAL AND METHODS

Melanaphis sorghi Colony

The study was conducted at the Ecotoxicology and Pest Management Laboratory of the Brazilian Agricultural Research Corporation (EMBRAPA Maize and Sorghum) in Sete Lagoas, Minas Gerais, Brazil (19°28' S, 44°15'08" W). A colony of *M. sorghi* was collected from EMBRAPA's experimental sorghum field and maintained under controlled laboratory conditions at 24±2°C, 60±10% relative humidity, and a 12-hour photoperiod. To sustain the colonies, sorghum leaves (variety BRS Ponta Negra) were placed in Gerbox® containers (1 × 11 × 3.5 cm) containing agar (20 g L^{-1} water) to prevent desiccation. Leaves were replaced regularly to ensure optimal conditions for aphid development.

Planting

Soil was placed in 5 L containers in a greenhouse, where three sorghum seeds were sown per container. After germination, plants were thinned to one per pot. Ten sweet sorghum single-cross hybrids from EMBRAPA's Sorghum Breeding Program were used: *CMSXS5027*, *CMSXS5029*, *CMSXS5035*, *CMSXS5037*, *CMSXS5039*, *CMSXS5041*, *CMSXS5043*, *CMSXS5045*, *202224B017*, and *202224B018*. These hybrids were derived from crosses between male-sterile A-lines and sweet sorghum restorer R-lines, exhibiting tall stature (4–5 m) and high yield potential.

The hybrids *CMSXS5027* and *CMSXS5029* are photoperiod-insensitive, exhibiting an intermediate growth cycle of 120 to 130 days to harvest, with flowering occurring between 80 to 90 days in spring/summer cultivation. In contrast, the hybrids *CMSXS5035*, *CMSXS5037*, *CMSXS5039*, *CMSXS5041*, *CMSXS5043*, *CMSXS5045*, *202224B017*, and *202224B018* are photoperiod-sensitive, requiring a longer growth cycle of 160 to 180 days to harvest and flowering between 120 to 140 days during spring/summer cultivation. The hybrids *CMSXS5027*, *CMSXS5029*, *CMSXS5035*, and *CMSXS5037* represent traditional sweet sorghum types, characterized by juicy stalks with high sugar content and fiber levels ranging from 14% to 16%. The hybrids *CMSXS5039*, *CMSXS5041*, *CMSXS5043*, *CMSXS5045*, *202224B017*, and *202224B018* display reduced stalk moisture content while maintaining high sugar concentration and elevated fiber content between 18% and 22%, exhibiting characteristics similar to biomass-type sorghum. Initial fertilization used 240 kg ha^{-1} of N-P-K 8-28-16, supplemented with 120 kg ha^{-1} of urea applied at the five-leaf stage.

***Melanaphis sorghi* Biology**

The experiment was conducted in a controlled environment (24±2°C, 60±10% RH, 12-hour photoperiod). One-day-old nymphs were selected for bioassays. Leaves from nine-leaf-stage plants were collected, and 3.8 cm diameter leaf discs (cut near the midrib) were placed in 50 mL containers with agar (20 g L^{-1}). Discs were replaced every three days to maintain nutritional quality (Avellar et al., 2022; Santos et al., 2025).

A completely randomized design was used, with 50 replicates (one nymph per disc). Nymphs were monitored daily for: *Survival*, *pre-reproductive* (time to first offspring) and *reproductive periods*, *longevity*, and *fecundity*. Offspring were counted and removed daily.

