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Life Table, Host Selection Behavior and Biochemical Aspects of Fall Armyworm, *Spodoptera frugiperda* (J. E. Smith) Reared on Various Host Plants on Laboratory

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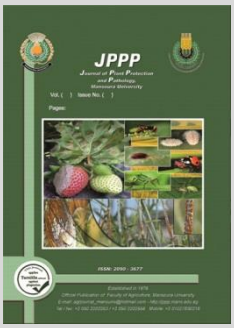

ABSTRACT

Spodoptera frugiperda (J.E.Smith) (fall armyworm), is very serious pest in Americas and has newly be an invasive pest in Africa. Exhaustive register of *S. frugiperda*'s plant of hosts is major to better understand the biology of this pest and develop Integrated Pest Management programmes. Impact of various plant of hosts on food consumption,host preference and several biological side,determine total protein,carbohydrate and lipid for third instar larvae of *S. frugiperda* were executed on laboratory. Outcome indicated that, larvae fed on leaves of maize, rice and artificial diets had the fastest larval and pupal development cycle. While those fed on pea and tomato had the longest one. In case of moth emerging from larvae fed on maize showed longest life span. But moths producing from larvae fed on leaves of tomato had the shortest life span. Obtained results revealed that, female moths produced from larvae fed on maize, rice and artificial diet laid the highest number of eggs,but female producing from larvae fed on tomato leaves produced the least number of eggs. Otherwise,the highest mean larval consumption for maize and wheat. While,larvae fed on leaves of tomato showed lowest mean consumption. Results reported that, total protein,carbohydrate and lipid were higher in the haemolymph of 3rd instar larvae of *S. frugiperda* reared on maize, wheat and rice leaves. Meanwhile, tomato and cucumber were present at a low value level. Studies showed that,maize was the preferred host for *S. frugiperda*,but may be also,successfully reared on another plants especially in absence of the main host.

Keywords: Fall armyworm *Spodoptera frugiperda*, biology, feeding preference, food consumption, biochemical aspects.

INTRODUCTION

Fall armyworm (FAW), *Spodoptera frugiperda* (Lepidoptera: Noctuidae) (J.E. Smith), is a master polyphagous pest with the potential to industriously damage different yield. For its wide host range, *S. frugiperda* is 1 of master attacker pests with greedy feeding behavior attacking yearly yield in tropical regions. *S. frugiperda* feed on a range of plant species, but may prefer on one particular host plant or a limited number of plant species (Guo *et al*., 2021). FAW was first found in America and is considered one of most widespread pests of maize in North and South America (Todd and Poole, 1980). In Africa, (Sisay *et al*., 2018) had the first report in 2016 about the invasive pest *S. frugiperda*.

Symptoms of damage start with larval stage making various sizes of papery windows in leaves causing extensive defoliation of plants, and the occurrence of faecal materials causing a passive effect on the later growth stage and the development of plants (Reddy, 2019). This insect has marching behavior like to that of an army leading to havoc loss to yields that come in its way (FAO, 2019).

We can describe the host selection as a chain of decisions that lead the insect to accept or reject the plant as a host (Rausher 1983). The selection of any plant as a host can be divided into the 'host plant finding' and 'host plant acceptance' phases (Finch and Collier 2012). Qualifying as a host plant depends on the acceptance of larvae for the plant as a host and the ability of fully develop on the plant when it's used as a food source (Henniges-Janssen *et al*., 2014). Difference and variation of host plant species has an obvious effect on the development and survival of FAW larvae. Continuity of the pest throughout the year depends on an affect by the difference species of host plants (Sharanabasappa *et al*., 2018). Very proper host can be applied as a withdrawal crop (trap crop) and repellent crop or the lower preference crop can be applied as an aggression or repellent crop. Occasionally, the deployment of flowering push or withdrawal crops can share the nectar, alternative food, pollen or shelter to the pests natural enemies (González-Chang *et al.*, 2019) and upgrade conservation biological control (Tiwari, Sharma & Wratten, 2020). So, this host preference study pillars understanding the pest's biology and ecology as well as helps to screen or rank the potential trap or repellent crops. This information's are useful to develop an integrated pest management protocol for various categories of pests inclusive fall armyworm.

