



**Pesticide
Abstracts**

Pesticides

1.4.1 Effects of test temperature on the values of free Acidity, pH viscosity, Wettability, and Emulsion stability on Emulsifiable Concentrates and settable Powders formulations

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Abstract

The study aimed to investigate the effect of prevailing laboratory temperature on the physical properties of some EC and WP formulations of insecticides. These insecticides were the generics of chlorpyrifos 48EC, *deltamethrin* EC and WP. The important speciation parameters were measured under temperatures ranging from 20 to 50 °C by an increment of 5 °C for each test. The tested properties were free acidity, pH, viscosity, wettability and emulsion stability adopting methods of the collaborative International of Pesticide Analytical Council (C(PAC)). Results showed that wettability of the three WP generic of deltamethrin did not show a specific trend for the formulations with the increase in temperature, the different generics wetting times differed significantly and behaved differently significantly and behaved differently, Carbaryl generics (3) showed significant increase in their wettability times (25 to 79 sec). K-othrine® needed 46 sec, (at 50°C), whereas Sevin® was wet within 10 sec only. In all cases, increasing the temperature resulted in decreasing the viscosity, however, the three EC generics of chlorpyrifos when their pHs were measured under 20, 25, 30°C showed the same pH range. At 35°C and above, the pH values differed. In almost all cases, at 50 °C the pH was the lowest and almost lower and also lower than its counterparts for the same insecticide. For the WPs, the pH values were decreasing as the temperature of the environment increases. The three chlorpyrifos EC formulations did not show similar acidity even at 20°C the three chemicals behaved differently, e.g. Dursban® was greatly affected when temperatures were higher than 30°C. The three ECs belonging to deltamethrin group were drastically affected by changing the test temperature to 35°C. The three WP generics of deltamethrin when measured under 20, 25 and 30°C showed the same free acidity values. At 45°C Shashtra® 2.5 WP had the highest value (1.28) within the group. Regarding the three generics of carbaryl, when measured under 20, 25 and 30°C showed different free acidity values. At 30°C Savin® showed the same value (2.32). A rather similar results

noted at 50⁰C (0.89 and 0.95) for Savin® an Savin®. At 35⁰C, almost identical values were obtained (1.29, 1.30. 1.28). Regarding the emulsion stability test at 0 time, Dursban® 4EC was not affected by the test temperature. Chloroguard® readings showed no. oil cream up to 35⁰C . Morisban® behaved like Dursban®. The three deltamethrin generics behaved like Dursban® and Morisban, except Decis® 25 EC. At 0.5 hr, five of these ECs showed no cream layer at the different test temperatures; Decis® 100 EC behaved similar to others up to 35⁰C, but not at 40, 45 and 50⁰C (cream). The readings at 2 hr also showed the appearance of the cream layer, except in Decis® 100 EC in which the cream layer appeared at 45⁰C and 50⁰C Chloroguard at high temperatures increased the cream layer, followed by Decis® 25 EC (0.7-0.9 ml) at 25-50⁰C. After 24 hr, the readings differed between chemicals. Reading chloroguard® the cream started to appear immediately after increasing the test temperatures: 0.1-0.3 ml up to 45⁰C, and disappeared at 50⁰C, Morisban® was not affected by the test temperature. Decis® 25 EC showed cream layers. In all test temperatures. The re-emulsification test (24.5 hr) in most cases showed cream layer. Very few cases resulted in no cream; most of them belong to Decis® 100 EC.

In general, properties such as EC, free acidity, viscosity, wettability and Ph range have considerably.

1.4.2 The ameliorating effects of green tea extract against cyromazine and chlorpyrifos induced hepato, renal and reproductive toxicities in male rats

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Abstract

Objectives: Pesticides are being widely used to control agricultural pests and insects causing public health hazard including oxidative stress, free radicals generation as well as infertility problems. The present study is aimed to elucidate the possible protective effect of an aqueous extract of green tea (GT) in alleviating the hepato, renal and reproductive toxicities resulting from cyromazine (Cyr), chlorpyrifos (CPF) and their binary mixture when administered to male rats. **Methods:** The route of administration selected for the study was oral gavage for 28 days in case of liver and renal toxicities and 70 days to complete the spermatogenic cycle in case of reproductive toxicity. Rats divided into 8 groups of sufficient animals. Group 1 served as control of

