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INFLUENCE OF SOME PLANT POWDERS ON MITE INFESTATION ON ONION AND GARLIC UNDER STORAGE CONDITION.

Horia Abd El-wahab[1];Wafaa F. L. Ibrahim[2];; Basma M. Abou El- Nour[2] and Amna M. H. Maklad[1]

1. Plant Protection Research Institute, Agricultural Research Center

2. Zoology Dept., faculty of Science, (Girls), Al- Azhar University

ABSTRACT

Experiments were carried out at 27 ± 2 ° c and 65 ± 5% RH, the onion bulbs and garlic cloves were treated by three plant powders, black pepper seed, cumin seed and basil leaves during two successive seasons 2006 and 2007. The obtained results Balady and Giza 20 onion bulbs cleared that, the tested dust powder black pepper seeds, was highly significantly effect in reducing the mites (*Rhizoglyphus robini* ;*Tyrophagus putrescentia* and *Tydius sp*) level infestation followed by cumin seeds and Basil leave was the least significant effect during storage period. Loss of weight for Balady onion bulbs treated with black pepper seeds and cumin seeds less than Balady onion bulbs treated with Basil leave. However, Loss of weight for Giza 20 onion bulbs in the first season for *R. robini* treated with black pepper seeds less than cumin seeds and Basil leave.

The obtained results cleqred also that, the differences between *Eriophyes tulipae [Aceria tulipae]* infestation of(Chinese garlic cloves and the`effects of the tested dust plant powders, black pepper seeds, cumin seeds and Basil leaves was not effective i~ minimizmng mite population compared with control. Loss of weight for(Chinese garlic clovås treated with blakk pepper såeds less than Jasil leave followed by cumin seeds.

INTRODUCTION

Onion, *Allium cepa* L., and garlic, *Allium sativum* L. are considered the most important vegetable crops in many parts of the world. In Egypt, they are fields' crops of an outstanding importance on account of their great value for local consumption and exportation to different countries (Osman *et al*. 1996). They are currently cultivated in many governorates separately or and as intercropping and intervention system with other field in Egypt. *Rhizoglyphus robini* (Claparede) is the most common and harmful mite species occurring on bulbs plants throughout the growing season and in storage. *Tyrophagus putrescentiae* (Schrank) were also abundant on bulbs (Bayram and Cobanoglu 2006). Mites associated with garlic were separated by Berlese's funnel method *Eriophyes tulipae [Aceria tulipae], Rhizoglyphus echinopus* (Timar *et al*. 2004).

The aim of work is to study the effect of different plant materials on artificial mite infestation on onion and garlic under storage condition.

MATERIALS AND METHODS

Plant dust:

1- Powders of black pepper seeds (piper nigrum), Fam.: Piperaceae.
2- Cumin seeds (*Cuminum cyminum*), Fam.: Umbelliferae.
3- Basil leaves (*Ocimvus basilicum*), Fam.: Labiatae.

Bioassay test:

The efficacy of the previously mentioned plant extract as bioacaricides were investigated against some mite's bulb and buds mite, (*Rhizoglyphus robini* (Claparede), 1869, *Tyrophagus putrescentia, Tydues sp.* and *Eriophyes tulipae [Aceria tulipae]*.Onion bulbs and garlic buds were treated using plant extracts in cages at 100gm/4kg. Three replicates were used for each concentration (100 gm). Experiments were carried out at 27 ± 2 ° c and 65 ± 5% RH and number of mortality after one month from treatments to four month was recorded. Onion bulbs or garlic buds for testing put in cages, the front and back walls of the cages were protected and covered with fine wire gauze, and the top of each cage covered with a plate glass. Three replicates for each treatment of each variety of onion (Balady cv. & Giza 20 cv.) or garlic (Balady cv. & Chinese cv.) and artificially infested with one onion bulbs or garlic cloves for each replicate. The cages were opened at two weeks interval for sampling (four kg onion bulbs or garlic cloves) investigation and determined of onion bulbs or garlic buds weight lose due to the mite infestation. Three uninfested replicate of each variety of onion bulbs or garlic buds were used to calculate the changes of weight onion bulbs or garlic cloves during the experiment.

Statistical analysis:

Data was carried out by using a computer software Package "a costal" a product of cohort software ICU. Barkeley, California, USA. Duncan's multiple range test (Duncan 1955) was used to differentiation between means.