This study was to determine larval and pupal longevity, longevity of adults (female and male), food oviposition preference, mean of the female fecundity on tested host plants and artificial diet, likewise, food consumption and weight gained of *Spodoptera frugiperda* resulting from larvae feeding on different plants (maize, rice, pea and tomato) and artificial diet under laboratory conditions. It was also appreciated total proteins, carbohydrates and lipids contents on third instar larvae of *S. frugiperda* feed on various yields.

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MATERIALS AND METHODS

1.Insect pest collection and rearing:

Population (eggs and larvae)of *Spodoptera frugiperda* was initially collected from maize fields of Agriculture, Benha University. These insects had been fed on a fresh castor leaves for 3 generations in laboratory of Plant Protection Dept. Fac. of Agri., Benha Univ. Larvae were reared under controlled conditions of 25 ± 1 °C, 60% ± 5% relative humidity (R.H.) in plastic box (34 x 28 x 7 cm). Newly larvae fed on castor bean leaves till pupation. Resultant pupae were collect and put in wide clean jars with saw dust as the medium for pupation till adult's emergence. Thereafter emerged adults were provided with a piece of cotton wetted with 10% sugar solution and branches of tafla (*Nerium oleander*) for oviposition. Egg masses which lay by females collected daily and transferred into the rearing jars Fig. (1).

Fig. 1. Stages of Spodoptera frugiperda; (a) eggs, (b) egg starting to hatch (c) newly hatched larvae, (d) 1st instar larvae, (e) 2nd instar larva, (f) 3rd instar larva, (g) 4th instar larva, (h) 5th instar larva, (i) 6th instar larva (j) Prepupae, (k) pupae male, (l) pupae female, (m) adult of male and (n) adult of female.

2.Plants and artificial diet:

Plants leaves used in feeding larvae of *S. frugiperda*:

Larvae was fed on 4 yield leaves (maize (*Zea mays* L., Fam.: Poaceae), rice (*Oryza sativa* L., Fam.: Poaceae), pea (*Lathyrus oleraceus* Lam., Fam.: Fabaceae) and tomato (*Solanum lycopersicum* L., Fam.: Solanaceae).

Preparation of artificial diet:

Specification of the installation of artificial diets is indicated in Table (1). Ingredients of artificial diet mixed together and artificial diet was diluted with distilled water, then mixture was poured into sterilized plastic container (21cm in length x15wide x10in height) and allow cooling.

Table 1. Installation of artificial diet for *S. frugiperda:*

Ingredient	Amount
Bean powder	62.5 g
Corn flower	50 g
Maize leaf powder	25 g
Milk powder	20 g
Ascorbic acid	3.0 g
Sorbic acid	1.0 g
Powder yeast	10.0 g
Agar	11.5 g
Multivitamin solution	7.0 ml
Formaldehyde (40%)	5.0 ml
Distilled water	500

Diet was refrigerated at room temperature till use after solidifying. Diet was removed from fridge and conditioned at room temperature for 2-3h before use. Solidified diet was cut into pieces of 2g and transferred to sterilized plastic cups for larval feeding.

