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EFFECT OF SPRAYING PLANT EXTRACTS ON SEED YIELD, QUALITYAND INSECT INFESTATION OF SOME COW PEA CULTIVARS

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ABSTRACT

The present investigation was conducted at El-Serw Experimental Agricultural Research Station (ARC) during the summer seasons of 2007 and 2008 to study the effect of spraying plant extracts on seed yield, quality and insect infestation of cow pea cultivars. The study included four cow pea cultivars i.e. Buff, Cream, Brabham and Local and four spraying treatments (black pepper seed extract, neem seed extract, Malathion 57 % pesticide and control (without spray). Seeds of each plot were stored for 3 and 6 months after harvest. The experimental design was arranged in strip plot design with three replicates. Buff cultivar surpassed the other cultivars in total fresh forage and dry yields, seed yield, germination percentage and the lowest values of insect infestation and seed dry weight loss. The same cultivar maintained its superiority in crude protein, tannins, total phenols and vicine contents. Spraying with Malathion 57 % gave the highest values of germination percentage and the lowest values of insect infestation and seed dry weight loss. The same treatment gave the highest values of chemical constituents. The germination percentage of cow pea seeds were decreased and insect infestation percentage and seed dry weight loss were increased as the storage period increased from zero to 6 months. Increasing the storage period from harvest to 6 month, reduced gradually total carbohydrates, tannins, total phenols and vicine and increased crude protein content. Insect infestation and seed dry weight losses had significantly negative correlation with seed contents of tannins, total phenols, vicine as well as germination percentage. The results revealed that, spraying cultivar Buff plants during flowering and pod filling stages with neem and black pepper seed extracts could substitute the spraying Malathion 57% to protect cow pea seed from weevils' infestation and hold seed quality for six month.

Keywords: Cow pea, seed yield, seed quality, plant seeds extracts, insect infestation and chemical analysis,

INTRODUCTION

Cow pea (*Vigna uniguiculata* L. Walp) is an annual summer pulse crop and is used as a fodder plant for animal feeding and seed production.

It is necessary to increase forage yield per faddan of cow pea by improving cultural practices to face the great shortage in the animal feed stuff especially in summer season. Latif (1993) found significant differences between cow pea cultivars (Local, Buff and Brabham) in dry matter (DM %) and crude protein yield/plant.

Insects play an important role in loss of seed yield as post harvest losses. Insect damage in stored grains and pulses may amount 10-40% in countries where modern storage technologies have been introduced (El-Hamady *et al*., 1999).

Bruchids (*Callosobruchus spp*.) are important storage pests of grain legumes, and are known to cause considerable economic losses, especially in pulses grown in the tropics and sub-tropics (Ramzan *et al*., 1990 and Srivastava and Pant, 1989). Bruchid-damaged seeds do not germinate well and this affect plant stand and consequently yield.

So, it is very important to understand that all of the bruchids that feed on legumes seeds lay eggs on seed pods before or when the pods mature, thus the pods that have bruchids emerge from the instorage were infested by bruchids before they put into storage. Therefore, it is very important to reduce the numbers of bruchids in seeds as soon as possible after they are harvested. (FAO, 1980)

Many investigators reported the importance of using insecticides before harvest to reduce insect infestation in stores. They reported that Malathion was effective in reducing field infestation (Gupta *et al*., 1998 and El-Lakwah *et al*., (1999). Also Felker *et al*., (1981) found that Orthene sprayed at three-week intervals reduced the number of bruchid emergence holes from 23/100 pods to one. They also concluded that Malathion seems as effective as Orthene. Meawhile Calumpang *et al*. (2001) reported that Malathion used in stored mungbean, corn, rice either whole or milled, residues could be detected at 8 mg/kg. But using chemical insecticides usually have some problems such as health hazards and a risk of environmental contamination by pesticides residues. So there is an urgent need for safe but effective biodegradable pesticides with no toxic effects.