received corn oil at a volume of 4 ml/kg body weight (bw) and allowed distillate water and labium. Group II permitted free access to solubilised GT (1.5% s/v in water) as the sole drinking fluid. Group III, IV and V rats were given a single daily oral doses of Cyr (135.48 mg kg⁻¹, 1/25 LD₅₀ in corn oil) CPF (5.4 mg kg⁻¹ LD₅₀ in corn oil) and the mixture of the doses of insecticides, respectively. Group VI, VII, VII rats were given the same doses as groups III, IV and V simultaneously permitted free access to solubilised GT as the sole drinking fluid. **Results:** Cyr, CPF and their binary mixture caused significant alteration (p<0.05) in the levels of biochemical indices related to liver function (ALT, AST, ALP), kidney function (creatinine, urea) and reproductive toxicity (testosterone level) when compared with the controls. Also, results showed that there was a correlation between insecticides administration and the significant alterations in that oxidative stress parameters (LPO, GSH, CAT, SOD, GPX and GST). On the other hand, the reproductive toxicity was manifested by alterations in sperm counts. Spermatozoon survivals, fertility index, increase of sperm abnormalities in the testis. In contrast, co-administration of GT to the testis rats ameliorated and restored almost most of these biochemical parameters to normal levels. Administration of Cyr, CPF and their mixture resulted in histopathological alterations in concerned organs (liver, kidney, testis) of male rats. However, co-administration of GT to treated-animals improved the damage and alleviates the toxic effects of Cyr, CPF and their mixture on reproductive functions in male rats. **Conclusion:** The use of green tea extract appears to be beneficial to a great extent in attenuating and improving the hepato-nephro- and reproductive-toxicities sustained by insecticide exposure in male rats.

Key words: Cyromazine; Chlorpyrifos; Green tea; oxidative damage; reproductive; rat

1.4.3 Oxidative damage and nephrotoxicity induced by prallethrin in rat and the protective effect of *Origanum majorana* essential oil

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Objective: This study aims to investigate the effects of prallethrin (Pral) on renal dysfunction biomarkers, antioxidant enzyme activities and lipid peroxidation in rats and the protective effect of *Origanum majorana* essential oil (EO).

Methods: Rats were divided into four groups of seven rats each. Groups (i) received only olive oil (ii) treated with 64.0 mg/kg body weight prallethrin (1/10LD₅₀) in olive oil via oral route daily for 28 days, (iii) treated with 64.0 mg/kg body weight prallethrin (1/10LD₅₀) and EO (160uL/kg b.wt.) in olive oil and (iv) received EO (160 uL/kg b. wt.) in olive oil oral route twice daily for 29 days. **Results:** Prallethrin cause significant increase in lipid peroxidation (LPO) and decreased in superoxide dismutase (SOD), glutathione peroxidase (GPx) and glutathione reduced (GSH). Consistent histological changes were found in the kidney of prallethrin treatment. Co-administration of EO attenuated the prallethrin induced renal toxicity and oxidative stress by decreasing LPO in kidney, creatinine, urea and uric acid levels in serum. In addition, SOD and GPx activity and GSH level were increased in kidney in Pral-EO groups. **Conclusion:** We can conclude that prallethrin induced oxidative damage and renal toxicity in male rat. Co-administrations of EO alleviate prallethrin-induced oxidative stress and renal toxicity.

Keywords: Prallethrin; *Origanum majorana*; Oxidative stress; Kidney

1.4.4 Efficacy of some insecticide and fungicide seed dressing mixtures for the control of flea beetle, *Podagrica spp.* (Coleoptera: Halticidae) and diseases on cotton

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New mixtures of the insecticide imidacloprid and the fungicides tebuconazole, triticonazole of the already recommended pesticide formulations were evaluated for the control of flea beetle (*Podagrica spp.*) and damping-off disease in three commercial cotton varieties at the Gezira Research Station Farm (GRSF) during 2010/2011 season. The tested mixtures significantly improved crop establishment, reduced seedbed losses, depressed flea beetle population and damage and increased seed cotton yield compared to the untreated control. Additionally, the mixture displayed comparable results to the standard and the counterpart treatments. High yields were obtained with Hamid cultivar when Ghoulish+Raxil, Gaucho+ Premis and Resumme+ Defender were used (7.8, 7.5 and 7.4 kantar/fed.) respectively. However, the highest yield increment was reported in Barakat 90 cultivar with 25% yield increment. Premis 25% FS displayed the highest inhibitory activity against *Macrophomina*

phaseolina and *Rhizoctonia solani* *in vitro* at the lower concentrations (250,500 ppm) when compared to the standard and Defender treatments.

