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FOOD PREFERENCE OF RED PUMPKIN BEETLE *RAPHIDOPALPA FOVEICOLLIS* (LUCAS) AND ESTIMATE OF PERCENTAGE OF ECONOMIC DAMAGE ON SOME DIFFERENT MELON VARIETIES

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Abstract

The study was conducted in the fields of the Faculty of Agriculture / University of Baghdad for the spring season 2014 to study two local varieties of melon (Spinal and pineapple), to find out the impact of the incidence of red beetle Lucas *Raphidopalpa foveicollis* and comparison between these varieties in appreciation the numerical density of this insect and the area of the plant leaf affected and the number The results of the study showed that the highest density of the insect on the two types of watermelon (pine and pineapple) was 40.5 and 32.5 insects / 18 plants respectively on 6 May and less number density on 8 July was 9.8 and 5.2 insect / 18 plants respectively, until the numerical density reached 0 and 0 insect / 18 plant respectively at the end of the season. And the paper area affected on the two types of watermelon had reached the highest paper area affected by the rate of 3 and 2 cm 2/6 leaves respectively on the twenty-seventh of May and the lowest area on the fifteenth of July and the rate of 1 and 0.7 cm 2/6 leaves respectively, At the rate of 0 and 0 cm 2/6 leaves respectively at the end of the season. The study showed that the highest rate of melted plants on the two types of melons reached 18 and 13 plants respectively on the twenty-fourth of June and the lowest rate of plants withered on the fifteenth of July 5 and 3 plant Respectively, until the rate reached 0 and 0 plants at the end of the season, and the percentage of flowers was The highest percentage of melons was 65.13 and 53.87%, respectively, on 27 May and the lowest percentage on July 1, 10.48 and 5.64% respectively, until the rate reached 0 and 0% at the end of the season.

***Key words*:** Red Pumpkin Beetle *Raphidopalpa foveicollis*, Food preference, melon varieties.

Introduction

Cucumis melo L. is a crop of Cucurbitaceae, which includes 118 genera and 825 plant species, and watermelon is one of the most important summer vegetable crops in Iraq, which is widely cultivated in all regions of the tropical and subtropical world (Al-Azzawi *et al*., 1990; Et al., 2015). The nutritional importance of watermelon fruits is the fact that it contains carbohydrates, especially sugars, which make up 96% of the total dissolved solids in the fruits of watermelon, which plays a major role in the quality of the fruits, It takes a large share in the export area, especially in the Arab markets and some European countries, especially that its fruits bear the freight and storage to Arrival to the foreign markets of a high degree of quality when following a good method of shipping and storage (Villanueva, 2004; Gichimu *et al*., 2009). Total profit for melon production in the United States was $ 543 million (Nass, 2012). Production in past years has decreased due to insect pests, resulting in reduced melon production (Evans, 2008 and Orzolek *et al*., 2010). The plants of this family are affected by many insect pests that have a significant impact on the growth and productivity of the plants of this family and the most important of these pests that prevent the economic production of many species of cucumbers, including watermelon, the red pumpkin beetle *Rhaphidopalpa foveicollis* (Lucas) and this insect is an important economic insects on Pumpkins, including watermelon, cause severe damage to the watermelon harvest in Iraq (Al-Ali *et al*., 1983; Al-Azawi *et al*., 1990).

Raphidopalpa (= *Aulacophora*) *foveicollis*, which is widespread in many parts of Asia, Africa, Europe and other parts of the world, has been studied by many researchers (Atwal and Dhaliwal, 2005). And it is one of the most important insect pests and one of the main obstacles facing the economic production of many species of cucumbers in the world, feeding insects adult on the tissues of the leaves with its loan and on the flowers causing damage and fall plant at germination and, while larvae attack roots near the surface of the soil and dig into the root and lower parts of The stems, And with age the larvae make faster, wilt of the plants and death if the infection is severe and as a result of injury the plants weaken, the quantity of the plant decreases and its quality deteriorates (Mahmood and others, 2005; Saljoqi; Khan, 2012). Khan *et al*. (2015) adult beetles

prefer modern seedlings and prefer flowering on leaves. The rate of damage caused by the insect in the Mediterranean countries is estimated at 35-70% at the seedling stage (Rahman and Prodhan, 2007). This insect caused field losses in the egg stage (10%) and the larval stage (20% to 30-100%). This insect caused significant economic damage of about 30 - 100% on some types of cucumbers, including melons, by assessing the resistance of some melons to this insect (Hassan *et al*., Khan, 2012, 2012). The losses caused by these pests on the watermelon crop in Iraq Studies show that insect pests have a significant role in determining the productivity of watermelon in quantity and quality (Dilson, 2003; Khormaly, 2004; Younes *et al*., 2010; Ndor *et al*., 2012 and Gameel, 2013).