Botanical insecticides show broad-spectrum in pest control and many are safe to apply, unique in action and can be easily processed and used. (Talukder and Howse 1995 and Montes *et al*., 2008). In neem extracts azadiractine is the major component showing the highest biological activity through its antifeedant and repellent properties to insect (Devaraj and Srilatha, 1993). Several types of plant extracts has been studied for bruchus control in stores while (Su, 1977 and Su and Horvat, 1981) reported that the ground of black pepper (*Piper nigrum*) and its ethanol crude extract were highly toxic to rice and cowpea weevils. Also (Yadav, 1985; Das, 1987 and Babu *et al*., 1989), reported that, neem seed oil showed 100% control of *C. chinensis, C. maculates* and *C. analis* (F.) in *Vigna radiate* for 5 months when applied at 10 ml kg-1. Meanwhile, (Makanjuola 1989 and Echendu, 1991) reported that neem extracts reducing infestation of cowpea seeds by *C. maculates* and there was no adverse effect on seed viability. Also, El-Lakwah *et al*., (1999) reported that the application of Nemazal at the highest concentrations reduced the loss in weight of cowpea from 16.4% to 1.2% after two months from storage.

Control of Bruchids infestations done by treating stored seeds with several chemicals are considered environmentally undesirable and are too expensive for subsistence farmers. To increase the insect resistance of cultivated varieties plant breeders are interested in understanding the resistance mechanisms that operate in wild varieties or why certain bruchidids attack one cultivated species but not another. Both the common bean and cow pea are endowed with compounds called general defensive compounds that protect their seeds against widely different herbivores.

Among these are the tannin, cyanogenic glucosides, vicine and non protein amino acids. These defensive compounds are infective against the host-specific bruchids which attack cow pea and common bean (Sales *et al.,* 2000).

Desroches *et al*., (1995) studied the effect of tannin, vicine and convicine in the *Vicia faba* seed on *Callosobruchus chinensis* (L.) and *C. maculates.* They found that the seeds of the tested genotypes of *Vicia faba* L. differed by the presence or absence of tannins in the seed coat, which influence the enzymatic activity of glucose-6- phosphate dehydrogenises (G-6-PDH). For both bruchids the seed coat represents a barrier that only 45-60 % of larvae overcome. Also, Mendoza *et al*., (2001) reported that, *vigna radiata* var. sublobata were screened for some biochemical factors of bruchid resistance namely:tannins, saponins, alkaloids, phytohemagglutinins, and ex-amylase inhibitors.

The current study was carried out to study:

1- The efficiency of protecting cowpea seeds from infestation by spraying plants with natural seed extracts and Malathion in the field on infestation levels during different storage periods.

2- The variations between cowpea cultivars in levels of natural infestation with cowpea weevils and its relation with seed chemical composition and its effects on seed quality and seed dry weight loss.

MATERIALS AND METHODS

A field study was conducted at the farm of the Experimental Station of El-Serw, Damitta Governorate during the two summer seasons of 2007and 2008.The soil of the Experimental Station was clay and its properties are listed in Table (1).

Table (1): Initial physical and chemical analysis of the soil before conducting the experiment (average of the two seasons).

Physical		Chemical	
Texture	Clay	**pH**	7.90
C.Sand	1.80	**Ec ds/m**	4.30
F.Sand	13.60	**$Caco_3$%**	2.56
Silt	20.40	**Organic matter %**	1.00
Clay	64.20	**Total N ppm**	40.49
		Available P ppm	9.25
		Available K ppm	201.30

Four cultivars of cow pea (*Vigna unguiculata* L.), namely Buff and Cream (USA), Brabham (Ghana) and Local c.v. (Egypt) and four spray treatments ie. black pepper seed extract (*Piper nigrum*), neem seed extract (*Azadirachta indica* A. Juss. (L.)), malathion 57% pestside and control. The Pesticide used was Nasrlathion (Malathion-57, EC: S-1.2-di (ethoxycarbonyl) ethyl 0,0-dimethyl phosphorodithioate) . Cow pea plants were sprayed with seed extracts at flowering and pod filling stages. The experiment was laid out in a strip plot design, the vertical plots were devoted for spray treatments and the cow pea cultivars were arranged in the horizontal plots. The plot area was