3.Experimental design of biological studies:

Newly hatched larvae were placed individually in a plastic cups, which were wrapped with a mesh screen for aeration. Three replicates were conducted in various treatments. Thirty larvae were put in each replicate. Severally individual larva from the first to third instars were left with food in a well of a 30 well plate, and each larva from fourth to sixth instars was left in plastic cup (2.5cm in diameter, 4cm in height). The number of leaf disks provided to each larva depended on larval age and type of host plant. Survival and development time of each larval stage were recorded daily. Newly emerged females were individually paired with young males recruited from colony in glass chambers (8cm in diameter, 12cm in height) wrapped with a fine mesh for ventilation. These pairs were fed on a mixture of 10% sugar solution. Then emerged adults were supplied with a piece of cotton wetted with10% sugar solution and branches of tafla (*Nerium oleander*) for oviposition. Number of egg masses laid by each female was recorded daily until the females died. Egg masses were individually transferred to plastic cups, and number of neonates hatched from each egg mass was recorded. Fecundity, survivorship, female longevity and oviposition period were determined. (Guo *et al*., 2021).

4.Food preference test:

Feeding preference of 3rd instar larvae to selected host plants

In this test leaf discs (diameter 2cm) from each host were kept inside plastic container (24cm×12cm×7cm) to keep freshness, wetted tissue papers were laid on bottom of plastic container. In the center of plastic box hundred 3rd instar larvae were released on eight host plants (maize, wheat, rice, tomato, pea, spinach, cucumber and castor) leaves with equal weights. Number of attracted larvae on each host plants were counted and recorded after 15, 30, 45 and 60 minutes.

This experiment was replicated 3 times on each host plant. (Botton, *et al.,* 1998).

5.Food consumption and weight gained:

Newly molted 3rd larval instar was placed individually on plastic cups and provided with 2g of each host plant leaves. The larvae were weighted before feeding and after 24 hours of feeding. Also, the consumed of leaves was estimated. The experiment was replicated 10 times on each host plant.

6.Effect of various plant of host on biochemical aspects of third instar larvae of *S. frugiperda*:

To evaluate the efficiency of biochemical aspects of the eight previous host plants, the newly hatched larvae per each host fed on different host plants until third instar larvae. Twenty 3rd instar larvae per each host plants separated into three replicates in glass jars wrapped with muslins. After 24 hours of feeding larvae weighted (1gm) from each trail. Samples were homogenized in distilled water using a Teflon homogenizer. Homogenates were centrifuged at 500r.p.m for 10minutes at 5°c. Supernatants were immediately assayed to determine total proteins, total carbohydrates and total lipids.

Total proteins were determined according to (Bradford, 1976).

Total carbohydrates were determined according (Dubois, *et al.,* 1956). Total lipids were determined according to (Knight, *etal.,* 1972).

7.Statistical Analysis:

Mortality percentages were corrected by Abbott's formula (1925) and Duncan's (1955) range test was adapted to variation between treatments. Dosage mortality response was determined by Probit analysis (Finney, 1971) using a computer program of Noack and Reichmuth (1978). Data are presented as the mean ± standard error (SE) and were analyzed using Student's t-test between treatments and control.

RESULTS AND DISCUSSION

1.The effect of feeding larvae of *S. frugiperda* on four plant leaves and one artificial diet on life stages:

The effect of feeding larvae of *S. frugiperda* on four plant leaves (maize, rice, pea and tomato) and artificial diet on life stages showed in Table (2). It turns out that larval life span stage from the first to sixth instars faster when that fed on maize (16.02 days) than on artificial diet, rice, pea and tomato (19.05, 22.17, 28.34 and 32.76 days), respectively. The experiment of biology started with (90 larvae) and we found that larvae were fed on maize were records (88) which was the highest number of larvae during the larvae stage and the larvae were fed on tomato were records (67) which was the lowest number of larvae during the larvae stage.

The prepupal and pupa stages were the shortest for the larvae fed on maize (2.27 and 6.65 days), respectively, followed by it fed on artificial diet was (3.91 and 7.42 days), respectively. While the prepupal and pupa stages were the longest for the larvae fed on tomato (5.00 and 10.66 days), respectively.

