

## Field studies on some potato varieties to evaluate their relative susceptibility to mite *Polyphagotarsonemus latus* and aphid insect *Aphis craccivora* pests

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### ABSTRACT

Two field experiments were conducted at Beni-Suef governorate during the early and late recommended sowing seasons 2010 to evaluate three potatoes (*Solanum tuberosum* L.) varieties; Diamant, Lady Rossetta and Burren for their relative susceptibility to mite, *Polyphagotarsonemus latus* (Banks) and aphid insect, *Aphis craccivora* Koch infestation. Obtained data revealed that Burren variety was susceptible to mite and intermediate to aphid insect infestation, where it aggregated (1436&2502) and (273.7&372.1) of mites and aphids during early and recommended seasons. While, Diamant variety was highly tolerant, which harboring (476&529) and (120.9&182.2) at the same trend. But Lady Rosetta variety was intermediate for mite and susceptible for aphid insects. In general the level infestation of both mite and aphid pests were high during the early season than recommended sowing season.

### Key words:

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### Introduction

Potato plants (*Solanum tuberosum* L.) considered as one of the most important vegetable crops all over the world. It has the fourth largest crop with production reaching a record of 320 million tons in 2007 (FAO,2007).Also, potato is one of the most important vegetable crop in Egypt. Approximately 327,000 hectares are cultivated with potatoes in 2008 with an average yield of 5 tons / ha (FAO, 2008). Also, it gained a considerable importance as an export crop to European markets as one of the national income resources (El-Sirafy *et al.*, 2008 ; El-mougy, 2009). *Polyphagotarsonemus latus* (Banks) is one of the most serious injurious tarsonemid mite having different common names i.e broad mite, chili mite, citrus silver mite, white mite and yellow tea mite. It world wide distributed in the tropical and subtropical regions attacking more than 60 plant families (Gerson, 1992). The tarsonemid mite feeds on plant juice and possibly inject toxic compounds in plant tissues (Gerson, 1992). Individuals are found on young leaves along the central vein damaging the primordial or corona, during vegetative growth, the damage is mainly limited to the terminal shoots and young leaves. The leaves exhibit various symptoms, most commonly leaf rolling towards the lower surface, the blade becoming corrugated in appearance the plant may stop developing and appears dwarfed Cross (1979), Bassett (1981) and Jovicich *et al.* (2004). Aphid insects (Homoptera) are one of the most important groups of insect pests in the world. They cause great damage to several crops. Aphid insects weaken stunt and sometimes even kill their host plants by sucking the juice. They depreciate the marketing value of crops or even render them completely unmarketable by high standards Hafez (1964).

The present study aims to evaluate three potato varieties for their relative susceptibility to tarsonemid mite, *Polyphagotarsonemus latus* and aphid, *Aphis craccivora* pests at Beni-suef governorate during the early and recommended seasons 2010.

### Materials and Methods

Two field experiments were carried out at Beni -Addy village, Naser district, Beni-suef governorate, north upper Egypt during two intervals seasons 2010.

The experimental area about one Fadden (4200m<sup>2</sup>) divided into three equal plots, each of four replicates. The replicate area is 350m<sup>2</sup> (1/12.0 Fadden), each of 50 rows with 10m. length and 0.7m width. Potato varieties were sown in September, 10 and October, 1<sup>st</sup> 2010 as early and recommended seasons. All agricultural practices were manipulated as recommended except using of pesticides.

Weekly samples of potatoes were putting in paper bags, transfer to laboratory after about a month of sowing dates to investigate aphid insect *A. craccivora* (adults and nymphs) on lower surface of 10 leaflets/ replicate and moving stages of mite *P. latus* one sq. inch lower surfaces of 10 leaflets of each replicate. The static analysis of variance was adopted and L.S.D. values were used to determine the significance between means of varieties.