6 m^2 (3×2 m) having 5 rows of 3 m length and 60 cm width. The preceding winter crop was berseem in the two seasons. Seeding rate was 20 kg/fad. and planted by hand after seed inoculation with the proper Rhizobium (1/2 kg Okadin/fad.) The sowing date was the 5th and the 2nd of June in the first and second seasons, respectively. All plots received Calcium super phosphate at the rate of 22.5 Kg P_2O_5/fad., Potassium sulphate at the rate of 50 kg K_2o/fad. during soil preparation and before sowing. Also, nitrogen fertilization was added at a rate of 20 kg N/fad. after germination and before nodulation. Other agricultural practices of forage cow pea were followed. The tested cultivars gave two cuts in both seasons and the third cut was left to seed production. Cuts were taken through the growing seasons when plants reached about 60 cm for each cut. After harvest seeds of each sub plot were sieved and cleaned from husk, dust and stored in cloth bags. The studied traits of seed quality and seed chemical compositions were determined directly after harvest as well as after 3 and 6 months from harvesting.

Crude extracts preparation methods and seed treated:

Five hundred grams of each of neem and black pepper seeds were air dried in open –air for 10 days followed by further drying in air oven at 45 ^oC for two days until constant weight. Dried seeds were ground, sieved and preserved away from light and moisture until used in preparing the crude extracts. Crude extracts were prepared according to the method adopted by Freedman *et al*., (1979). The 500 gm of the seed powder were separately soaked in 1500 ml. of the solvent (Ethanol) for 4 days and filtered through Whatman No.1 filter pepper over Anhydride Sodium Sulphate. After that, the extracts were evaporated by rotary evaporator (temperature not accessed 50C^0).After extraction, the stock solution was prepared and a concentration of 5% from each extract (black pepper and neem seeds) was used for spraying cow pea plants in each plot. Malathion was used with a rate of 75 cm^3/100 liters water. Cowpea plants were sprayed with the neem, black pepper seed ethanol extracts and Malathion-57% at flowering and pod filling stages.

The studied traits were as follows

A: Yield traits:

1- Fresh forage yield (t/fad.): All plants of each plot were hand clipped and weighed in kg/plot, then transferred to t/fad.

2- Dry forage yield (t/fad.): Sub samples of 100 gms each were dried at 105^oC to constant weight and dry matter percentage was estimated. The dry forage yield (t/fad.) was calculated by multiplying fresh forage (t/fad.) with dry matter percentage (DM %)

3- Seed yield (kg/fad.): Pods of all plants in each plot were collected and seeds were separated and weighed in kg/plot, then transferred to kg/fad.

B: Seed quality traits

1- Seed germination and seedling vigor

Germination percentage was performed according to ISTA, 1985. During the final count 10 normal seedlings from each replicate were taken randomly to measure the plumule and radical lengths. After that they dried in a hot-air oven at 85 C^o for 12 hours (Kirshnasamy and Seshu, 1990) and weighed then the seedlings dry weight was recorded.

2- Insect infestation percentage

Directly after harvest, as well as after 3 and 6 months 100 seeds from each sample were used to estimate insect infestation, the infestation level was expressed as percent of damaged seeds according to Jood *et al*., 1996

Insect infestation % = No. of infested seeds / No. of inspected seeds x 100

3- Seed dry weight loss

Seed dry weight loss percentage was recorded according to Dick, 1987, after 3 and 6 months from storage.

Seed dry weight loss % = (UNd) - (DNu) / U (Nd+Nu) x 100

Nu = Number of undamaged seed, Nd = Number of damage seed.