RESULTS AND DISUSSION

The effect of some different powder dust on mite's infestation and weight loss of onion bulbs and garlic cloves under a method of storage were studied during two successive seasons 2005/2006 and 2006/2007.

The obtained results in Table (1) cleared that *Rhizoglyphus robini* infestation of Balady onion bulb was more effective than Giza 20 onion bulb in reducing the mite level infestation. The three tested dust powders black pepper seeds (piper nigrum), cumin seeds (*Cuminum cyminum*) were highly significantly effect, (99% and 92%, respectively) and significant effect for Basil leaves (*Ocimvus basilicum*), (61%) during storage period in 2006 season.

The mean percentage of infested onion cultivars increased gradually as the period of storage prolonged for all the tested powders as well as the control.

The mean of weight loss of the tested plant powders of *R. robini* were determined. Loss of weight for Balady onion plant treated with black pepper seeds, cumin seeds and Basil leaves was, 37.9 %, 37.9 % and 48.1 %, respectively during first season 2005/2006 as represented in Table (1).

As shown in table (1) the three tested dust powders black pepper seeds (piper nigrum), cumin seeds (*Cuminum cyminum*) and Basil leave (*Ocimvus basilicum*) were effective in minimizing mite population compared with control were tested (94 %, 88 % and 79 %), respectively in 2007 season.

Loss of weight for Balady onion plant treated with black pepper seeds, cumin seeds and Basil leaves was, 21.2 %, 17.6 % and 17.6 %, respectively during the second season as represented in Table (1).

Table (1): Effect of some plants powder against *R. robini* on onion plant, (Balady cv.) and weight loss under storage conditions.

Treatments	Season	No. of mites (% Mortality) after treated								General mean		weight loss %
		One month		Two months		Three months		Four months				
		No	%	No	%	No	%	No	%	No	%	
Black pepper seeds	2006	0	100	19	95	16	99	21	98	56	99	37.9
	2007	98	76	39	92	0	100	0	100	137	94	21.2
Cumin seeds	2006	0	100	111	73	96	93	88	93	295	92	37.9
	2007	175	58	91	82	0	100	25	97	291	88	25.0
Basil leave	2006	579	41	319	22	411	69	216	82	1525	61	48.1
	2007	25	88	83	41	93	49	94	489	79	25	17.6
Control	2006	979	0	411	0	1315	0	1199	0	3904	0	50.0
	2007	0	519	0	611	0	788	0	2333	0	0	39.8

It seems clearly from Table (2) that the mite *Tyrophagus putrescentia* infestation of onion stored in sealed cage was obviously highly significant difference between the three-tested plant powders. The mean percentage of mortality mite on Balady onion for black pepper seeds (piper nigrum) was % 99, cumin seeds was % 99 and Basil leaves was 82 %.

Table (2): Effect of some plants powder against *T. putrescentia* on onion plant, (Balady cv.) and weight loss under storage conditions.

Treatments	Season	No. of mites (% Mortality) after treated								General mean		weight loss %
		One month		Two months		Three months		Four months				
		No	%	No	%	No	%	No	%	No	%	
Black pepper seeds	2006	0	100	11	99	5	99	9	99	25	99	37.9
	2007	19	81	16	90	0	100	0	100	35	96	21.2
Cumin seeds	2006	0	100	19	98	9	99	13	99	41	99	37.9
	2007	25	74	11	93	0	100	9	97	45	94	25.0
Basil leave	2006	413	49	215	77	32	97	21	98	681	82	48.1
	2007	33	66	15	90	13	95	12	96	73	91	17.6
Control	2006	805	0	919	0	998	0	1114	0	3836	0	50.0
	2007	98	0	156	0	240	0	315	0	809	0	39.8

Loss of weight for Balady onion bullb in the first season for *T.putrescentia* treated with black pepper seeds, cumin seeds and Basil leaves was, 37.9 %, 37.9 % and 48.1 %, respectively during first season as represented in Table (2).

Data appeared in Table (2) the *T. putrescentia* infestation of stored onion Tantawy (Balady) onion plant was highly significant difference between the tested plant powders (black pepper seeds (piper nigrum), cumin seeds and Basil leaves. The mean percentage of mortality mite on of Balady onion for black pepper seeds (piper nigrum) was 96%), cumin seeds % 94 and Basil leaves 91 %.