Life Table and Fertility Analysis

Data included: Daily offspring per female (m_x), surviving females per day (l_x), and time (x). Key parameters were calculated:

Net reproductive rate (R_0): Total offspring per female.

$$R0 = \sum (mx.lx)$$

Mean generation time (T): Average time between generations.

$$T = \left(\frac{(\sum mx.lx.x)}{(\sum mx.lx)} \right)$$

Intrinsic rate of increase (r_m): Offspring per female per day.

$$rm = \left(\frac{(log\ R0\ )}{(T)} \right)$$

Finite rate of increase (λ): Population growth rate.

$$\lambda = e^{rm}$$

Doubling time (DT): Time for population to double.

$$DT = \frac{(\ln(2))}{(rm)}$$

Statistical Analysis

The biological data of *M. sorghi* were subjected to analysis of variance (ANOVA) using the statistical software Minitab (Alin, 2010), with mean comparisons performed using Tukey's test at a 5% significance level ($P < 0.05$). Nymph survival across different genotypes was assessed using Pearson's chi-square test, also at a 5% significance level ($P < 0.05$). The standard error of the life table was estimated using the computational application TABVIDA (Penteado et al., 2010) employing the Jackknife method, with results subsequently analyzed by Student's t-test at 5% significance ($P < 0.05$). Aphid mortality was evaluated through Cox regression analysis implemented in R software (Battist & Smolski, 2019).

RESULTS

The biology of *M. sorghi* was evaluated across different sweet sorghum genotypes, focusing on parameters such as pre-reproductive, reproductive, and post-reproductive periods, longevity, fecundity, and daily nymph production (Table 1). The pre-reproductive period ranged from 5.00 to 5.32 days, with no significant differences among genotypes ($P > 0.05$), indicating similar conditions for initial aphid development. In contrast, the reproductive period varied significantly ($P < 0.05$), with genotypes *CMSXS5027* (7.90 ± 0.87 days) and *CMSXS5037* (6.95 ± 0.93 days) exhibiting the longest durations, while *CMSXS5039* (3.90 ± 1.06 days) and *CMSXS5043* (4.20 ± 0.46 days) showed the shortest.

Table 1. Biological data (mean ± standard error) of *Melanaphis sorghi* in sorghum genotypes

Hybrid	Pre-Reproductive Period (days)	Reproductive Period (days)	Post-Reproductive Period (days)	Longevity (days)	Fecundity (Nymphs/Female)	Daily Nymph Production
CMSXS5027	5.32±0.17a	7.90±0.87a	0.74±0.23ab	13.95±0.98a	32.58±3.57a	4.34±0.28 a
CMSXS5029	5.13±0.09a	6.13±0.85ab	0.13±0.09ab	11.38±0.90abc	26.88±3.91a	4.17±0.38 a
CMSXS5035	5.08±0.05a	4.50±0.63b	0.23±0.12ab	9.81±0.68bc	21.88±3.46a	4.57±0.42 a
CMSXS5037	5.26±0.10a	6.95±0.93ab	0.95±0.47a	13.16±1.19ab	34.68±5.43a	4.49±0.46 a
CMSXS5039	5.20±0.13a	3.90±1.06b	0.40±0.31ab	9.50±1.09c	17.10±5.57a	3.57±0.55 a
CMSXS5041	5.24±0.09a	6.14±0.60ab	0.45±0.23ab	11.83±0.71abc	29.93±3.10a	4.78±0.27 a
CMSXS5043	5.30±0.12a	4.20±0.46b	0.10±0.07b	9.60±0.47c	19.37±2.42a	4.52±0.35 a
CMSXS5045	5.11±0.08 a	4.78±0.74b	0.28±0.14ab	10.17±0.85bc	20.39±37.71a	4.10±0.46 a
202224B017	5.08±0.04a	5.36±0.46ab	0.10±0.07b	10.54±0.48bc	29.82±2.60a	5.56±0.34 a
2022224B018	5.00±0.00a	4.00±0.44b	0.16±0.08ab	9.16±0.43c	19.87±2.46a	4.75±0.37 a

* Means separated by the Tukey's test at 5% probability. Means followed by the same lowercase letter within a column do not differ significantly.