U = weight of undamaged seed, D =weight of damage seed.

C: Seed chemical composition

Chemical analysis followed the conventional methods recommended by the Association of Official Agricultural Chemists A.O.A.C. (1980) in dried samples of seed powder to determine crude protein and total carbohydrates. Tannins, total phenols and vicine were measured calorimetrically by using spectrophotometers (Spectronic 21-D) according to Burn (1971) for tannins, Swain and Hillis (1959) for total phenols and Collier (1976) for vicine.

Collected data for each season were statistically analyzed by the technique of analysis of variance and the least significant differences (L.S.D.) of treatments (Gomez and Gomez, 1984). Bartlett test was done to the homogeneity of error variances. The test was significant for all traits except fresh and dry forage yields, radical length, seedling dry weight, tannins and vicine, thus the data of both years were combined for these traits only.

RESULTS AND DISCUSSION

Forage and seed yields

Fresh and dry forage yields of the tested cultivars varied significantly for the individual cuts as well as the total fresh and dry forage yields. The first cut produced higher fresh and dry yields than that of the second cut. Results in Table (2) showed that significant differences between the studied cultivars were observed in total fresh and dry forage yields. Buff cultivar produced the highest fresh and dry forage yields while, the local cultivar gave the lowest fresh and dry forage yields. The superiority of Buff cultivar hold fairly true for the individual cuts as well as the accumulated yield of the two cuts.

Table (2): Fresh and dry forage yields of cow pea cultivars (combined over 2007 and 2008 seasons)

Traits / Cultivars	Fresh yield (t/fad.)			Dry yield (t/fad.)		
	1st Cut	2nd Cut	Total	1st Cut	2nd Cut	Total
Local	7.94	5.81	13.75	1.00	0.72	1.72
Brabham	9.20	7.88	17.08	1.38	1.05	2.43
Cream	8.74	6.22	14.96	1.24	0.88	2.12
Buff	10.75	8.65	19.40	1.55	1.24	2.79
LSD 5%	**1.92**	**0.76**	**1.86**	**0.66**	**0.31**	**0.46**

Data presented in Table (3) illustrated significant differences between cow pea cultivars, spray treatments and their interaction effect on seed yield. Significant differences between the tested cultivars were observed in seed yield and the Buff cultivar produced the highest seed yield (373.2 kg/fad.) while, the local cultivar gave the lowest yield (310.1 kg/fad.). This superiority of Buff cultivar over the local cultivar amounted 20.03%.

Table (3): Effect of cow pea cultivars and spraying treatments on seed yield (combined over 2007 and 2008 season)

Treatments	Seed yield (kg/fad.)
A- Cultivars	
Local	310.1
Brabham	336.8
Cream	352.4
Buff	373.2
LSD 0.05	**7.48**
B- Spraying treatments	
Control	313.9
Black pepper seed ext.	333.2
Neem seed ext.	349.3
Malathion 57%	376.0
LSD 0.05	**7.48**
AXB- Interaction	
Local X Control	284.2
Local X Black pepper seed ext.	316.8
Local X Neem seed ext.	305.9
Local X Malathion	333.4
Brabham X Control	305.0
Brabham X Black pepper seed ext	345.8
Brabham X Neem seed ext.	323.3
Brabham X Malathion	373.3
Cream X Control	330.8
Cream X Black pepper seed ext	355.8
Cream X Neem seed ext.	341.5
Cream X Malathion	381.6
Buff X Control	335.8
Buff X Black pepper seed ext	379.0
Buff X Neem seed ext.	362.4
Buff X Malathion	415.8
LSD 0.05	**10.56**

The data in Table (3) also revealed significant differences among the spraying treatments. The highest value (376.0 kg/fad.) was obtained from spraying cow pea plants with malathion meanwhile, the lowest value (313.9 kg/fad.) was obtained from unsprayed materials.