Loss of weight for Balady onion plant treated with black pepper seeds, cumin seeds and Basil leave was, 21.2 %, 17.6 % and 17.6 % respectively during the second season as represented in Table (2).

Data obtained in Table (3) cleared that the *Tydius sp.* infestation of stored Tantawy (Balady) onion plant was highly significant difference between the tested plant powders (black pepper seeds) and cumin seeds , while it was significant for Basil leaves . The mean percentage of mortality of mite on Balady onion for black pepper seeds was % 90, a cumin seed was % 92 and Basil leaves was 86 % after four months.

Loss of weight for Balady onion plant in the first season for *Tydius sp.* treated with black pepper seeds, cumin seeds and Basil leaves was, 37.9 %, 37.9 % and 48.1 %, respectively during the first season as represented in Table (3).

Table (3): Effect of some plants powder against *Tydues* sp. on onion plant, (Balady cv.) and weight loss under storage conditions.

Treatments	Season	No. of mites (% Mortality) after treated								General mean		weight loss %
		One month		Two months		Three months		Four months				
		No	%	No	%	No	%	No	%	No	%	
Black pepper seeds	2006	19	65	4	95	5	95	5	95	33	90	37.9
	2007	6	71	14	53	11	86	3	97	34	85	21.2
Cumin seeds	2006	0	100	8	89	9	90	8	92	25	92	37.9
	2007	12	43	17	43	15	81	11	89	55	76	25.0
Basil leave	2006	15	73	9	88	11	88	9	91	44	86	48.1
	2007	15	29	21	30	19	75	14	86	69	69	17.6
Control	2006	55	0	73	0	93	0	99	0	320	0	50.0
	2007	21	0	30	0	77	0	97	0	225	0	39.8

Data in Table (3) cleared that there were a significant difference between the mite *Tydius sp.* infestations of Balady onion bulb and the tested plant powders (black pepper seeds , cumin seeds and Basil leaves . The mean percentage of mortality mite on Balady onion for black pepper seeds was 85%, a cumin seed was 76% and Basil leaves was 69 % after four months in the second season.

Loss of weight for *Tydius sp.* for Balady onion plant treated with black pepper seeds, cumin seeds and Basil leaves was, 21.2 %, 17.6 % and 17.6 %, respectively during second season 2007 as represented in Table (3).

Data in Table (4) indicated that there was highly significant difference between the *R. robini* Claparede infestation on Giza 20 onion plant and the tested plant powders (black pepper seeds and cumin seeds and significant between onion plant and Basil leaves . The mean percentage of infested Giza 20 onion for black pepper seeds (*piper nigrum*) was % 98, a cumin seed was % 88 and Basil leave was 69 % after four months.

Loss of weight for Giza 20 onion plant in the first season for *R. robini* treated with black pepper seeds, cumin seeds and Basil leave was, 48.1 %, 53.8 % and 53.8 %, respectively during the first season as represented in Table (4).

Data in Table (4) cleared that there were a significant difference between the mite infestations of Giza 20 onion bulb and the tested plant

powders black pepper seeds, cumin seeds and Basil leaves. The mean percentage of infested Giza 20 onion for black pepper seeds was % 86, a cumin seed was % 75 and Basil leaves was 71 % after four months.

Loss of weight for Giza 20 onion plant in the second season for *R.robini* treated with black pepper seeds, cumin seeds and Basil leave was, 21.2 %, 25 % and 21.1 %, respectively during the second season as represented in Table (4).

Table (4): Effect of some plants powder against *R. robini* on onion plant, (Giza 20 cv.) and weight loss under storage conditions.