The longest means of longevities (8.16 days for males and 9.25 days for females) were obtained with adults who emerged from larvae fed on maize. At same time, adults who emerged from larvae fed on tomato the shortest means of longevities (3.73 days for males and 5.54 days for females). The mean laid eggs was affected significantly by food type during larval stage, being 665egg/♀ for maize leaves, 597egg/♀ for rice leaves, 444egg/♀ for artificial diet leaves, 266egg/♀ for pea leaves and 177egg/♀ for tomato leaves.

The data in the same table indicated female who emerged from larvae fed on maize increased that, the fecundity, was recorded 665 eggs/ female, 646.67 hatched eggs and 97.24% hatchability compared with rice, pea, tomato and artificial diet.

In general, the feeding with maize plant recorded the shortest larval life span stage from the first to the sixth instar, prepupal stage, pupal stage, adult longevity (♀ & ♂), mean fecundity (no. of eggs, hatched eggs and hatchability %). We detected considerable differences in survival and developmental times of the laboratory reared FAW on four plant leaves (maize, rice, pea and tomato) and artificial diet. The development of insects consist on quality of the food consumed in the first little instars, maybe may vary according to the host (Barros *et al.,* 2010). Results indicated that maize leaves could be considered as a more favorable food material to rearing of *S. frugiperda.* These results agree with findings by Gamil 2020, Guo *et al.,* 2021 and Maha *et al.*, 2024.

Also, artificial diet can be considered a suitable food source to *S. frugiperda* larvae as it, successfully, complete their life on it and succeeded in laying fertile eggs (87.38% hatchability). It can also be arranged favorable food material to rearing of *S. frugiperda*, as follows: maize, artificial diet, rice, pea and tomato.

Given that *S. frugiperda* is competent of completing its whole life history on rice, pea and tomato, it attend hazard to rice, pea and tomato yield.

Table 2. Effect of different hosts on biological of FAW:

Stage		Maize		Rice		pea		Tomato		Artificial diet		LSD at 0.05
		n.	Mean duration (days) ± S E	n.	Mean duration (days) ± S E	n.	Mean duration (days) ± S E	n.	Mean duration (days)± S E	n.	Mean duration (days)± S E	
Larvae (instars)	1st	90	2.15±0.25^{C}	90	2.93±0.09^{BC}	90	4.20±0.16^{A}	90	3.25±0.50^{B}	90	2.18±0.27^{C}	0.91
	2nd	90	2.35±0.31^{C}	89	3.66±0.06^{B}	87	4.52±0.18^{A}	83	4.10±0.06^{AB}	88	3.62±0.05^{B}	0.52
	3rd	89	2.09±0.27^{C}	87	3.20±0.16^{B}	84	4.50±0.17^{A}	80	4.69±0.13^{A}	85	3.62±0.07^{B}	0.54
	4th	88	2.35±0.36^{C}	85	3.20±0.16^{BC}	81	4.80±0.10^{A}	77	5.67±0.06^{A}	83	3.48±0.60^{B}	1.02
	5th	88	2.44±0.17^{D}	82	3.48±0.60^{C}	76	5.12±0.16B	72	6.75±0.41^{A}	82	3.22±0.01^{CD}	1.07
	6th	88	4.63±0.56^{B}	80	5.70±0.59^{B}	73	4.20±0.16^{A}	67	8.29±0.22^{A}	80	2.93±0.09^{C}	1.25
Total larvae			16.02±0.78^{E}		22.17±0.78^{C}		28.34±0.24^{B}		32.76±0.10^{A}		19.05±0.90^{D}	2.04
Prepupa		88	2.27±0.11^{C}	78	4.43±0.31^{AB}	72	4.57±0.32^{AB}	64	5.00±0.00^{A}	80	3.91±0.20^{B}	0.7
Pupa		88	6.65±0.39^{C}	75	8.72±0.23^{B}	70	9.00±0.00^{B}	60	10.66±0.36^{A}	79	7.42±0.36^{C}	0.95
Adult longevity	Female	55	9.25±0.16^{A}	43	7.72±0.08^{B}	47	5.63±0.27^{D}	41	5.54±0.28^{D}	46	6.62±0.30^{C}	0.74
	Male	33	8.16±0.27^{A}	32	6.89±0.52^{B}	23	4.43±0.31^{C}	19	3.73±0.05^{C}	33	5.93±0.38^{B}	1.08
Mean fecundity (female)	No. of eggs		665±12.58^{A}		597±1.00^{B}		266±14.8^{D}		177±6.66^{E}		444±4.62^{C}	29.69
	Hatched eggs		646.67±3.67^{A}		543.00±2.52^{B}		210±0.00^{D}		90±4.16^{E}		388±0.00^{C}	8.58
	Hatchability%		97.24^{A}		90.95^{B}		78.94^{D}		50.84^{E}		87.38^{C}	1.68