Results of seed yield as affected by the interaction between cow pea cultivars and the spraying treatments are presented in Table (3). The statistical analysis indicated significant differences among the different treatments as combined over the two seasons. It is clear from the data that the increases in seed yield when Buff cultivar plants was sprayed by

malathion 57% and gave the highest seed yield (415.8 kg/fad.) and the lowest seed yield (284.2 kg/fad.) was obtained with the unsprayed local cultivar.

Data presented in Table (4), illustrated the effect of cowpea cultivars, spray treatments and storage periods, on germination percentage, plumule length, radical length, seedlings dry weight, insect infestation and seed dry weight loss. Cowpea cultivars showed significant differences in the above traits except the plumule length. Cultivar Buff produced the highest value of germination percentage (92.3%). On the other hand, local cultivar produced the lowest values of these traits. The significant differences between cowpea cultivars in seed germination and seedlings vigor might be due the variation between these cultivars in its genetic make up. With respect to the variations between the studied cultivars in insect infestation % and seed dry weight loss % , cultivar buff produced the lowest values of insect infestation percentage (6.94,6.99 %) , and seed dry weight loss percentage (2.98,3.01%) in the first and second seasons, respectively. meanwhile, the local cultivar produced the highest value (8.49,8.65 %) and (3.96,4.25%) in the first and second seasons, respectively. The variation between the studied cultivars in insect infestation might be attributed to chemical composition. Mendoza *et al*., (2001) screened *vigna radiata* for some biochemical factors of bruchid resistance namely: tannins, saponins, alkaloids, phytohemagglutinins and ex-amylase inhibitors. The data presented in Table (4) reveled that spraying with plant extracts or Malathion on cowpea plants had significant effects on the studied traits. The highest value of germination percentage (92.1%) was obtained from spraying cowpea plants with Malathion followed by black pepper seed extract (91.4%), neem seed extract (90.6 %) and the lowest value (88.5%) was obtained from unsprayed plants. This might be due to differences in the chemical constituents between plant extracts and its toxicity to the storage pests. Similar results were obtained by Makanjuola 1989 and Peterson *et al*., 1989.

Obtained cowpea seeds from sprayed plants with Malathion-57%, black pepper and neem seed extract recorded the lowest values of insect infestation (6.64,6.74%), (7.78,7.86%) and (8.34,8.16%) in the first and second seasons, respectively. On contrast the highest value of insect infestation percentage (9.61, 9.47%) was obtained from the control treatments in the first and second season, respectively. Consequently, the same trends were recorded for the seed dry weight loss percentage. The lowest values of seed weight loss (2.25, 2.76 %) were recorded from spraying with Malathion and the highest values of seed weight loss (5.31, 5.26 %) were obtained from the unsprayed plants (control treatment) in the first and second seasons, respectively. The same trend was obtained for seed dry weight loss. (Su, 1977 and Su and Horvat, 1981) reported that the ground of black pepper (*Piper nigrum*) and its ethanol crude extract were highly toxic to rice and cowpea weevils. Also (Yadav, 1985; Das, 1987; Babu *et al*., 1989) reported that, neem seed oil showed 100% control of *C. chinensis, C. maculates* and *C. analis* (F.) in *Vigna radiata* for 5 months. Meanwhile, (Makanjuola 1989 and Echendu, 1991) reported that neem extracts reduced the infestation of cowpea seeds

Significant effects for the storage periods on the studied traits were obtained as shown in Table (4).As the storage period extended from 0 to 3 and 6 months, germination percentage of cowpea seed decreased from 98.2 % to 90.8% and 83.6 %, respectively. The reduction in seed viability or seedlings vigor might be due to increasing the storage period might be infested with the storage pests or might be due to the increase in some organic compounds in respiration process with increasing storage period. These results are similar with those reported by Girish *et al*., 1976.