Due to the severe damage caused by the insect on the melon crop, the study aimed to calculate the numerical density of some melon varieties, food preference and estimate the percentage of damage on some production characteristics.

Materials and Methods

The land was divided into three sectors with a width of 12 meters, representing three replicates, Divide each sector into two parts, planting each section in one of two types of melons (spinal and pineapples) at random. Planting the two melon seeds on 5/4/2015 in terres and the distance between terres and the other 30 cm, all crop service operations were carried out by cultivating and irrigating and adding the chemical fertilizers according to the recommendations. A study was conducted to estimate the numerical density of the red pumpkin beetle *Raphidopalpa* (= Aulacophora) *foveicollis* From the beginning of the emergence of the seedlings 12/4/2015 until the end of the season and the end of the plant age 15/7/2015, where 18 plants were randomly selected from each variety and each replicator. The average number of insect eggs was estimated using the Net Sweeping (Faraj) And Al-Gusani, 2003) by conducting12 weekly random trees, which are all inclusive of all melon plants for each species and each replicator and calculate the number of insects caught and after the Calculation of insects are released into the field, their numbers have been calculated in situ in the field through their presence on the plants covered in the sample from the beginning of seedling until the end of the season. And to estimate rate of insect damage on the leaves of the two types of watermelon, by taken 6 leaves randomly from each varitey and refined and calculated the leaf area affected by the use of charts and calculated the percentage of flowers affected weekly by the calculated the total number of flowers per plant and the number of flowers affected by taking Twelve plants randomly By taking twelve random plants from the beginning of flowering until the end of the life of the plant, And the average number of plants withered per replicate was calculated from the beginning of germination to the end of the season. The diagnosis of the insect was carried out by the specialists in the plant protection department. The results of the study were statistically analyzed according to the design of the complete random segments. The results were compared using the smallest difference of 5% Elsahookie and Wahaib, 1990). The results were analyzed using the Gen State statistical program.

Results and Discussion

The numerical density of the red pumpkin beetle *Rhaphidopalpa foveicollis* on some melon varieties

The results of the numerical density of adult the red pumpkin beetle on some varieties of melon (spinal and pineapple) for the spring season 2015 as shown in Figure 1, as the females began to appear for the first time after the end of the lactation period on the 4th of December in a few numbers on (spinal and pineapple), With a rate of 6.5 and 10.9 insects/18 plants respectively, and then increased gradually to reach the highest density on the fifth of May, where the rates were 32.5 and 40.5 insect/18 plants, respectively. The numerical density began to decrease gradually and was less intense During the last week of May, with a rate of 2.6 and 6.9 insect/18 plants per ton This is explained the decline in the number of first generation of the insect is nearing its end. The numerical density of the adults has increased gradually again, with 18.5 and 27.4 insects / 18 plants, respectively, and the numerical density of the insect gradually decreased with the end of the age of the host. The beginning of July. These results indicate that the rates of numerical density of the adult species of the melon, more than the presence of the pineapple species, may be due to the morphological differences between them and the food preference of the insect and the different chemical content of the melon plants in terms of their quality and quantity (Hassan, 1993; *et al*., 2005; *et al*., 2011 Hassan *et al*., 2012). These results came close to what he had reached (Rathod, Borad, 2010; Nath and Ray, 2012) that the numerical density of the insect decreased during July and then new infections have emerged and have disappeared this month due to high temperatures of 34 °C.