The post-reproductive period was generally brief, ranging from 0.10 ± 0.07 days (*CMSXS5043*) to 0.95 ± 0.47 days (*CMSXS5037*), with no significant differences among most genotypes ($P > 0.05$), except for *CMSXS5037*, which had a significantly longer period compared to *CMSXS5043* ($P < 0.05$). Aphid longevity also differed significantly ($P < 0.05$), with *CMSXS5027* (13.95 ± 0.98 days) and *CMSXS5037* (13.16 ± 1.19 days) supporting the longest survival, while *CMSXS5039* (9.50 ± 1.09 days) and *CMSXS5043* (9.60 ± 0.47 days) resulted in the shortest.

Fecundity and daily nymph production showed no significant differences among genotypes ($P > 0.05$), with values ranging from 17.10 ± 5.57 nymphs/female (*CMSXS5039*) to 34.68 ± 5.43 nymphs/female (*CMSXS5037*) and from 3.57 ± 0.55 nymphs/day (*CMSXS5039*) to 5.56 ± 0.34 nymphs/day (*202224B017*), respectively. Life table parameters of *M. sorghi* were also analyzed (Table 2). The net reproductive rate (R_0) varied significantly among genotypes ($P < 0.05$), with *202224B017* showing the highest value (18.92 ± 0.48 females) and *CMSXS5039* the lowest (2.34 ± 0.08 females). The mean generation time (T) ranged from 6.90 ± 0.31 days (*202224B018*) to 8.80 ± 0.02 days (*CMSXS5027*), with significant differences ($P < 0.05$). The intrinsic rate of increase (R_m) varied from 0.11 ± 0.00 females/day (*CMSXS5039*) to 0.40 ± 0.00 females/day (*202224B017*), with no significant differences among most genotypes ($P > 0.05$). The finite rate of increase (λ) ranged from 1.12 ± 0.01 (*CMSXS5039*) to 1.49 ± 0.00 (*202224B017*), showing significant differences ($P < 0.05$). The population doubling time (DT) varied from 1.74 ± 0.01 days (*202224B017*) to 6.11 ± 0.27 days (*CMSXS5039*), indicating that *202224B017* provided the most favorable conditions for aphid population growth, while *CMSXS5039* exhibited greater resistance.

Table 2. Life Table Parameters - R0 - Reproduction Rate (Females), T - Generation Interval (days), - Rm - Intrinsic Growth Rate (Females/day), - λ - Finite Rate of Increase, - TD - Time to Double the Population (Days) of *Melanaphis sorghi*

Hybrid	*Ro* (female)	*T* (days)	*Rm* (female/day)	*Λ* (female/female/day)	*DT* (days)
CMSXS5027	10.66±0.07c	8.80±0.02a	0.27±0.00a	1.31±0.00a	2.58±0.00b
CMSXS5029	9.71±0.42cd	7.87±0.47ab	0.29±0.00a	1.33±0.00a	2.40±0.01b
CMSXS5035	9.03±0.36d	7.17±0.40b	0.31±0.00a	1.36±0.00a	2.26±0.01b
CMSXS5037	10.81±0.59c	8.56±0.65a	0.28±0.00a	1.32±0.00a	2.49±0.01b
CMSXS5039	2.34±0.08f	7.49±0.03b	0.11±0.00a	1.12±0.01a	6.11±0.27a
CMSXS5041	15.76±0.56b	8.12±0.28a	0.34±0.01a	1.40±0.05a	2.04±0.07b
CMSXS5043	9.67±0.32d	7.06±0.23b	0.32±0.01a	1.38±0.05a	2.16±0.07b

CMSXS5045	5.66±0.06 e	7.14±0.01b	0.24±0.00a	1.27±0.00a	2.85±0.02b
202224B017	18.92±0.48a	7.39±0.26b	0.40±0.00a	1.49±0.00a	1.74±0.01a
2022224B018	9.68±0.31cd	6.90±0.31b	0.33±0.00a	1.39±0.00a	2.11±0.01b

* Means separated by the student's t-test at 5% probability. Means followed by the same lowercase letter within a column do not differ significantly.