Keywords: Seed dressing, Flea beetle, Damping-off Disease, Inhibiting activity

1.4.5 Gentotoxicity associated with lipid peroxidation and oxidative damage in the liver of rat exposed to prallethrin: the protective role of *origanum majorana* L. essential oil

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Abstract

Objectives: Because of the widespread use of prallethrin in household, the evaluation of their toxic effects is major concern to public health. Therefore, this study aimed to investigate: (1) the geotoxic and cytotoxic potential of prallethrin in rat bone marrow cells, (2) lipid peroxidation and oxidative stress in the liver in rat. (3) free radical scavenging activity, GC-MS analysis and protective effect of *O. majorana* L. Essential oil **Methods:** Male rats were divided into 4 groups: (i) received only olive oil (ii) treated with 46.0 mg/kg body weight prallethrin (1/10 LD₅₀) in olive oil via oral route daily for 28 days (iii) treated with 64.0 mg/kg body weight prallethrin (1/10₅₀) and EO (160 uL/kg b.wt) in olive oil and (iv) received EO (160uL/kg b. wt) in olive via oral route twice daily for 28 days **Results:** our results demonstrated that prallethrin at dose 64.0 mg/kg body weight (b.wt), (1/10₅₀) has a clastogenic/genotoxic potential as shown by the high percentage of chromosomal aberration (CA) and micronucleus (MN) in the bone marrow cells of male rats, Par induced alteration in liver dysfunction biomarkers (e.g. AST, ALT, and ALP). It caused increase in thiobarbituric acid reactive substances and reduction in the activities of SOD, CAT, GST, and GPx in liver tissue. Consistent histological changes were

found in the liver of prallethrin treatment, GC-MS analysis of *O. majorana* E.O revealed the presence of 4-terpinol (29.97 %), γ -terpinene (15.40%), trans-sabinene hydrate (10.93%), a terpinene (6.86%), 3-cyclohexene-1-1 methanal-, (S)-(CAS) (6.54%), and sabinene (3.91%) as a main constituents. *O. majorana* L. EO exhibited concentration-dependent inhibitory effects on DPPH*, hydroxyl radical, hydrogen peroxide, reducing power and lipid peroxidation with IC₅₀ values of 58.67, 67.11, 91.11, 78.67 ug/ml, respectively. EO showed significant protection with the reduction of the CA (54.54%), reduced the micronuclei formation, improvement in liver dysfunction biomarkers and replenishment of antioxidant status and brought all the values to near normal. **Conclusion:** we can conclude that prallethrin can be considered clastogenic/genotoxic and may carry a risk to human health. It caused lipid peroxidation, oxidative stress and liver damage in male rat. The study revealed the *O. majorana* EO has a significant potential to be used as a natural antioxidant. It has antigenotoxic and anticytotoxic potential against prallethrin-induced genotoxic and cytotoxic in rat bone marrow cells and attenuated the toxic effect prallethrin. These results demonstrate that administration of EO may be useful, easy, and economical to protect human against pyrethroids toxic effects.

2.4.2 Simultaneous Analysis of Floupyram, Tebuconazole, Trifloxystrobin and its metaboliten residues in soil by Ultra performance liquid chromatography coupled to tandem mass spectrometry

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Abstract

In this work, an analytical multi-residue method based on extraction with acetonitrile using ultra-performance liquid chromatography tandem – mass spectrometry (LC-MS-MS) for simultaneous determination four fungicides in soil was developed. The four fungicides (Fluopyram, Tebuconazole, Trifloxystrobin and its metabolite) were extracted from soil matrix using acetonitrile and subsequently clean up using only octadecylsilane (C18) as sorbent prior to LC-MS-MS analysis. The limits of detection were ranged between 0.5 to 1.4 ug/hg¹, while the limits of quantification were ranged between 1 to 4 ug/hg¹ in soil matrix. The matrix-matched standard gave

satisfactory recoveries and relative standard deviation (RSD) values in soil matrix at three spiked levels (0.01, 0.1) and 1mg kg⁻¹)

The overall average recoveries for this method in all soil samples at three levels ranged from 75.2% to 97.6% with RSDs in the range of 0.03 to 12.8% (n=5) for all analyses.