Treatments	Season	No. of mites (% Mortality) after treated								General mean		weight loss %
		One month		Two months		Three months		Four months				
		No	%	No	%	No	%	No	%	No	%	
Black pepper seeds	2006	0	100	11	97	13	98	15	98	39	98	48.1
	2007	13	75	9	85	18	76	0	100	40	86	21.2
Cumin seeds	2006	0	100	79	81	82	84	69	90	230	88	53.8
	2007	17	67	14	77	25	67	13	86	69	75	2.5
Basil leave	2006	209	40	115	73	211	60	79	89	614	69	48.1
	2007	23	55	19	69	21	72	19	79	82	71	21.1
Control	2006	351	0	419	0	525	0	698	0	1993	0	21.2
	2007	51	0	61	0	76	0	91	0	279	0	22.2

Data in Table (5) revealed that the *T. putrescentia* mortality of stored Giza 20 onion was highly significant difference between the tested plant powders black pepper seeds amounted 90% and significant difference between the tested plant powders cumin seeds accounted for 73% while non significant difference between the tested plant powders Basil leaves , 44% for control after four months.

Table (5): Effect of some plants powder against *T. putrescentia* on onion plant, (Giza 20 cv.)and weight loss under storage conditions.

Treatments	Season	No. of mites (% Mortality) after treated								General mean		weight loss %
		One month		Two months		Three months		Four months				
		No	%	No	%	No	%	No	%	No	%	
Black pepper seeds	2006	0	100	14	81	7	91	9	89	30	90	48.1
	2007	5	71	8	78	9	81	0	100	22	86	21.2
Cumin seeds	2006	0	100	30	59	33	58	18	78	81	73	53.8
	2007	7	59	8	78	13	73	7	87	35	78	2.5
Basil leave	2006	44	28	69	7	35	56	19	77	167	44	48.1
	2007	9	47	15	58	9	81	6	89	39	75	21.1
Control	2006	61	0	74	0	79	0	83	0	297	0	21.2
	2007	17	0	36	0	48	0	55	0	156	0	22.2

Loss of weight for Giza 20 onion bulbs in the first season for *T.putrescentia* treated with black pepper seeds, cumin seeds and Basil leave was, 48.1 %, 53.8 % and 53.8 %, respectively during the first season as represented in Table (5).

Data appeared in Table (5) the *T. putrescentia* infestation of stored onion Giza 20 onion plant was significant difference between the tested plant powders (black pepper seeds , cumin seeds and Basil leaves . The mean

percentage mortality of mite on Giza 20 onion plant for black pepper seeds was 86%, cumin seeds 78% and Basil leaves 75 % after four months.

Loss of weight for Giza 20 onion bulbs in the second season for *T.putrescentia* treated with black pepper seeds, cumin seeds and Basil leaves was, 21.2 %, 25 % and 21.1 %, respectively during the second season as represented in Table (5).

Data obtained in Table (6) cleared that the *Tydius sp.* infestation of stored Giza 20 onion bulbs was highly significant difference between the tested plant powders (black pepper seeds and cumin seeds, while it was significant for Basil leaves. The mean percentage mortality of mite on Giza 20 onion for black pepper seeds was 93%, a cumin seed was 90% and Basil leaves was 84 % after four months.

Loss of weight for Giza 20 onion plant in the first season for *Tydius sp.* treated with black pepper seeds, cumin seeds and Basil leaves was, 48.1 %, 53.8 % and 53.8 %, respectively during the first season as represented in Table (6).

Table (6): Effect of some plants powder against *Tydues* sp. on onion plant, (Giza 20 cv.) and weight loss under storage conditions.

Treatments	Season	No. of mites (% Mortality) after treated								General mean		weight loss %
		One month		Two months		Three months		Four months				
		No	%	No	%	No	%	No	%	No	%	
Black pepper seeds	2006	8	62	3	92	0	100	0	100	11	93	48.1
	2007	4	64	7	53	5	74	0	100	16	77	21.2
Cumin seeds	2006	11	48	6	84	0	100	0	100	17	90	53.8
	2007	5	55	6	60	9	53	8	69	28	61	2.5
Basil leave	2006	19	10	8	78	0	100	0	100	27	84	48.1
	2007	8	27	9	40	13	32	12	54	42	41	21.1
Control	2006	21	0	37	0	48	0	58	0	164	0	21.2
	2007	11	0	15	0	19	0	26	0	71	0	22.2

Data in Table (6) cleared that there were a significant difference between the mite infestations of Giza 20 onion bulb and the tested plant powders (black pepper seeds and cumin seeds. While it was non-significant difference between the mite infestations of Giza 20 onion bulb and the tested plant powders Basil leaves. The mean percentage of mortality of mite on Giza 20 onion for black pepper seeds was % 77, a cumin seed was 61% and Basil leave was 41 % after four months.