It is noted in these results that the beetle red beetle species preferred the spine apple species to the pineapple variety due to the fact that the pineapple variety of smooth varieties with a thick crust and the spinal strain are of low resistance to the insect and the increase in the thickness of the shell for smooth melon varieties gives the fruit more protection than wet loss And the increase in storage time and transportability,

which is preferred by the insect, which feeds on the peel of fruits and enter into the fruit and feed on it and thus the spinal strain is a low-resistance to infection (Christopher *et al*., 2001; Johri and Johri, 2003; Saljoqi and Khan, 2007; Kumar; Nadarajan, 2007; Khan, 2012; id *et al*., 2014). Rajak (2000) found that the insect density was 30 insects when the melon plants were 3-4 leaves. Al-Obeidi (2010) reported that the highest rate of adults insect was 9.16 insect / 3 plants, 1.000 insect / 3 pineapple species, and red beetle beetle *Raphidopalpa foveicollis* found in all stages of life preferred to live on melons Cucumis sp. On the roots and leaves and fruits and the population density of the insect 47.4 insect / plant in mid-June and the percentage of damage to plants 93.3% -100% (Agro et al. (2012).

Ahmed (2015) mentioned in his study the nutritional preference of the red pumpkin beetle *Rhaphidopalpa foveicollis* on some species of the cucumber family that the melon was more favorable for the presence of large numbers of insect larvae and a high percentage of damage plants and dead plants. The numerical density of adults was 6.68% and the percentage of damage was 88%.

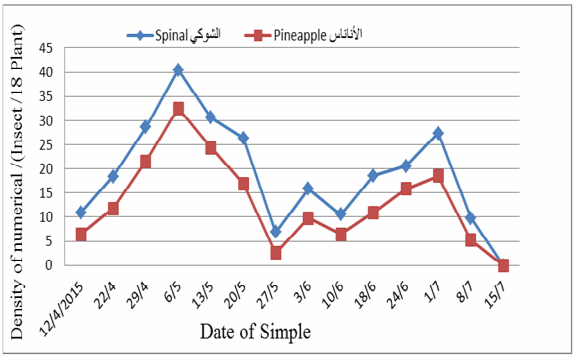

Fig. 1 : Population density of the red pumpkin beetle *Rhaphidopalpa foveicollis* on some varieties of melon (pineapple, spinal).

Leaf Area Damage

The results of the affected paper area (cm^2) were shown in chickpea beetle on the two types of melons (pineapples and spines) during the spring season 2015 as shown in Fig. 2 as the insect started to damage by leaf paper and feeding on April 12th. 1.5 cm 2/6 leaves respectively, and then took the rate of paper area affected by increasing to reach the highest rate of 2 and 3 cm 2/6 leaves respectively on the twenty-seventh of May, and then took the rate of paper area affected decrease on the twenty-second of July to With the lowest 0 and 0 cm 2/6 leaves respectively Season.

By following the insect's behavior in nutrition and the nature of its harm, it has become clear that the adult insects of the red pumpkin beetle feed on leaves and flowers. They feed on the young leaves with their loan in a semi-circular and irregular manner, as well as scratching the Leaves tissue from the upper surface. The reason may be due to differences in phenotypic characteristics of some leaves of melon plants and some types of cucumbers such as the presence of capillaries and lack of presence, as well as differences in the thickness and tenderness of (Hassan *et al*., 2012; Kamal *et al*., 2014).

According to Saljoqi and Khan (2007), the relative presence of the red pumpkin beetle on the various cucumber family vegetables indicates that 70% of the damage caused by this insect is on young and large leaves. The varieties of melons are preferred in attracting insect adult. Chemical differences in plants and their types and concentrations The reason for the preference of the insect to one of the plants over the other through studying the effect of the age of the leaf and the chlorophyll content of the plant family cucumber and some varieties of melons on the nutrition and consumption of red beetle beetle plant of this family (Khan, 2011), Khan (2012) examined a range of plant family plants, including melons, 2 insects / 3 plants of melons through studying the nutritional preference of red pumpkin beetles and their nutritional preference on the family group of plantations under field conditions. Rashid (2015) that the numerical density of the insect beetle pumpkin red *Aulacophora foveicollis* stood at 8.06% and that her watermelon plants amounted to 15.46% through the study of life and environmental insect management, and how to control it in India through her some varieties of watermelon.