2.4.3 Effects of pheromone lures on mass trapping of tomato leafminer, *Tauta asbsoluta* (Lepidoptera: Gelechiidae) in Sudan

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The tomato leafminer, *Tuta absoluta*, is one of the most devastating pests in protected and open field tomato cultivations in Sudan. Mass trapping using pheromone is an effective alternative for limiting the population of *T. absoluta* and the most important practical components of an IPM approach. The effectiveness of TUA-Optima, TUTA-CAP long life and YUA-100N loaded with 0.8, 1.5 and 3 mg of synthetic pheromone, respectively, were evaluated for mass trapping of *T. absoluta* males. These trials were carried out in seasons 2010-2011 and 2012 – 2013 in Khartoum State, Sudan Commercial open fields and greenhouses were treated with insecticides. The results indicated that all tested types of pheromone captured sufficiently high populations of males. Moreover, the combined effects of using mass trapping and insecticides in greenhouse trial resulted in significant reduction of the pest population, yield loss and percentage damaged fruits and increased the tomato yield compared with that when only chemical insecticides were used .

Keywords: Tauta, Pheromone, Mass Trapping

2.4.4 Evaluation of some insecticides for the control of major insect pests of cotton

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Eight products of different formulation were evaluated for their efficacy against the major cotton insect pests In Gezira scheme during 2011/12 – 2012/13 seasons. Four of the tested products were new formulation of an already recommended insecticide (Sarte/D 18.8% UL, Sinodalta/D18.7% UL, Prothrin 220 UL and Strempt 20% EC). And the other four products were new ready mixed insecticides. The results obtained showed that the products tested exhibited satisfactory performance against the target insect pest during both testing seasons. Comparable results with the standard treatments were observed as their performance against the target insect pests .Sarte /D UL at the rate of

1.0 l/fed. gave the best performance against the ABW and jassid throughout 2012/13 season. Moreover, Sarte /D UL at 1.0 l/fed., Titan 46% EC at 0.5 l/fed., standard EC, Belt Extra at 0.084 L/fed. and Hunter 300 OD at 0.06 l/fed. showed significant performance against jassid throughout the season 2012/13. All treatments were very effective in the control of the whitefly but Hunter 300 OD at the rate of 0.06 l/fed gave significantly better control than the standard treatment in season 2011/12. Population of the natural enemies was not affected by the application of the tested products.

Keywords: Gezira Scheme, Cotton, Performance, Insect pests, Natural enemies

2.4.5 Residues of phosphine (hydrogen phosphide) in sorghum

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Abstract

During storage sorghum is attacked by various insect pests which will be controlled by fumigation with phosphide compounds. This could result in residues of phosphine or PH_3 in the food, so an experiment was conducted to determine the residues of phosphine. Deviphos (56% tablets) fumigant (aluminum phosphide, AIP) was used for the some important insect pests in stored sorghum during season 2011. Two dosage rates were used. 1.85 and $2.5\text{g}/\text{m}^3$. For residue analysis we used the higher dose. After 5 days fumigation, degassing took place for 24 hours. Samples were collected at 1, 2, 3, 4, 5 days after degassing. Spectrophotometric method was used for determination of phosphine (PH_3) residue by detecting the AgNO_3 -complex at 430nm. The detection limit of the method was 0.008ug and the recovery of the method was 90%. In the tubes containing phosphine only, yellow color was formed, which has a maximum absorption at 430nm. No color or interference occurred in the tubes containing the treated and control samples, and this indicates that no residues of phosphine were found in these samples.