A, B & C: There is no significant difference (P>0.05) between any two means, within the same row have the same superscript letter.

2.Feeding preference of 3rd instar larvae to selected host plants:

Selected host plants:

From table (3) third instar larvae were more attracted to maize (9.0 larvae) and wheat (8.0 larvae) after 15 min. of release, while tomato was the last attractive food source (2.0 larvae). On the other hand, after 30 minutes, (13.0 larvae) settled on maize seedlings and exhibited an equal feeding preference for wheat and rice (10.0 larva), then tomato leaves (5.0 larva) was recorded the lowest rate. After 45 minutes of release the highest count of larvae were on maize (16.0 larva), wheat (15.0 larva), rice and spinach (13.0 larva) Finally, the lowest attraction to leaves of tomato (7.0 larva). However, after 60 minutes the higher attraction on maize seedlings (20.0 larva) followed by wheat (16.0 larva), pea (11.0 larva), castor (10.0 larva), cucumber (9.0 larva) and the lowest rate was recorded on tomato (7.0 larva). These results indicated that, higher attraction was noticed to leaves of maize and wheat more than other host plants. While tomato leaves recorded the lowest attraction.

3.Food consumption and larval weight gain after 24 hours of feeding:

In table (4) after introducing two grams of each host separately for one 3rd instar larva, the highest food consumption of food from different hosts was (0.97g) for maize seedlings, followed by wheat seedlings (0.71g) while, the lowest feeding amount was recorded (0.29 g) in case of tomato comparing with other host plants (rice, spinach, cucumber, pea and castor).

On the other hand, larval weight gain rate could be arranged descendingly after feeding on each of the eight tested host plants as 0.067, 0.067, 0.059, 0.025, 0.054, 0.030, 0.044 and 0.035g after feeding on maize, wheat, rice, tomato, spinach, cucumber, pea and castor, respectively.

Finally, these results concluded that, maize and wheat seedling recorded the highest hosts for food consumption and increasing weight of 3rd instar larvae of *S. frugiperda*.

Table 3. Mean number of 3rd instar larvae of *S. frugiperda* reared on various host plant after 60 minutes under laboratory conditions.

Host plants	Mean number of larvae ± SE			
	After 15 min. exposure	After 30 min. exposure	After 45 min. exposure	After 60 min. exposure
Maize	9.0 ± 0.61	13.0 ± 1.32	16.0 ± 0.38	20.0 ± 0.39
Wheat	8.0 ± 0.72	10.0 ± 0.55	15.0 ± 0.65	16.0 ± 0.32
Rice	7.0 ± 0.63	10.0 ± 0.26	13.0 ± 0.30	14.0 ± 0.19
Tomato	2.0 ± 0.76	5.0 ± 0.30	7.0 ± 0.31	7.0 ± 0.22
Spinach	6.0 ± 0.46	9.0 ± 1.39	13.0 ± 0.20	13.0 ± 0.23
Cucumber	3.0 ± 0.94	6.0 ± 0.32	8.0 ± 0.36	9.0 ± 0.21
Pea	5.0 ± 0.50	8.0 ± 0.14	11.0 ± 0.54	11.0 ± 0.33
Castor	4.0 ± 0.59	7.0 ± 0.16	10.0 ± 0.37	10.0 ± 0.27