Loss of weight for Giza 20 onion plant in the second season for *Tydius sp.* treated with black pepper seeds, cumin seeds and Basil leave was, 21.2 %, 25 % and 21.1 %, respectively during the second season as represented in Table (6).

The obtained results in Table (7) cleared that *E. tulipae* infestation of Balady garlic plant was more effective than Chinese garlic cloves in reducing the mite level infestation. The three tested dust powders black pepper seeds, cumin seeds were significantly effect amounted (68% and 52%, respectively) while it was non-significant effect for Basil leaves (44%) during storage period.

Table (7): Effect of some plants powder against *E. tulipae* on garlic plant, (Balady cv.) and weight loss under storage conditions.

Treatments	Season	No. of mites (% Mortality) after treated								General mean		weight loss %
		One month		Two months		Three months		Four months				
		No	%	No	%	No	%	No	%	No	%	
Black pepper seeds	2006	0	0	0	100	0	100	1450	26	1450	68	37.9
	2007	0	0	121	79	233	69	750	62	1104	66	42.8
Cumin seeds	2006	0	0	264	77	315	78	1600	18	2179	52	60.0
	2007	0	0	243	58	395	47	1100	44	1738	47	53.8
Basil leave	2006	0	0	396	66	399	73	1750	10	2545	44	53.8
	2007	0	0	316	45	499	34	1351	31	2166	34	50.9
Control	2006	0	0	1157	0	1451	0	1955	0	4563	0	37.0
	2007	0	0	577	0	751	0	1958	0	3286	0	40.1

The mean of weight loss of the tested plant powders of *E. tulipae* were determined. Loss of weight for Balady garlic cloves treated with black pepper seeds, cumin seeds and Basil leave was, 37.9 %, 60 % and 53.8 %, respectively during the first season as represented in Table (7).

Data in Table (7) cleared that the differences between *E. tulipae* infestation of Balady garlic cloves and the effects of the tested dust plant powders, black pepper seeds was significant, while the differences between *E. tulipae* infestation of Balady garlic cloves and the effects of the tested dust plant powders, cumin seeds and Basil leaves were not effective in minimizing mite population compared with control.

The mean percentage mortality of Balady garlic cloves for black pepper seeds was 66 %; a cumin seed was 47 % and Basil leaves was 34 % after four months.

Loss of weight for Balady garlic cloves treated with black pepper seeds, cumin seeds and Basil leaves was, 42.8%, 53.8 % and 50.9 %, respectively during the second season as represented in Table (7).

The obtained results in Table (8) cleared that the differences between *E. tulipae* infestation of Chinese garlic cloves and the effects of the tested dust plant powders, black pepper seeds , cumin seeds and Basil leaves was not effective in minimizing mite population compared with control.

Table (8): Effect of some plants powder against *E. tulipae* on garlic plant, (Chinese cv.) and weight loss under storage conditions.

Treatments	Season	No. of mites (% Mortality) after treated								General mean		weight loss %
		One month		Two months		Three months		Four months				
		No	%	No	%	No	%	No	%	No	%	
Black pepper seeds	2006	0	0	391	9	321	53	659	20	1371	29	53.8
	2007	0	0	498	47	631	62	855	56	1984	57	66.6
Cumin seeds	2006	0	0	398	8	437	36	761	7	1596	18	66.6
	2007	0	0	576	39	839	50	961	51	2376	48	48.1
Basil leave	2006	0	0	399	8	459	33	799	2	1657	14	60.0
	2007	0	0	798	15	1057	37	1224	37	3079	33	60.0
Control	2006	0	0	432	0	687	0	819	0	1938	0	50.1
	2007	0	0	943	0	1665	0	1954	0	4562	0	44.3

The mean percentage of infested Chinese garlic cloves for black pepper seeds was 29 %; a cumin seed was 18 % and Basil leaves was 14 % after four months.

Loss of weight for Chinese garlic cloves treated with black pepper seeds, cumin seeds and Basil leave was, 53.8%, 66.6 % and 60 %, respectively during the first season as represented in Table (8).

The mean percentage mortality of mite on Chinese garlic cloves for black pepper seeds was 57 %; a cumin seed was 48 % and Basil leave was 33 % after four months in 2007 season.