The proportion of surviving nymphs was also evaluated, with genotypes grouped according to Pearson's chi-square test ($P < 0.05$) (Table 3). Genotype *202224B017* had the highest survival proportion (0.78) and was classified in Group A, whereas *CMSXS5039* showed the lowest (0.20) and was placed in Group D. Genotypes *202224B018* (0.62), *CMSXS5043* (0.60), *CMSXS5041* (0.58), *CMSXS5035* (0.52), and *CMSXS5029* (0.48) were grouped in Group B, while *CMSXS5027* (0.38), *CMSXS5037* (0.38), and *CMSXS5045* (0.36) were assigned to Group C. These results indicate that *202224B017* was the most susceptible to aphids, while *CMSXS5039* demonstrated the highest resistance.

Table 3. Survival Proportion of *Melanaphis sorghi* Nymphs, with Genotypes Grouped According to Pearson's Chi-Square Test Results

Hybrid	Survivor Ratio	Statistical Grouping
202224B017	0.78	a
2022224B018	0.62	b
CMSXS5043	0.60	b
CMSXS5041	0.58	b
CMSXS5035	0.52	b
CMSXS5029	0.48	b
CMSXS5027	0.38	c
CMSXS5037	0.38	c
CMSXS5045	0.36	c
CMSXS5039	0.20	d

Cox regression analysis (Table 4) was used to assess *M. sorghi* mortality across genotypes. Genotype *CMSXS5039* had the highest hazard ratio (HR = 1.9894; 95% CI: 0.8901–4.446), suggesting approximately double the mortality risk, though without statistical significance ($P > 0.05$). Conversely, *CMSXS5037* showed an HR below 1 (HR = 0.6656; 95% CI: 0.3238–1.368), indicating reduced mortality risk, also non-significant ($P > 0.05$). The remaining genotypes had HRs close to 1, with no significant differences ($P > 0.05$), suggesting that genotype did not significantly influence aphid mortality (Figures 1 and 2).

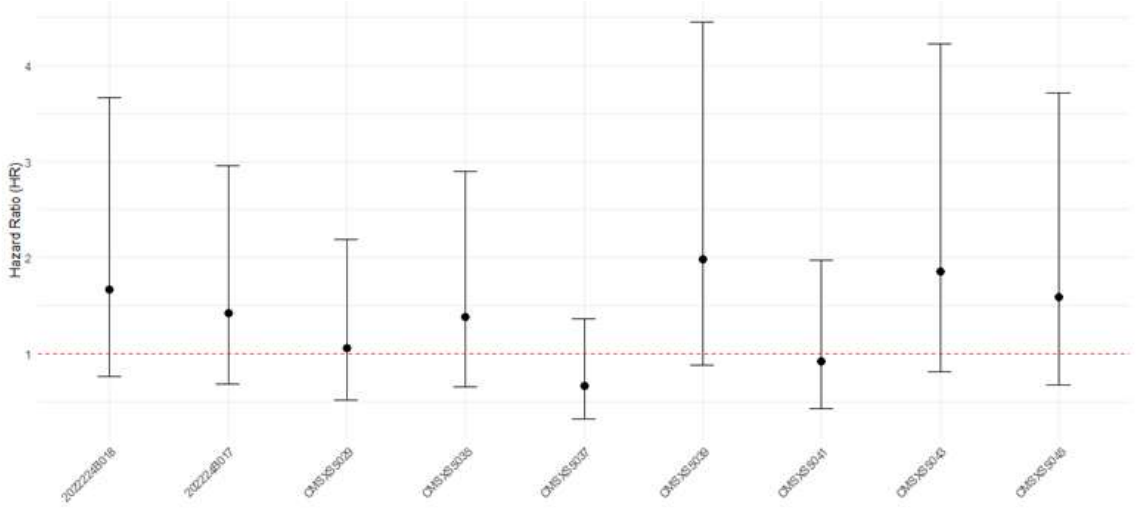

Figure 1. Hazard Ratios (HR) with 95% confidence intervals for *Melanaphis sorghi* mortality across sweet sorghum hybrids. HR values above 1 indicate increased mortality risk, while values below 1 suggest reduced risk. Horizontal bars represent confidence intervals.