3.4.1 The Performance of formulated *Beauveria bassiana*, *Metarhizium anisopliae*, *Verticillium lecanii* alone and combined on controlling *Helicoverpa armigera* (Hubner) in cotton in Gezira and Rahad

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Keywords: *Beauveria bassiana*, *Metarhizium anisopliae*, *Verticillium lecanii*, *Helicoverpa armigera*, cotton,. Gezira, Rahad, Sudan

ABSTRACT

The study was conducted July 2007 to April 2008 in two sites (U of G research farm and Rahad experimental farm,ARC) to investigate the potential of the bio- insecticide BRIGADE[®] (a mixture of *Beauveria bassiana*, *Metarhizium anisopliae*, *Verticillium lecanii*) and the effect of each fungus for immediate and season-long suppression of the African bollworm (ABW), *Helicoverpa armigera* (Hb.) (Lepidoptera: Noctuidae), in cotton (Acala, Barac 67). Five treatments composed of the three entomopathogenic fungi (each alone), Avaunt[®] (As a standard) and Brigade[®] were evaluated. Cotton, was planted in 7\7\2007 by seeds treated with Gaucho[®] + Raxil[®] following the application of the herbicide oxyflourfen (Sharoxy[®]) + Diuron[®]. Urea fertilizer (2N) was added. Pesticides were applied using a knapsack sprayer (16 L capacity). The field was divided into six treatments replicated 3x (18 plots). The ABW was sprayed according to the recommended ETL. The other cotton pests were dealt with according to Gezira and Rahad practices. Counts were performed twice weekly .Cotton was harvested, weighed and subjected to standard q1ualitative tests at the Fiber and Spinning Testing Laboratory (ARC Medani) . Data was subjected to ANOVA. Results showed that all the sprayed plots gave significantly low numbers of the ABW (eggs/larvae) than the unsprayed plots, which sustained 21.6 and 26.3 eggs+larvae/100 plants in Gezira and Rahad schemes, respectively. All treatments significantly reduced the ABW infestation, with the best results obtained from *B. bassiana* 3.64 eggs+larvae/100 plants (2 sprays), followed by Brigade[®] 3.96 (2 sprays), the standard Avaunt[®] 4.03 (2 sprays), *M. anisopliae* 4.15 (3 sprays), then *V. lecanii* 4.92 eggs+larvae/100 plants (4 sprays) in Gezira scheme. While in Rahad scheme the best results were of Brigade[®] 5.09 eggs+larvae/100 plants (3 sprays), followed by Avaunt[®] 5.21 (4 sprays), *B. bassiana* 7.26 (4 sprays), *M. anisopliae* 7.57 (3 sprays), and *V. lecanii* 7.60 eggs+larvae/100 plants (4 sprays).

All treated plots showed significant increase in seed cotton yield compared to untreated control. No significance differences between Brigade® treatment and the standard Avaunt® in yield. Gezira mean (8.83, 7.88 k /F, respectively); Rahad (7.04, 7.22 k / F, respectively). Moreover Brigade® treatment hosted higher population of the predators *Chrysoperla* and *Coccinella*.

3.4.2. Identification of Some Alkaloids in Datura Stramonium (Saikaran, Jumson Weed)

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Abstract

This study aims at investigating the presence of alkaloids and other chemical constituents in Datura stramonium (Saigarm jimson weed). All parts of the plant were dried, crushed and then underwent extraction by soxhlet and maceration methods. The solvent used in these methods were the hexane (non polar) and ethanol polar). TLC techniques were used for the analyses the chemical component of Jimson seed. The result of TR showed the presence of the plant and then in thd seeds only. The best separation was found to be when the solvent system was acetone: water: conc, ammonia (90:07:03). Maceration method is the best procedure for extraction in addition it is cheap.

Keywords: Datura stramonium, TLC,TR, atropine, hyoscine, seeds

3.4.3 Bacterocera invadens (Drew, Tsuruta and White) (Diptera: Tephritidae), Identification, Population Incidence and Control in Wad Medani Locality, Gezira State, The Sudan