Loss of weight for Chinese garlic cloves treated with black pepper seeds, cumin seeds and Basil leave was, 66.6 %, 48.1% and 60.0 %, respectively during the second season as represented in Table (8).

These obtained results are in agreement with Almaguel *et al*. (1986) they mentioned that. Dicofol at 0.4% a.i. and chlorobenzilate at 0.1 and 0.4% a.i. alone or mixed with Citol K at 0.1% a.i. were effective against the mite. Soaking the cloves in water at 55 and 60 °C for 10 min was also effective, but affected the clove sprouting capacity. The best results were obtained by soaking the cloves in water for 2 h and then dipping them for 10 min in a solution of dicofol at 0.4% a.i mixed with Citol K at 0.1% a.i. or chlorobenzilate at 0.4% a.i. mixed with Citol K at the same concentration. Also, Larrain (1986) reported that infestation by *E. tulipae* reduced emergence by about 20%, resulted in the production of distorted leaves and reduced the yields by about 23%. In Korea Republic also our results agree with Choi *et al*. (1988) revealed that in the laboratory, the most effective methods of control *R. echinopus* were immersing seed of garlic in solutions of dimethoate for 30 min or broadcasting diazinon at 6 kg/10 acres. Also our results agree with Ramsamy (1988) stated that garlic bulbs and cloves were exposed for 1-3 h in the laboratory to 2 fumigants at 40 g/m3 (as if for control of the stored products mite *T. putrescentiae* and stored for up to 3 months and tested for phytotoxicity. Viability of the garlic was found to decrease with exposure and storage times, and ethylene dibromide caused greater inviability than methylene bromide. When protected as bulbs in their tunica, the garlics were less affected by fumigants than when exposed as cloves. In Taiwan, Chen and Lo (1989) reported that *R. setosus* was more tolerant to carbamates and organophosphorus compounds than *R. robini*. Both species were tolerant to avermectin [abamectin] 1.8% EC and some newly developed synthetic pyrethroids, which were proven to have acaricidal activity. It is suggested that since both species were more susceptible to the so-called insecticides than the acaricides, it may be that they have different physiological mechanisms than to mite species. In Egypt, Kassab and Hafez (1990) reported that the numbers of *R. robini* mites in the soil were reduced following the application of powdered sulfur at 7.5 and 10 kg, whereas mites disappeared for a 3-4 week period after soil had been treated with 14, 28 and 56 kg. A few mites were detected in soil samples after this period. Only a few swollen females were found infecting garlic roots with egg masses attached to them. Bottcher *et al.* (1993) showed that stored garlic a mean infestation level of *T. longior* of 70% (range 27-98%) as early as 10 weeks after harvest. After a 6-month storage period in stores ventilated using outside air, 20 mites/

bulb were counted on 17.1% of all bulbs examined, even when the RH of the store reached 75-85%. The morphology of the bulbs seemed to favour the spread of *T. longior*, as other species of storage mite. Budai *et al.* (1997) reported that *Aceria tulipae*, an eriophyid mite that had previously been known only from onion and tulip bulbs in Hungary, is damaging garlic bulbs there. Numbers and damage have become more conspicuous as a result of the recent hot dry summers. Infestation rates of garlic cloves for propagation were 20-100%, and storage losses were considerable. Chemical control measures by seed dressings and plant stand treatments are reported, in which Thiocell dressing [of unstated composition] was mixed, as various combinations, with 0.5% Thiovit [sulfur], 0.2% Lannate [methomyl] 20 L and 0.1% Bi 58 [dimethoate] EC, increasing yields by 3.4-65% in 1994. Carter *et al*. (2004) mentioned that, survival of *R. robini* exposed to Cry3Aa in a short-term contact and ingestion experiment was not affected, although *R. robini* was significantly affected by the insecticide FipronilReg. used as a positive control. Similarly, *R. robini* exposed in a longer duration feeding trial to the Cry3Aa toxin in artificial diet were also not significantly affected. When Cry3Aa was tested on the positive control insect, *Leptinotarsa decemlineata*, reduced weight of larvae and increased mortality was recorded. The effect of Cry3Bb1 toxin in transgenic corn tissues on *R. robini* food choice was assessed in a laboratory study. In no-choice tests a greater proportion of *R. robini* were found on garlic roots than on Cry3Bb1 transgenic corn. In a choice test, more *R. robini* was recovered on garlic roots than on either corn variety, and on Cry3Bb1 corn than on non-transgenic corn**.** Hubert *et al*. (2006) stated that legume proteins were shown to have insecticidal activity against stored-product pests. Grain enriched by bean (*Phaseolus vulgaris*) flour inhibits the growth of stored-product mites. In this study, the toxicity of bean flour to storage mites was tested under optimum conditions for their population growth. Bean flour was added to the diet in one of eight concentrations (0, 0.01, 0.1, 0.5, 1, 2.5, 5, and 10%). The population growth of, *T. putrescentiae*, *A. siro* and *Aleuroglyphus ovatus* initiating from a density of 50 mites per 0.2 g of diet was recorded for 21 days. The enrichment of grain with bean flour decreased the population growth of the tested species. These differed in their sensitivity to bean flour. Population growth was decreased to 50% in comparison to the control (rC50) by the bean flour concentration of 0.02% in *T. putrescentiae*, 0.04% in *A. siro*, and by 4.87% in *A. ovatus*. The concentration of 5% bean flour in diets kept populations of *A. siro* and *T. putrescentiae* at the initial level.