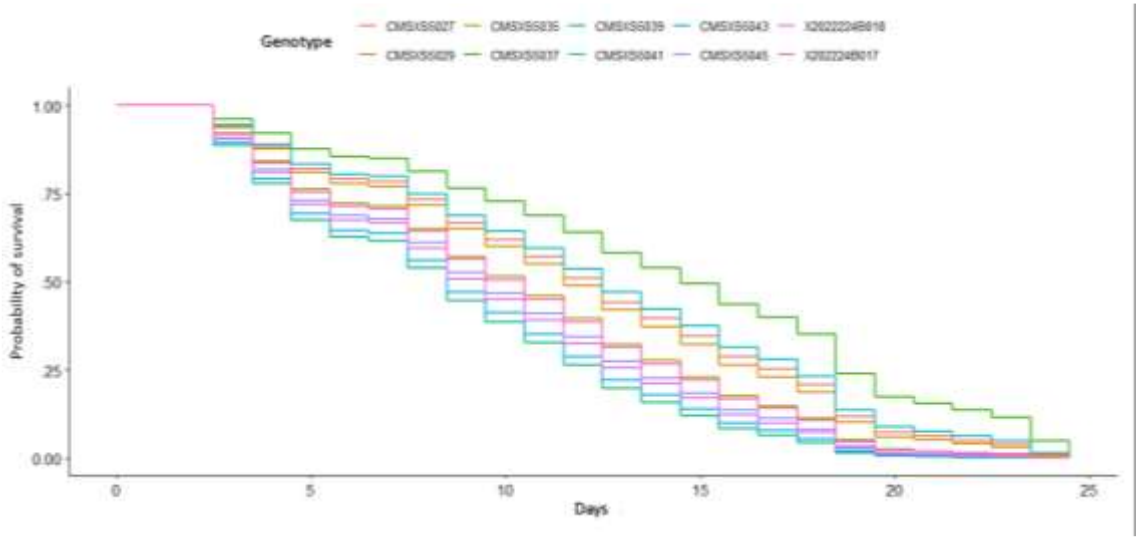

Figure 2. Kaplan-Meier survival curves for *Melanaphis sorghi* across different sweet sorghum genotypes. The vertical axis represents the survival proportion, while the horizontal axis indicates time (in days). The curves demonstrate survival variation over time for each evaluated genotype.

The fertility of *M. sorghi* over time was also analyzed (Figure 3). Genotype *202224B017* exhibited the highest fertility, reaching the highest peaks in nymph production per female. In contrast, *CMSXS5039* and *CMSXS5045* showed the lowest fertility rates. The other genotypes (*CMSXS5041*, *CMSXS5027*, *CMSXS5035*, *CMSXS5043*, *202224B018*, *CMSXS5029*, and *CMSXS5037*) displayed intermediate fertility levels.