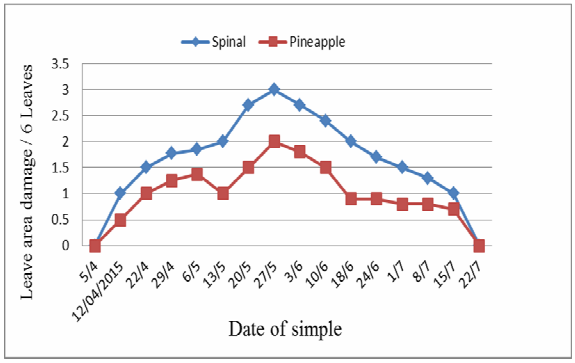

Fig. 2 : The leave area damaged (cm^2) for two varieties of watermelon (Spinal and pineapple) during the spring season 2015.

Number of Plants Withered

The results of Figure (3) showed that the withered plants of the two varieties of the watermelon (spine and pineapple) during the spring season 2015 appeared on

the third of June at the rate of 3 and 6 plants, respectively, then took the rate of the number of plants withered gradually increase to reach the highest rate of 13 and 18 plants Respectively, on June 24, after which the number of plants gradually decreasing on July 22 reached the lowest rate of 0 and 0 plants respectively at the end of the season. This may be due to the larvae that feed on the roots and dig tunnels in the main root For melon plants causing the plant death (Begum, 2002; Mahmood *et al*., 2005). And also Loan to the tissues of plants under the surface of the soil, causing the entry of bacteria and fungi, which causes the rot of the roots and Death of the whole plant and that attacking the insect of plants in the seedling phase, which feed heavily, which increased the seriousness of the feeding of adults on vegetative growth and larvae Loan roots (Khokharatel; Kumar and Nadarajan, 2007). Khan *et al*. (2012) showed that red beetle beetles attack the melon early and affect vegetative growth as well as fruits touching the soil, causing significant losses when grown in large areas.

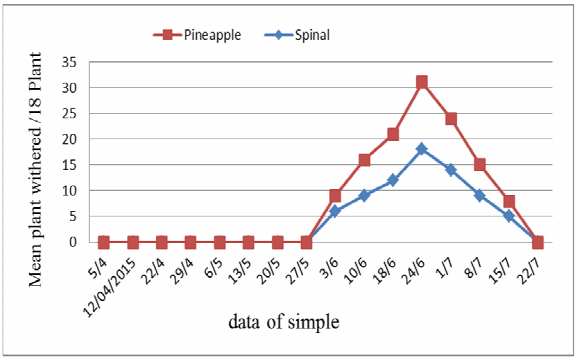

Fig. 3 : Number of plants withered for two watermelons during the spring season 2015.

Number of Flowers Affected

The results of Table (4) showed that the percentage of flowers affected by the two seasons of watermelon (pineapples and spines) during the spring season 2015 started at 10.63% and 16.48% respectively on 6 May and the rate continued to rise gradually until the highest percentage reached 53.87 And 65.13%, respectively, on 27 May, after which the percentage of the percentage decreased until it reached the lowest rate of 5.64 and 10.48% respectively on the first of July, and the rate of flowers declined decreased by 0 and 0%, respectively in end of the season. The reason may be that the adult prefer the flowers in nutrition for their high content of water, protein, fat and carbohydrates in addition to some mineral elements and amino acids, Johri and Johri, 2003; Ghathala and Bajpai, 2007) reported that flowers in cucumber plants contained 95% water, 1.4 mg protein, 0.3 mg fat, carbohydrates 2.7 g, calcium 47 mg, phosphorus 86 mg, thiamin 0.02 mg, rhiboflavin 0.11 mg, Such as vitamin A and C. Khan and others (2012) also pointed out that red pumpkin females prefer flowers to feed them more than leaves and other parts of the plant, where they lend leaves, petals and leaves, resulting in the wilting and falling of flowers, causing significant losses in the melon crop and large areas. Rashid *et al*. (2014) reported that this insect feeds on leaves and flowers greedily and causes a loss of 35-75% and estimates the loss caused by the insect 30 - 100% in the field. Khan and others (2015) pointed out that the red pumpkin beetle *Rhaphidopalpa foveicollis* food preference for various plants from the cucumber family to the size of the fruit depends on the amount of vaccine sufficient for fertilization, leaf area, photovoltaic period and other environmental conditions.