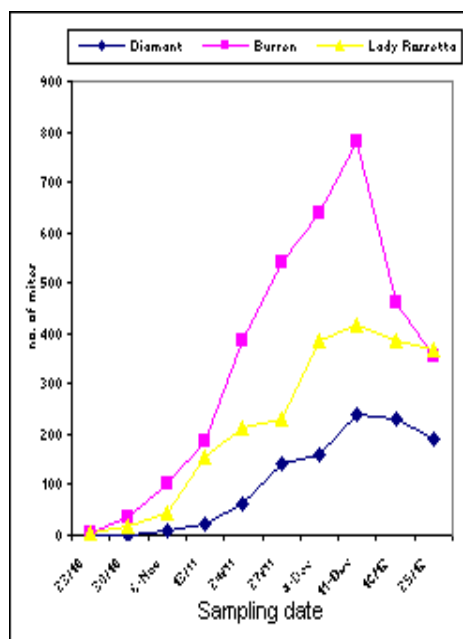
## Results and Discussion

1- As shown in Tables (1&2) data and statistical analysis revealed that there were highly significant differences between potato varieties, diamante, burren and lady rossetta in their relative susceptibility to tarsonemid mite, *Polyphagotarsonemus latus* infestation, during early and late seasons 2010. The mite infestation started in a few numbers in all tested varieties, whereby population increased gradually until reached its peak during the second week of December at early season and the third week of January at the late season.

Obtained data in Tables (1&2) showed that burren variety was the most susceptible to tarsonemid mite infestation, which receiving the highest number of mite individuals (3484.0&2837.0) during the early and late seasons with average of 11.6 and 9.4 mites / sq. inch, while diamant variety rated relatively resistant to mite infestation, where it aggregated a total number of 1058.0 and 734.0 at the same trend, with an average of 3.5 and 2.4 mites / sq. inch. On the other hand lady rossetta variety was intermediate in its relative susceptibility to tarsonemid mite *P. latus* infestation, whereas, it receiving 2318 and 1901 mites during the early and late seasons with average of 7.7 and 6.3 mites / sq. inch. At the same pattern Tables (1&2). Hafez *et al.* (2010) evaluated some paper varieties to *P. latus* infestation which it causes series damage to especial leaves of paper seedlings Dhooria and Bindra (1977) mentioned that *P. Lutas* a mite pest of potato in Punjab

Table and Fig. (1) Population fluctuation of mite *Polyphagotarsonemus latus* (Banks) on potato varieties at Bani-souf governorate during early season 2010.

Varieties	Diamant	Burren	Lady Rossetta
Date	No. of mite		
23/10	0	6	5
30/10	0	36	16
6-Nov	8	100	45
13/11	24	184	156
20/11	60	384	213
27/11	144	540	232
4-Dec	160	638	385
11-Dec	240	780	415
18/12	232	460	384
25/12	190	356	368
Total	1058	3484	2318
Mean	105.8	348.4	231.8
L.S.D.	22.6	94.9	82.4



In general the obtained data cleared that population fluctuation of tarsonemid mite, *P. lutes* was high in the early season than the recommended sowing date, were 1.4, 1.2 and lady rossetta at early than recommended sowing date, which considered the best time for cultivation. Li and Li (1986) studied the population fluctuation of tarsonemid mite *P. latus* on different vegetable crops.

2- Relative susceptibility of certain potato varieties to aphid insect *Aphis craccivora* infestation:

As demonstration in table (3&4) potato varieties differ in their relative susceptibility to aphid insect, *A. craccivora*, whereas lady rossetta variety was the most susceptible to aphid insects, whereas, it receiving the highest number of individuals 1002.2 and 1342.2 individuals during early and recommended seasons 2010, while diamant variety showed the most tolerant to aphid insect infestation, where by it received the lowest number 365.4& 245.6 individuals during early and late season 2010.

On the other hand burren variety was intermediate to aphid insect *A. craccivora* infestation during early and recommended seasons whereas, it receiving the average number of aphids 744.2&863.2 individuals.

The susceptibility of the potato varieties to aphid infestation could be arranged in a descending order in the two tested seasons as follows; Diamant variety exhibited the lowest number of aphid individuals whereas, it received (3.6 &2.5) leaflet during early and recommended seasons. While burren variety showed intermediate in number of aphids (7.4&8.6) individual per leaflet during the two seasons of 2010. on the other hand lady rossetta variety was the most susceptible to aphid insect infestation where it received (10.0&13.4) aphid insects / leaflet during the early and recommended seasons of 2010.

Table and Fig. (2) Ppopulation fluctuation of mite *Polyphagotarsonemus latus* (Banks) on potato varieties at Bani-souf governorate during late season 2010.