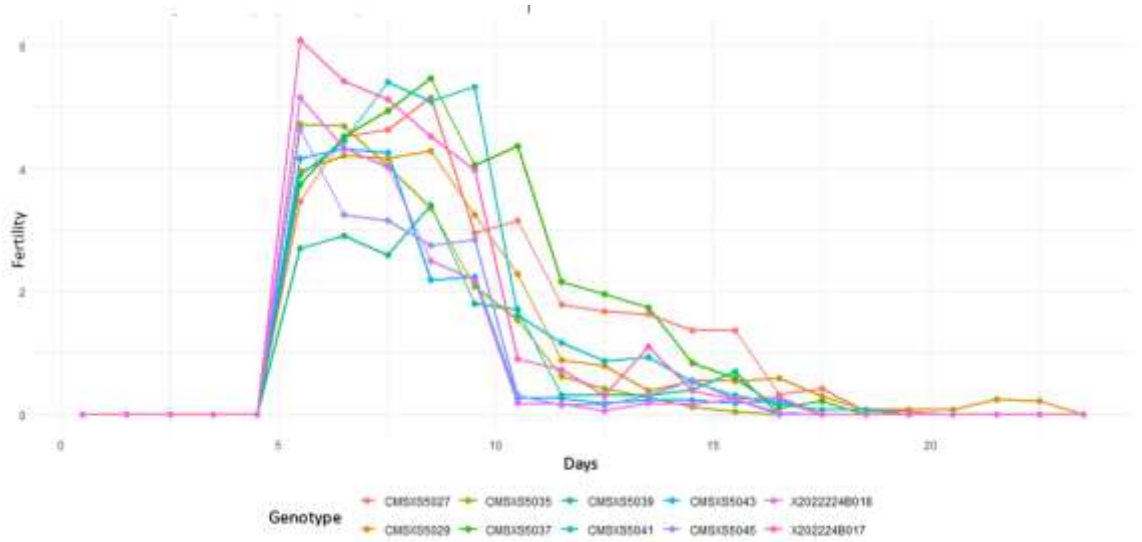

Figure 3. Fertility curve of *Melanaphis sorghi* over time across different sweet sorghum genotypes. The vertical axis represents nymph production (fertility), and the horizontal axis indicates time (in days). The curves illustrate fertility variation throughout the reproductive period for each evaluated genotype. Genotypes are represented by distinct colors or patterns to facilitate comparison.

All genotypes reached peak fertility between the 6th and 9th day of the aphid's life. After the 10th day, fertility declined considerably, and by the 15th day, nymph production was minimal, remaining at low levels until the end of the evaluation period.

DISCUSSION

The results of this study demonstrate that sorghum genotypes significantly influence the biology of *M. sorghi*, supporting previous research highlighting genetic variability as a critical factor in plant susceptibility or resistance to pests. The genotype *202224B017* emerged as the most susceptible, exhibiting high values of R_0, R_m, and DT. These findings align with studies linking susceptible genotypes to enhanced aphid development and reproduction. For instance, Zhu et al. (2023) observed that susceptible alfalfa cultivars hosting *Therioaphis trifolii* (Monell, 1882) (Hemiptera: Aphididae) supported significantly larger aphid populations compared to resistant cultivars, which upregulate defensive compounds. The susceptibility of *202224B017* may be attributed to physiological or biochemical traits, such as higher nutrient content or lower production of defensive metabolites (Kumaraswamy & Huang, 2024; Wu et al., 2025; Zhang et al., 2024).

Doubling time (*DT*) is among the most critical parameters for managing *M. sorghi*, as it directly reflects the pest's population growth potential and consequent crop damage. Certain cultivars exhibit varying levels of aphid resistance, which directly influence population growth rates. For example, Gordy et al. (2021) demonstrated in field trials that partially resistant sorghum genotypes (*M. sacchari/sorghi*) had significantly longer *DT* compared to susceptible ones, resulting in lower yield losses. This underscores the importance of selecting cultivars with higher *DT* to reduce pest pressure and minimize economic losses. Additionally, Neupane et al. (2020) emphasized that plant developmental stage and varietal resistance are key factors affecting *DT*, with resistant genotypes significantly delaying aphid population growth. This is particularly

relevant for sweet sorghum; whose tall stature limits effective spray-based pest control in advanced growth stages. Genotypes like *CMSXS5039*, with higher *DT*, may provide a broader management window, reducing pest pressure and facilitating field control.

In contrast, *CMSXS5039* was the most resistant genotype, showing the lowest R_0, R_m, and survivor proportions, along with significantly reduced fertility. These results agree with studies identifying aphid-resistant sorghum genotypes. Compounds such as tannins may be toxic to aphids, disrupting their digestive processes and reducing survival rates (Farhan et al., 2024). Tannins interfere with aphid feeding behavior, limiting nutrient uptake and consequently impairing growth and reproduction (Farhan et al., 2024).