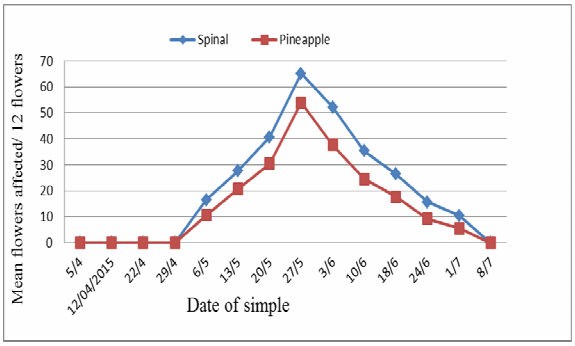

Fig. 4 : Number of flowers rejected for two watermelons during the spring season 2015.

References

Al-Ali, A.S.; Al-Nuaimi, I. and Alwan, M.S. (1983). The life of the red beetle *Aulacophora foveicollis* and the differentiation of their food families. The annual book on plant protection research. (1): 131-146.

Al-Azawi, A.F., Kado, I.K. and Alhaidari, H.S. (1990). Economic Entomology. Dar Al-Hikma of Printing and Publishing, 652.

Ali, A.A.; Rasul, I.A. and Hani, N.A. (1987). The annual presence of *Raphidopalpa foveicollis* beetles and the sensitivity of some of their cathodes during the autumn and spring seasons. Journal Agricultural Research and water Resources (3): 45-59.

Ali, A.S.A.; Al-Rasul, I.A. and Hani, N.A. (1987). The annual presence of *Raphidopalpa foveicollis* beetles and the sensitivity of some of their cathodes during the autumn and spring seasons. Agricultural Research and Aquatic Resources Series. (3): 45-59.

Ahmed, K.J. (2015). The study food preference of red pumpkin beetle *Raphidopalpa foveicoll* (Lucas)

(Chrysomolidae: Coleoptera) for some species of cucurbit family. Journal of Kirkuk University For Agricultural Sciences.6(2).119-126.

Agro, A.; Cusumano, A. and Pinto, M.L. (2012). Indagine su *Raphidopalpa foveicollis* (Lucas) nella coltura del melone biologico della Sicilia occidentale. Protezione delle Colturr. Università degli Studi di Palermo, 1: 39-44.

Aziz, M.A. (2009). On the biology and host preference of *Aulacophora foveicollis* (Lucas) Zeitschriftfür Angewandte Entomologie, 94: 82–86.

Atwal, A.S. and Dhaliwal, G.S. (2005). Agricultural pests of south Asia and their management. 4th edition. Kalyani Publishers, India. 236-238.

Al-obaidi, S.H. (2010). Study the density of some insects bests on some melon cultivars. The Tikrit University Journal of Agricultural Sciences, 10(1): 139 -144.

Begum, L.A.A. (2002). Host preference of fruit fly and red pumpkin beetle to different cucurbit vegetables grown in summer. M.S. Thesis. Department of Entomology. BSMRAU, Gazipar, Bangladesh. 65p.

Christopher, C.G.; Lang, M.K.; Nowaskie, D. and Thompson, A. (2001). Eatern muskmelon trails for southwestern Indiana. J. Amer. Soc. Hort.Sci.28:163-169.

Dilson, A.B. (2003). Origin and evolution of cultivated cucurbits. Ciencia Rural, Santa Maria. 32(5): 715-723.

Elsahookie, M. and Wahaib, K.M. (1990). Applications in the Design and Analysis of Experiments. Ministry of Higher Education and Scientific Research. Baghdad Univ. Iraq, 487.

Evans, G.B. (2008). Consumer Preferences for Watermelons: A Conjoint Analysis. A Thesis Submitted to the Graduate Faculty of Auburn University in Partial Fulfillment of the Requirements for the Degree of Master of Science. Auburn, Alabama 71.

Faraj, A.H. and Jassany, R.F. (2003). Effects of some chemical pesticides on red pumpkin beetle *Raphidopalpa foveicollis* Lucas on melon plants and cucumber. The Iraqi Journal of Agricultural Sciences, 34(4): 125-136.

Gameel S.M.M. (2013). Species composition of piercing- sucking arthropod pests and associated natural enemies inhabiting cucurbit fields at the new valley in Egypt. J. Biolog. Sci. Egypt. Acad. 6(2): 73 – 79.