Varieties	Diamant	Burren	Lady Rossetta
Date	No. of mite		
1/11/2010	0	0	0
8-Nov	22	9	7
15/12	34	32	26
22/12	46	96	84
29/12	56	200	140
5-Jan	108	460	324
12-Jan	144	660	362
19-Jan	176	715	410
26/1	92	400	352
2-Feb	56	265	196
Total	734	2837	1901
Mean	73.4	283.7	190.1
L.S.D.	18.3	54.0	48.3

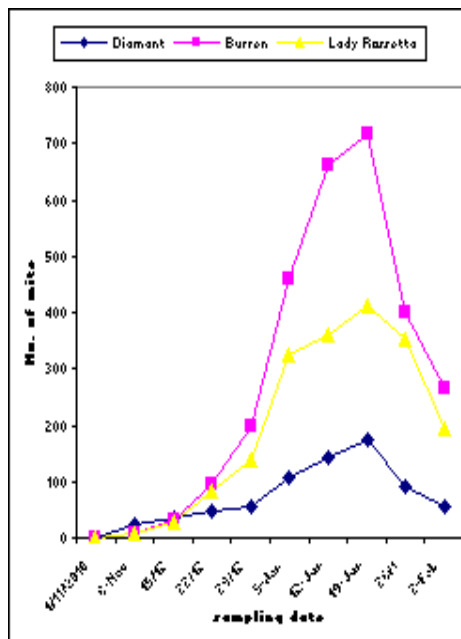


Table and Fig. (3) Population fluctuation of *Aphis craccivora* insect on different potato varieties at Bani-souf governorate during early season 2010.

Varieties	Diamant	Burren	Lady Rossetta
Date	No. of mite		
23/10	0	0	0
30/10	4	2	0
6-Nov	24	6	2
13/11	3	10	9
20/11	24	19	22
27/11	33	40	58
4-Dec	34	20	70
11-Dec	50	60	223
18/12	62	214	276
25/12	90	177	241
Total	365.4	744.2	1002.8
Mean	36.54	74.42	100.28
L.S.D.	6.7	22.2	29.4

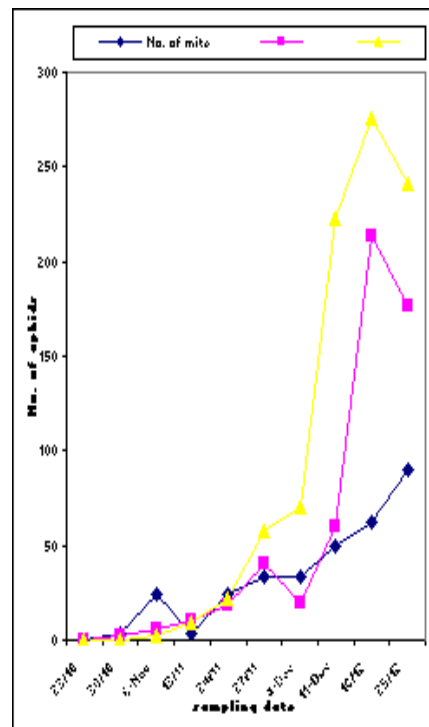
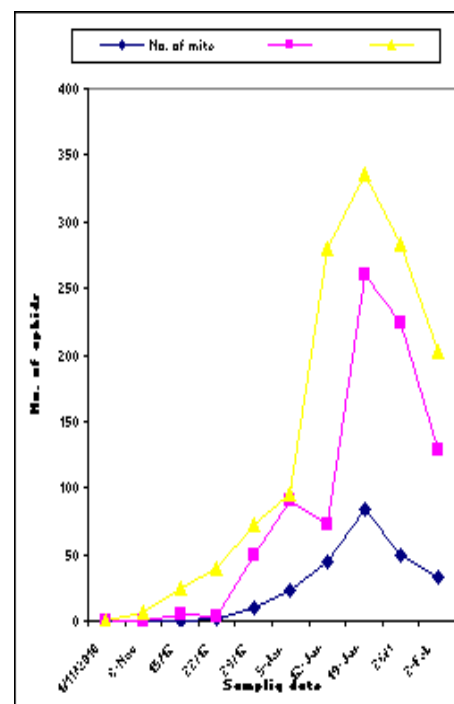


Table and Fig. (4) Population fluctuation of *Aphis craccivora* insect on different potato varieties at Bani-souf governorate during late season 2010.

Varieties	Diamant	Burren	Lady Rossetta
Date	No. of mite		
1/11/2010	0	0	0
8-Nov	0	0	6
15/12	0	5.2	25.2
22/12	2	3.2	40
29/12	9.2	49.2	72
5-Jan	22.6	90	96
12-Jan	44	73.2	280
19-Jan	84	260	336.6
26/1	50.2	223.2	283.2
2-Feb	33.2	129.2	203.2
Total	245.6	863.2	1342.2
Mean	24.56	86.32	134.22
L.S.D.	4.2	10.4	12.2



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