On contrast, insect infestation percentage was increased from (1.14, 0.95%) to (4.09, 3.78%) and (19.05, 19.44%) when the storage period increased from zero to three and six months in the first and second seasons, respectively. On the other hand, values of seed dry weight loss percentages were quite increased from (0.00, 0.00) to (2.79, 3.13) and (8.22, 8.09 %) as the storage period increased from zero to six months in the first and second seasons, respectively. Jood *et al*., (1996) found that insect infestation and seed dry weight loss were increased as the storage period increased.

Results in Table (4) revealed that the effects of the 1st and 2nd orders interactions reached the significant level with most of the studied traits with few exceptions mainly with the plumule length. The significant interactions mean that the levels of the different studied factors did not behave the same under each other.

Data presented in Table (5) illustrateed the effect of cow pea cultivars, spraying treatments and storage periods on the chemical constituents, crude protein, total carbohydrates, tannins, total phenols and vicine. Cow pea cultivars significantly differed in these chemical constituents. Cultivar buff gave the highest values in crude protein (22.58, 23.73%), tannins (179.04 mg/100gm), total phenols (34.50, 32.78 mg/gm) and vicine (5.01mg/gm), while cultivar brabham gave the highest values in total carbohydrates (45.07, 45.53%) in the first and second seasons, respectively.

The data presented in Table (5) revealed that the spraying treatments had significant effects on the investigated cow pea chemical constituents except tannins, total carbohydrates and total phenols in the second seasons. Seeds of cow pea plants which sprayed with Malathion contained the highest values of crude protein (22.23, 21.57%), total phenols (27.19, 27.14 mg/g) in the first and second seasons and vicine (4.31 mg/g) while, the control treatment produced the lowest values of these traits.

The data presented in Table (5) showed that extending the storage period from harvest up to 6 months gradually reduced seed contents of total carbohydrates, tannins, total phenols and vicine. Meanwhile crude protein contents were gradually increased from (21.79, 21.39 % to 22.80, and 21.60 %) with prolonging the storage period to 6 months. On the contrary, the total carbohydrates were decreased from (43.09, 43.64 %) to (40.18, 40.45 %), tannins from (178.29 to 128.71 mg/100g), total phenols from (35.46, 35.40) to (20.61, 20.41 mg/g) and vicine from (4.70 to 3.83mg/g).

Table (5): Effect of cultivars, spraying treatments and storage periods on protein, total carbohydrate percentages, Tannins, total phenols and vicine contents of cow pea seed.

Traits / Treatments	Crude protein (%)		Total carbohydrate (%)		Tannins (mg/100g)	Total phenols (mg/g)		Vicine (mg/g)
	2007	2008	2007	2008		2007	2008	
A- Cultivars								
Local	22.51	21.70	39.98	40.89	138.73	21.87	23.61	3.33
Brabham	23.00	22.39	45.07	45.53	155.04	29.62	29.19	4.64
Cream	20.56	18.29	44.53	42.38	142.78	22.35	22.47	4.05
Buff	22.58	23.73	37.34	39.68	179.04	34.50	32.78	5.01
L.S.D. 0.05%	**0.02**	**0.11**	**0.03**	**0.24**	**0.93**	**0.19**	**0.34**	**0.05**
B- Spraying treatments								
Control	22.12	21.44	41.58	42.12	153.84	27.00	26.94	4.26
Black pepper seed ext.	22.13	21.54	41.67	42.12	153.90	27.06	26.99	4.26
Neem seed ext.	22.17	21.56	41.80	42.11	154.01	27.08	26.97	4.29
Malathion-57%	22.23	21.57	41.68	42.13	153.85	27.19	27.14	4.31
L.S.D. 0.05%	**0.02**	**0.11**	**0.03**	**Ns**	**Ns**	**0.19**	**Ns**	**0.05**
C- Storage periods								
0 months	21.79	21.39	43.09	43.64	178.29	35.46	35.40	4.70
3 months	21.89	21.59	41.92	42.26	154.69	25.18	25.23	4.31
6 months	22.80	21.60	40.18	40.45	128.71	20.61	20.41	3.83
L.S.D. 0.05%	**0.02**	**0.13**	**0.03**	**0.28**	**1.09**	**0.23**	**0.40**	**0.06**
D- Interactions								
AB	**0.01**	**0.16**	**0.04**	**Ns**	**Ns**	**Ns**	**Ns**	**Ns**
AC	**0.02**	**0.15**	**0.04**	**0.32**	**1.29**	**0.29**	**0.46**	**0.07**
BC	**0.03**	**0.15**	**0.04**	**Ns**	**Ns**	**Ns**	**Ns**	**Ns**
ABC	**0.04**	**0.25**	**0.07**	**Ns**	**Ns**	**Ns**	**Ns**	**Ns**