Ghathala, S.L. and Bajpai, N.K. (2007). Seasonal incidence of red pumpkin beetle, *Raphidopalpa foveicollis* on major cucurbitaceous crops in south east Rajasthan. Indian Journal of Applied Entomologyl, 21(2): 98-99.

Gichimu, B.M.; Owuor, B.O. and Dida, M.M. (2009). Comparing the yield components of three most popular commercial watermelon cultivars in Kenya with one newly introduced cultivar and one landrace. Journal of Plant Breeding and Crop Science. 1 (4): 65-71.

Hassan, A.A.M. (1993). Agriculture of Vegetable Crops. Arabic Department for Publishing and Distribution. Cairo. 780.

Hassan, M.K.; Uddin, M.M. and Haque, M.A. (2012). Host susceptibility of red pumpkin beetle, *Aulacophora foveicollis* (Lucas) among different cucurbitaceous hosts. International Research Journal of Applied Life Sciences, 1(4): 91-100.

Johri, R.A. and Johri, P.K. (2003). Survey for host range of red pumpkin beetle, *Aulacophora foveicollis* Lucas (Coleoptera : Chrysomelidae) at Kanpur in Uttar Pradesh. J. Appl. Zool. Res., 14 (1) : 31-33.

Johri, R.A. and Johri, P.K. (2003). Survey for seasonal biology and intensity of attack of red pumpkin beetle, *R. foveicollis* Lucas at Kanpur in Uttar Pradesh. Journal of Applied Zoological Research. 14: 144-147.

Kamal, M.M.; Uddin, M.M.; Shahjahan, M.; Rahman, M.M.; Alam, M.J.; Islam, M.S.; Rafii, M.Y. and Latif, M.A. (2014). Incidence and Host Preference of Red Pumpkin Beetle, *Aulacophora foveicollis* (Lucas) on Cucurbitaceous Vegetables. Life Science Journal. 11(7): 459-466.

Khan, M.M.H. (2011). Influence of leaf age and chlorophyll content of cucurbits on the incidence and consumption of red pumpkin beetle. SAARC J. Agri., 9(1):133-142.

Khan, M.M.H. (2012). Host preference of red pumpkin beetle, *Aulacophora foveicollis* (Lucas) on cucurbits under field conditions. J. Asiat. Soc. Bangladesh, Sci., 38(1): 75-82.

Khan, M.M.H.; Alam, M.Z. and Rahman, M.M. (2011). Host preference of red pumpkin beetle in a choice test under net case condition. Bangladesh J. Zool. 39(2): 231-234.

Khan, M.M.H.; Hossain, M.S. and Hoque, M.E. (2012). Field evaluation of some selected lines of musk melon against red pumpkin beetle, *Aulacophora foveicollis* Lucas. Bangladish J. Agri. 37(1): 23-26.

Khan, L.; Shah, M. and Usman, A. (2015). Host preference of red pumpkin beetle (*Aulacophora foveicollis*) Lucas (Chrysomelidae: Coleoptera) among different cucurbits. JEZS. 3(2): 100-104.

Khan, M.M.H.; Alam, M.Z.; Rahman, M.M.; Miah, M.I. and Hossain, M.M. (2012). Influence of weather factors on the incidence and distribution of red pumpkin beetle infesting cucurbits. Bangladesh J. Agril. Res., 37(2): 361-367.

Khokhar, T.M.; Hussain, K.M.; Jeelani, S.I.G. and Laghari, M.H. (2005). Host preference of red pumpkin beetle *Aulacophora (Raphidopalpa) foveicollis* among cucurbits crops. Sarhad Journal Of Agriculture., 21 (3): 473-475.

Khormaly, S. (2004). Preliminary study on watermelon pests (insects) in Gonbad and Minoodasht. Proceedings of the 16th Iranian Plant Protection Congress.(1): p. 297.

Kumar, K.S. and Nadarajan, L. (2007). Studies on biology of *Aulacophora foveicollis* on pumpkin. Annals of Plant Protection Sciences. 15(2): 489-491.