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ABSTRACT

Fruit flies (FFs; Diptera :Tephritidae) are recently declared to be pests of national importance, as they cause extensive damage to several fruit and vegetable crops. This study aimed to identify of the prevailing species in Wad medani greater locality, study the seasonal abundance and fluctuations of *Bacterocera invadens* (Drew, Tsuruta and White) and other species, if present; evaluate the performance of the pyrethroid Decis®(deltamethrin) 12.5% UL as a fogging treatment for controlling the adults in the orchards and evaluate the performance of neem seed powder extract (NSPE), when sprayed on the fruits before oviposition(in terms of infestation %; *i.e.* presence of eggs and/or larvae).The fieldwork was carried out in two locations (Hantoub and Gezirat-elfil)within Wad Medani Greater locality, Gezira State, central Sudan. Four orchards (one feddan each; *i.e.* F= 4200m²) were selected. Yellow sticky and locally made traps were used to collect and monitor FF species. Deltamethrin UL and NSPE were used against adults and immature stages, respectively. Deltamethrin was applied at three rates: (1, 0.5 and 0.25 L/F) using a fogging machine. One orchard was selected and divided into 4 blocks; each block contained three treatments plus the control. The fogging was repeated according to the population density. Ten fruits per tree were collected randomly and taken to the laboratory. The number of larvae per fruit, and number of emerged adults were recorded. The same was adopted following treatment with two concentrations of NSPE (50 and 25 g/L of water) were used. NSPE was applied every two wks. The results revealed all tested concentrations of deltamethrin and NSPE significantly reduced the number of pupae and the number of emerged of *B. invadens* adults on treated fruits, compared to the untreated ones. Methyl eugenol (ME) with the organophosphate (OP) malathion[®] 57% EC proved effective and is recommended for controlling adults of *B. invadens*. The highest population of *B. invadens* was detected during July and September (298 and 168 adults/trap, respectively, in Gezirat-elfil area), where as the lowest population was found during July and August in Hantoub area.

3.4.4 Fruit phytochemical analysis and saponins toxicity effects of bitter apple (Hanzal), *Citrullus colocynthis* (L.) schrad, on the Norway rat, *rattus norvegicus* (Berkenhout)

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Abstract

Citrullus colocynthis (L.) schard (CCT) is an important medicinal plant belonging to the family Cucurbitaceae. It is a well recognized plant in the traditional medicine and was used by people in rural areas as areas as a purgative, antidiabetic and insecticide. The board objective of this study was to evaluate saponins acute toxicity and histopathological effects; this might lead to elucidate their mode and site of action. This objective was achieved through different methodologies; Powdered dried fruit parts (rinds, pulps and seeds) of (CCT) were screened for decoction of saponins, glycosides, terpenes, anthraquinones, flavonoids, tannins, alkaloids, coumarins, cardiac glycosides, cyanogenic glycosides and cucurbitacins. The results of the qualitative analysis and phytochemical screening profiles indicated that, most of the natural products tested for are present in the plant material, except cyanogenic glycosides. The histopathological effects were determined on *Rattus norvegicus* (Berkenhout). Five dosage levels (60, 70, 80, 90 and 100 mgs saponins/rat) were selected following a pilot study and administered intraperitoneally (I.P) to each batch of albino rats (4 rats/batch). The treated rats were observed for 96 hr for acute toxicity symptoms. Death occurred between 1-4 days post-treatment. The corrected mortalities were 0, 25, 50, 75 and 100%, respectively. The LC₅₀ (Probit analysis), was 79.43 mg/rat. Symptoms and behavioural changes during the observation period were anorexia, abnormal gait, twitches, blepharoptosis (drooping of the upper eyelid), reduced activity, and bleeding. Severe diarrhea was the most serious symptom. The histological changes in the liver exhibited prominent nucleolus, open chromatin, congestion of central veins and liver sinusoids. The kidney showed signs of reduced renal tubules lining of epithelial cells. The stomach and digestive system showed mucosal edema, open chromatin, prominent mucosal edema, open chromatin, prominent nucleolus and structural necrosis. The hypoglycemic effect of saponins was also studied. Percentages reduction in glucose level in previously treated rats and the control after six hr from the treatment were 42%, 55.4%, 60%, 62.5%, 69.3 and 0.10%, following the same order, There was a considerable decrease in the concluded that (CCT) saponins can cause damage to the liver, kidney and stomach

furthermore, interferes with blood glucose levels, and consequently cause death of the rats.

Keywords; *Citrollus colocynthis*, *Rattus norvegicus* Cardiac Gloycides Saponins, Coumarins Cucurbitacins, Blood Glucose Levels