Furthermore, tannins trigger complex signaling pathways in plants that activate additional defense mechanisms, thereby enhancing resistance to aphid infestation (Kumaraswamy & Huang, 2024). Affect aphid biology by impairing reproductive success and survival (Chandrakumara et al., 2024). Similarly, tannic acid, a secondary metabolite in alfalfa, has shown direct gastric toxicity against *T. trifolii*, inhibiting growth and fecundity (Zu et al., 2025). The resistance of CMSXS5039 likely involves analogous mechanisms that compromise aphid feeding and development. The resistance of *CMSXS5039* could stem from similar mechanisms that impair aphid feeding and development.

Cox regression survival analysis indicated that genotypes did not significantly influence aphid mortality. However, the lower survival rate in CMSXS5039 suggests possible antibiosis resistance, a mechanism also reported in other plant-insect interactions (Zhang et al., 2024; Kumaraswamy & Huang, 2024). *Fertility* of *M. sorghi* varied among genotypes, with *202224B017* producing the most nymphs and *CMSXS5039* the fewest. These findings are consistent with studies that link aphid fertility to the nutritional quality of host plants. For example, pea aphids (*Acyrthosiphon pisum*) exhibit higher fecundity on nutrient-rich hosts like *Vicia faba* compared to less suitable plants (Liu et al., 2023). The lower fertility on *CMSXS5039* may result from nutritional deficiencies or defensive compounds limiting aphid development (Wang et al., 2024).

The *pre-reproductive period* did not differ significantly among genotypes, suggesting similar initial developmental conditions for aphids (Tora et al., 2023). However, the *reproductive period* varied markedly, with *CMSXS5027* and *CMSXS5037* showing the longest durations, likely due to lower fiber content, better nutritional quality, or fewer defensive compounds. Conversely, genotypes like *CMSXS5039* and *CMSXS5043* had shorter reproductive periods, possibly due to higher fiber content and secondary metabolites (e.g., alkaloids, terpenoids, phenolics) with antifeedant or insecticidal properties (Farhan et al., 2024).

Aphid longevity also differed significantly, being highest on *CMSXS5027* and *CMSXS5037*, indicating these genotypes are more favorable for pest survival, potentially due to lower fiber content. Time-dependent fertility data further confirmed that *202224B017* provides optimal conditions for aphid reproduction, while *CMSXS5039* and *CMSXS5045*, with higher fiber content, are less suitable hosts. These findings are critical for integrated pest management (IPM) programs, suggesting that resistant genotypes like *CMSXS5039* can be deployed in varietal resistance strategies against *M. sorghi*. The observed resistance may also be leveraged in breeding programs to develop aphid-resistant sorghum varieties.

CONCLUSION

The results of this study demonstrate that sorghum genotypes significantly influence the biology of M. sorghi. The genotype 202224B017 proved to be the most susceptible, exhibiting the highest values of net reproductive rate (R_0), intrinsic rate of increase (R_m), finite rate of increase (λ), and proportion of surviving nymphs, along with the shortest population doubling time (DT). In contrast, the genotype CMSXS5039 emerged as the most resistant, displaying the lowest values for these parameters and the lowest fertility,

suggesting its potential as a promising option for aphid management. The remaining genotypes exhibited intermediate performance, with no significant differences in fecundity or daily nymph production.

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CONTRIBUTION
D. G. dos Santos: investigation (equal); methodology (equal); original draft writing (equal). S. M. Martins: methodology (equal); funding acquisition (equal); project and lab administration (equal); resources (equal); writing and editing (equal). G. S. de Avellar: methodology (equal), N. C. R. Damasceno: methodology (equal). B. L. S. Silva: methodology (equal). N. M. dos Santos: methodology (equal). K. A. S. Rezende: methodology (equal). A. C. M. Redoan: methodology (equal). R. A. C. Parrella: critical writing, review, and editing (equal).

CONFLICT OF INTEREST
The authors declare no conflict of interest.

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