Mahmood, T.; Khokhar, K.M.; Hussain, S.I.; Jeelani, G. and Laghari, M.H. (2005). Host preference of red pumpkin beetle, *Aulacophora (Rhaphidopalpa) foveicollis* among cucurbits crops. Sarhad Journal of Agriculture, 21(3): 473-475.

Ndor, E.; Dauda, S.N.; Anda, D.; Chamang, H.B. and Farringoro, U.D. (2012). Assesing the efficacy of aqueous leaf extract of some botanicals for control of field insects of watermelon in southern guinea savanna, nigeria. Asian Journal of Agricultural Sciences 4(5): 329-332.

National-Nass.2012. United States Department of Agriculture, Agricultural Statistics Service (USDA-NASS), Washington, DC.

Nath, D. and Ray, D. (2006). Ecological studies of *Raphidopalpa foveicollis* (Lucas) (Coleoptera: Chrysomelidae) on *cucumissativus* L. crop in barak valley of assam. Nat J.L. Sci. 3(2): 101-107.

Nath, D. and Ray, D. (2012). Traditional management of red pumpkin beetle, *Raphidopalpa foveicollis* Lucas in cachar district, Assam. Indian Journal of Traditional Knowledge. 11(2): 346-350.

Orzolek, M.D.; Greaser, G.L. and Harper, J.K. (2010). Agricultural Alternatives: Commercial vegetable production guide. Penn State Cooperative Extension The Pennsylvania State University.

Rahman, M.A. and Prodhan, M.D.H. (2007). Effects Of Net Barrier And Synthetic Pesticides On Red Pumpkin Beetle And Yield of Cucumber. International Journal of Sustainable Crop Production, 2(3):30-34.

Rajak, D.C. (2000). Studies on the population fluctuation of red pumpkin beetle on muskmelon (*Cucumusmelo* L.). Agric. Sci. Digest. 20(1): 54-55.

Rashid, M.A.; Khan, M.A.; Arif, M.J. and Javed, N. (2014). Red Pumpkin Beetle, *Aulacophora foveicollis* Lucas; A Review of Host Susceptibility and Management Practices. Academic Journal of Entomology 7 (1): 38-54.

Rashid, M.A. (2015). Eco-Biology and Management of Red Pumpkin Beetle (*Aulacophora foveicollis* Lucas) on Indian Snap Melon (*Cucumis melomomordica* Roxb.). A thesis submitted in partial fulfilment of the requirement for the degree of Doctor of philosophy in Entomology Department of Entomology Faculty of Agriculture, University of Agriculture, Faisalabad. 152.

Rathod, S.T. and Borad, P.K. (2010). Population dynamics of red pumpkin beetle, *Raphidopalpa foveicollis* (Lucas) on pumpkin. Journal of Current Biotica, 3(4): 565-569.

Sam, B.S.; Velmurugan, B.; Selvanayagam, M. and Satar, A. (2008). Biochemical aspects of the host plant and their role in host selection by adult *Raphidopalpa foveicollis* (L.). Annals of the Upper Silesian Museum (Entomology), 16: 161-165.

Saljoqi, A.U.R. and Khan, S. (2007). Relative abundance of the red pumpkin beetle, *Aulacophora foveicophora* Lucas, on different cucurbitaceous vegetables. Sarhad J. Agric. 23(1): 109-114.

Tariq, M.; Khalid, M.K.; Syed, I.H.; Ghulam, I. and Laghari, M.H. (2005). Host preference of red pumpkin beetle *Aulacophora (Raphidopalpa) foveicollis* among cucurbits crops. Sarhad Journal of Agriculture, 21 (3),473-475.

Vandana, R.M.; Prashad, P.R. and Rao, N.V. (2001). Host preference of *Raphidopalpa foveicollis (*Lucas) Vegetable Sci., 28(1): 95-97.

Villanueva, M.J.; Tenorio, M.D.; Esteban, M.A. and Mendoza, M.C. (2004). Compositional changes during ripening of tow culivars of muskmelon fruit. Food chemistry., 87: 179-185.

Younes, M.W.F.; El-Sebaey, I.I.A.; Hanafy, A.R.I. and Abd-Allah, Y.N. (2010). Survey of pests and their natural enemies on six cantaloupe *Cucumis melo* L. varieties in Qaha Region, Qualyobia Governorate. Egypt., 88: 739-754.