Table 4. Food consumption and larval weight of *S. frugiperda* 3rd instar larvae on different host plants after 24 hrs. under laboratory conditions

Host plants	Food consumption (g) after 24h.	Initial weight of larvae (g)	Final larval weight (g) after 24h of feeding
Maize	0.97 ± 0.56	0.033 ± 0.013	0.067 ± 0.011
Wheat	0.71 ± 0.38	0.024 ± 0.003	0.067 ± 0.008
Rice	0.48 ± 0.31	0.018 ± 0.003	0.059 ± 0.005
Tomato	0.29 ± 0.20	0.014 ± 0.005	0.025 ± 0.004
Spinach	0.93 ± 0.37	0.021 ± 0.009	0.054 ± 0.015
Cucumber	0.33 ± 0.30	0.010 ± 0.004	0.030 ± 0.007
Pea	0.36 ± 0.36	0.014 ± 0.005	0.044 ± 0.013
Castor	0.36 ± 0.39	0.013 ± .004	0.035 ± 0.010

4.Effect of different host plants on total proteins, carbohydrates and lipids contents on 3rd instar larvae of *S. frugiperda*:

Found in table (5) only host plant maize give rise to raise in the total proteins of 3rd instar larvae of *S. frugiperda* than other tested host plants. The mean values of total proteins reached to (85.53, 79.26, 70.60, 47.84, 68.70, 50.20, 63.66 and 58.88 mg/g b.w) after feeding on maize, wheat, rice, tomato, spinach, cucumber, pea and castor.

Also, results in Table (5) revealed a high level of total carbohydrates in 3rd larval haemolymph of *S frugiperda* fed on maize, wheat and rice leaves, sequentially (13.31, 11.26 and 11.0 mg/ g. b.w) compared to spinach, cucumber, tomato, pea and eastor leaves 10.67, 9.0, 8.70, 10.14 and 9.63 mg/g b.w.

Table 5. Determination of total proteins, carbohydrates and lipids contents in haemolymph of 3rd instar larvae of *S. frugiperda* after feeding on different host plants.

Host plants	Total proteins (mg/g b.w) Mean ± S.E	Total carbohydrates (mg/g b.w) Mean ± S.E	Total lipids (mg/g b.w) Mean ± S.E
Maize	85.53 ± 0.39	13.31 ± 4.21	6.36 ± 0.02
Wheat	79.26 ± 1.72	11.26 ± 0.04	6.09 ± 0.07
Rice	70.60 ± 0.94	11.00 ± 0.06	5.74 ± 0.05
Tomato	47.84 ±	8.70 ± 0.36	2.62 ± 0.16
Spinach	68.70 ± 1.13	10.67 ± 0.64	4.33 ± 0.07
Cucumber	50.20 ± 0.17	9.0 ± 0.05	2.79 ± 0.33
Pea	63.66 ± 0.08	10.14 ± 0.07	3.69 ± 0.58
Castor	58.88 ± 0.04	9.63 ± 0.09	3.47 ± 0.67

At the same table, maize and wheat caused increase in total lipids contents of 3rd instar larvae of *S. frugiperda* than other host plants and a low level were detected in tomato leaves. The values of total lipids reached (6.63, 6.09, 5.74, 2.62, 4.33, 2.79, 3.67 and 3.47 mg/g b.w) after feeding with maize, wheat, rice, tomato, spinach, cucumber, pea and castor, respectively.

The feeding larvae of FAW on different host plants showed that maize and sorghum are the most preferred crops. (Nandhimi *etal.*, 2022; Birhanu *et al.*, 2023; Tiwari, 2022; Wijerathna *et al.*, 2021). Also, Hailu *et al.*, (2023) discovered that, maize, sorghum, swisschard, teff, elephant grass and cabbage were the most preferred hosts for larval feeding and development.