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تقنية تخزين البصل والثوم تحت الظروف المعمليه

حوريــه عبـد الوهـاب*، وفـاء فكـرى لبيـب أبـراهيم ، بسـمه محمـود أبـو النـور** و آمنه محمد حسن مقلد***

*** معهد بحوث وقاية النباتات دقى- جيزة**

****قسم الحشرات كلية العلوم(بنات). جامعة الأزهر**

أجريت التجربه فى معمل معهد بحوث وقاية النباتات بالدقى خلال الموسمين ٢٠٠٥ /٢٠٠٦ ، ٢٠٠٦ /٢٠٠٧ .بتخـزين صـنفين مـن البصـل (بلـدى وجيـزة ٢٠) وصـنفين مـن الثـوم (بلـدى وصينى) و المعامله ببودر الفلفل والكمون والريحان وكنترول (بدون معامله)وحساسيتهم للاصابه بل الاكاروسات الاتيه

Rhizoglyphus robini و *Tyrophagus putrescentia* و*Tydeus* على البصل(بلدى وجيزة ٢٠) .

Eriophyes tulipae غلى الثوم (بلدى وصينى).

أظهرت النتائج ان صنفى البصل(البصل البلدىوالبصل جيزة ٢٠) المعاملين بالفلفل الأسود كانــا أقـل المعـاملات حساسـية للإصـابة بأكـاروس البصـل *Rhizoglyphus robini* و *Tyrophagus putrescentia* و*Tydeus sp* يأتى بعده المعامل بـالكمون ثم أقلهم حساسية المعامل بالريحان. ومن جهة أخرى فان معدل فقد الـوزن للبصـل المعامل بالفلفل الأسود و الكمون يكون أقل من البصل المعامل بالريحان خلال فترة التخزين فى الموسم الاول. وتأخذ نتائج الموسم الثاني نفس الاتجاه بالنسبة للبصل البلدى بينما للبصل جيزة ٢٠ فان معدل فقد الوزن للبصل المعامل بالكمون يكون أقل من البصل المعامل بالفلفل الأسود و الريحان خلال فترة التخزين. لصنفى(الثوم البلدي و الصينى) أنها كانت معنوية فى تقليل نسبة الاصابة *Eriophyes tulipae* خلال موسمي الزراعة المتتاليين.

وأيضا أظهرت النتائج ان الثوم البلدي المعامل بالفلفل الأسود و بالكمون كانا أكثر المعاملات حساسية للإصابة *Eriophyes tulipae* ثم أقلهم حساسية المعامل بالريحان. ومن جهة أخرى فان معدل فقد الوزن الثوم المعامل بالفلفل الأسود كان أقل من الثوم المعامل الكمون ومن ثم المعامل بالريحان فى الموسم الاول. وتأخذ نتائج الموسم الثاني اتجاه مختلف حيث نجد ان الثوم البلدي المعامل بالفلفل الأسود كان أكثر معنوية لتقليل الاصابة بالآفات بينما كان غير معنويا للثوم المعامل بالكمون و الريحان.