The significant interactions revealed that the response of the investigating cultivars were not the same with the spray treatments and storage periods.

Data in Table (6) illustrated the correlations between insect infestation and tannins, total phenols, vicine, seed dry weight loss as well as germination percentage. Highly significant correlations were recorded. Insect infestation had highly significant negative correlations with tannins content (r=-0.679), total phenols (r=-0.624), Vicine (-0.421) and germination percentage.On contrast highly positive correlation between insect infestation and seed dry weight loss (r=0.933). On the other hand, seed dry weight loss negatively correlated with tannins (r=-0.648), total phenols (r=-0.645), Vicine (r=-0.409) and germination percentage (r=-0.909).

Table (6): Correlations between insect infestation and germination percentage, seed dry weight loss percentage, tannins, total phenols and vicine contents.

Traits	Tannins	Phenols	Vicine	Seed dry weight loss %	Germination %	Insect infestation %
Tannins	1.000					
Phenols	0.435**	1.000				
Vicine	0.769**	0.014ns	1.000			
Seed dry weight loss%	-0.648**	-0.645**	-0.409**	1.000		
germination%	0.703**	-0.658**	0.432**	-0.909**	1.000	
Insect infestation %	-0.679**	-0.624**	-0.421**	0.933**	-0.888**	1.000

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تأثير الرش بالمستخلصات النباتية على الحاصل وصفات جودة البذور و الأصابة الحشرية لبعض اصناف لوبيا ألعلف

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أجري هذا البحث بهدف دراسة تأثير الرش بمستخلصات البذور ألنباتية و المبيد الكيماوي (ملاثيون ٥٧%) على كمية الحاصل و جودة البذور و ألأصابة الحشرية لبعض اصناف لوبيا ألعلف و ذلك في محطة ألبحوث الزراعية بالسرو- خلال الموسم الصيفي لعامي ٢٠٠٧و ٢٠٠٨.

- أشتملت ألدراسة على أربعة أصناف من لوبيا ألعلف هي (Buff, Cream, Brabham and Local) و أربعة معاملات رش بمستخلصات البذور النباتية و المبيد الكيماوي (رش بمستخلص بذور الفلفل ألأسود ، رش مستخلص بذورالنيم و رش بمبيد الملاثيون(٥٧%) و بدون رش.
- أجري تخزين للبذور المتحصل عليهابعد الحصاد لمدة ثلاثة و ستة شهور.
- اتبع تصميم ألشرائح المتعامدة في ثلاثة مكررات.
- أظهرت النتائج تفوق ألصنف Buffعلى ألأصناف ألأخرى في كمية الحاصل ألأخضر الكلي و الحاصل الجاف الكلي ومحصول البذرة ونسبة ألأنبات كما اعطى أقل نسبة أصابة حشرية ونسبة فقد في ألوزن ألجاف للبذور كذلك أعطى نفس الصنف أعلى قيم للبروتين ألخام، ألتانينات ، الفينولات الكلية و الفيسين .
- أعطى الرش بالملاثيون(٥٧%) أعلى قيم في نسبة ألانبات و أقل قيم في ألأصابة ألحشرية و نسبة ألفقد في ألوزن ألجاف للبذور.
- أظهرت النتائج أنه بزيادة فترات التخزين من بداية الحصاد ألى ستة شهور انخفاض ألنسبة ألمئوية للأنبات بينما زادت نسبة ألأصابة ألحشرية و كذلك الفقد في الوزن الجاف للبذور كما حدث نقص معنوي في محتوى البذور من ألكربوهيدرات و ألتانينات و الفينولات الكلية وكذلك الفيسين بينما أزداد محتوى البروتين الخام تدريجيا بزيادة فترة ألتخزين ألى ستة شهور.
- اظهرت النتائج وجود أرتباط سالب بين الأصابة ألحشرية و الفقد في الوزن الجاف للبذور ومحتوى البذور من التانينات والفينولات الكلية و الفيسين و كدا النسبة المئوية للأنبات .
- تشير النتائج السابقة أنه يمكن ألتوصية بزراعة صنف لوبيا العلف Buff و الرش أثناء مراحل ألتزهير و أمتلاء القرون بمستخلصات بذورالنيم و الفلفل ألأسود كبدائل للرش بالملاثيون ٥٧% لحماية بذور لوبيا ألعلف من ألأصابة ألحشرية بخنفساء اللوبيا وألأحتفاظ بجودة البذور لمدة تخزين ٦ شهور.