These results correspond with those of Goergen *et al.*, (2016) whoever specific maize was the highest performance host for larval feeding among the 3 crops, potato and tobacco.

Wu *et al*., (2021) revealed that larvae of *S. frugiperda* feeding and completed development on pepper and tomato plants. While, Praveen and Mallapur (2019) reported that, larvae of *S. frugiperda* feeding on maize and sorghum compared with other hosts. On the other hand, Nandhini *etal.*, (2023) found the highest larval survival (80%) on maize compared with other plants.

Nandhini *et al.*, (2024) studied preference for feeding including sorghum, maize, castor, banana, cotton, marigold and cowpea as hosts and mentioned that at 24 h after release the number of larva was greatest on maize and lowest on cotton leaves among the host plant tested.

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جدول الحياة والتفضيل العوائلى والجوانب البيوكيميائية لدودة الحشد الخريفية المرباه على عوائل نباتية مختلفة تحت الظروف المعملية

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الملخص

تعتبر دودة الحشد الخريفية *Spodoptera frugiperda* أكثر أهمية فى الامريكتين وقد أصبحت مؤخرا أفة غازية فى أفريقيا. يعد السجل التفصيلى للعوائل النباتية لدودة الحشد الخريفية أمرا ضروريا لفهم بيولوجيا هذه الأفة بشكل أفضل وكذلك لتطوير برامج المكافحة المتكاملة للأفات. فى تلك الدراسة المعملية تم دراسة تأثير العوائل النباتية المختلفة على معدل استهلاك الغذاء، التفضيل العوائلى وبعض الجوانب البيولوجية بالإضافة لتقدير محتوى البروتين، الكربوهيرات والليبيدات الكلية ليرقات العمر الثالث لدودة الحشد الخريفية تحت الظروف المعملية. أظهرت النتائج المعملية أن اليرقات التى تغذت على أوراق الذرة، الأرز والبيئة الصناعية أظهرت أقل مدة للطور اليرقى وكذلك قصر فترة عمر العذراء، بينما اليرقات التى تغذت على أوراق البسلة والطماطم أظهرت أكبر مدة للطور اليرقى وأيضا مدة طور العذراء. أوضحت الدراسة أن الذكور والأناث التى تخرج من يرقات تغذت على أوراق الذرة أعطت أطول مدة بقاء ولكن الحشرات الكاملة الناتجة من يرقات تغذت على أوراق الطماطم أقل مدة بقاء. أظهرت الدراسة أن الأناث الناتجة من يرقات تغذت على أوراق الذرة،الأرز والبيئة الصناعية وضعت أعلى عدد من البيض ولكن وضعت الأناث الناتجة من يرقات تغذت على أوراق الطماطم أقل عدد من البيض. بينت النتائج أن أعلى متوسط لاستهلاك الغذاء كانت لليرقات التى تغذت على أوراق الذرة والقمح بينما كان أقل متوسط لاستهلاك الغذاء لليرقات التى تغذت على أوراق الطماطم. من ناحية أخرى أشارت النتائج أن هناك ارتفاع فى محتوى البروتين، الكربوهيدرات والليبيدات الكلية ليرقات العمر الثالث التى تغذت على أوراق الذرة، القمح والأرزبالمقارنة بالتغذية على أوراق الخيار والطماطم التى أظهرت انخفاضا ملحوظا. أكدت الدراسة أن أوراق الذرة هى العائل المفضل لتغذية يرقات دودة الحشد الخريفية، ولكن يمكن تربيتها بنجاح أيضا على نباتات أخرى خاصة فى حالة غياب العائل الرئيسى.

الكلمات الدالة: دودة الحشد الخريفية ، بيولوجى الحشرة، التفضيل العوائلى، استهلاك الغذاء، الجوانب البيوكيميائية.