Table (4): Effect of cow pea cultivars, spraying treatments and storage periods on germination percentage, plumule length, radical length, seedling dry weight, insect infestation and seed dry weight loss.

Treatments	Germination (%)	Plumule length (cm)		Radical length (cm)	Seedlings dry weight (mg)	Insect infestation (%)		Seed dry weight loss (%)	
		2007	2008			2007	2008	2007	2008
A- Cultivars									
Local	90.0	16.1	16.0	17.5	624	8.49	8.65	3.96	4.25
Brabham	90.6	16.0	15.9	17.6	624	8.52	8.45	3.99	4.12
Cream	90.6	16.1	15.8	17.5	625	8.02	8.13	3.75	3.58
Buff	92.3	16.1	15.8	17.6	625	6.94	6.99	2.98	3.01
L.S.D. 0.05%	**0.6**	**Ns**	**Ns**	**0.1**	**0.1**	**0.26**	**0.22**	**0.02**	**0.29**
B- Spraying treatments									
Control	89.4	16.0	15.7	17.4	624	9.61	9.47	5.31	5.26
Black pepper seed ext.	91.4	16.1	16.0	17.7	625	7.78	7.86	3.31	3.25
Neem seed ext.	90.6	16.1	15.9	17.6	625	8.34	8.16	3.81	3.69
Malathion-57%	92.1	16.1	15.9	17.7	626	6.64	6.74	2.25	2.76
L.S.D. 0.05%	**0.6**	**Ns**	**Ns**	**0.1**	**0.9**	**0.38**	**0.22**	**0.02**	**0.29**
C- Storage periods									
0 months	98.2	16.3	16.2	18.3	627	1.14	0.95	0.00	0.00
3 months	90.8	16.1	15.9	17.4	625	4.09	3.78	2.79	3.13
6 months	83.6	15.8	15.5	17.0	622	19.05	19.44	8.22	8.09
L.S.D. 0.05%	**0.7**	**0.2**	**0.5**	**0.1**	**0.1**	**0.45**	**0.26**	**0.03**	**0.34**
D- Interactions									
AB	**0.9**	**Ns**	**Ns**	**Ns**	**Ns**	**Ns**	**0.31**	**0.33**	**0.41**
AC	**0.9**	**Ns**	**Ns**	**0.1**	**1.3**	**0.51**	**0.29**	**0.03**	**0.39**
BC	**0.9**	**Ns**	**Ns**	**0.1**	**1.3**	**0.51**	**0.29**	**0.03**	**0.39**
ABC	**Ns**	**Ns**	**Ns**	**Ns**	**Ns**	**0.88**	**0.50**	**0.05**	**0.67**