3.4.5 Chemical analysis of the physic nut, *Jatropha curcas* (L). seed Extract in Sudan

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Natural products are excellent alternatives to synthetic pesticides in order to reduce negative impacts on human health and the environment. The physic nut, *Jatropha curcas*L. (Malpighiales Z: Euphorbiaceae), is widely grown in the Sudan. The objective of this study was to identify the chemical composition of *J. curcas* seed extracts. It was focused on isolation and identification of extracted alkaloids by means of their R_f values in some solvent including methanol, ethyl acetate, chloroform and ethanol and their chromomeric reactions with UV_{254mm} or UV_{366mm} and spray reagent (dragendorff, marquis, Liebermann, ansisaldehyde-sulfuric acid and 10% H₂So⁴ in methanol) is described. To confirm the results, identification was performed by analysis of chemical group and the the molecular weight using Fourier Transform Infera Red by chemical group and the molecular weight analysis using Fourier Transform Infera Red (F.T.I.R) spectrum and Mass Spectrometry, respectively. The results of the analysis suggested that the seed *curcas* have three alkaloids i.e. (1): 2, 4 – dimethyl 1-6 pyridine (2): 5, 7-dihydroxy-5, 6, 7, 8-tetrahydro-lazocin-2one (3): ent-16B-hydroxy-17 acetoxy-kauran-19-al. These compounds were reported from *J.curca* seed extract for the first time.

Keywords:Chemical analysis ,Physical nut, *Jatropha curcas* (L), Seed extract

3.4.6 The Effect of UV- Light, Sun –Light, Temperature, and PH on the stability of Neem Seed Extracts

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The neem tree, *Azadirachta indica* A. Jus., is widely grown in the Sudan. The tree proved to be a potential source of botanical insecticides and fungicides. The objectives of the present study were to deal with the factors that cause degradation or that change the structure of the constituents or active ingredient (a.i.) of neem methanolic (Me. OH) extract or acetonitrile (AN) extract. Fresh neem seeds (NS) were extracted by Soxhlet after being decorticated and powdered. The oil was solvent- extracted (3×) with Me. OH in a separatory funnel for the collection of the polar components. This was followed by AN to collect the medium polarity compounds. TLC was used to locate (in terms of R_f values) the compounds of each extract. Each extract was exposed to one of four treatments(factors): Sunlight (1,2 and 3hrs); UV-light (15,20,30,40 and 60 min.); temperature (25,35,45 and 55, °C for 1,2 and 3hrs), and pHs (6.5,7.0, 8.1,8.6, in addition to two extremes 4.0 and 9.0. The original extracts revealed the presence of 8 compounds in Me,OH and 6 in AN- extracts. When the extracts were exposed to direct sunlight for 2 and 3 hr, the results proved to be time- dependent. When exposed to UV-light for > 15 min., the compounds started to decompose. Exposure for 60 min caused the disappearance of most of the compounds; the effect was also time – dependent. Temperature effect: The constituents were stable when the extracts were exposed to 25 to 35, °C . The critical temperature was 55 C°, it caused disappearance of most spots. Following exposure to 45 C, some spots (compounds) almost disappeared or their concentrations have decreased. pH effects. The extracts were more stable at pH 7.0. The safe range was 6.5 -8.6. The two extremes 4 and 9 must be avoided; both caused disappearance of the spots (compounds).

4.4.1 Residues of confidor 200 SL (imidacloprid) on date Palm

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Abstract

The residues of confidor 200 SL (imidacloprid) on date palm was detected by thin layer chromatography (TLC) and high performance liquid chromatography (HPLC) methods. No residues of imidacloprid and its metabolites were detected in all samples at R_f 0.53 by TLC method. The detection by HPLC indicated that, the parent compound and total reduces <9.01 and <0.05 respectively. The recovery rate was 83%. On basis of these results, the usage of Confidor 200L at the rate of 35 ml per tree on date palms constitutes no risk to humans.

4.4.2 Effects of Different Concentrations of Gezira Tannery Waste Water on Germination and Growth of Sorghum, Okra and Cotton

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Keywords: *wastewater, effluents, tannery, cotton, sorghum, okra, chromium, sulfur, sodium, Wad Medani, Sudan*

ABSTRACT

The Gezira tannery Corporation (GTC) uses huge amount of water throughout the tanning process. These effluents are usually released to the nearby forest which was devastated by the effects of this wastewater (WW) pollutants. The objective of this research was to investigate the effect of different concentration of GTCWW) on germination and growth of sorghum, okra and cotton. The study design was CRD. Samples of (WW) were collected from both the mouth (location I) and the tail (Location II) of the drainage stream. These samples were analyzed to determine the concentrations of Cr and sulphide using atomic absorption spectrometric (AAS) method. The effects of the WW (as is) and its dilutions on seed germination and seedling growth of sorghum, okra and cotton were studied. The results generally indicate the WW as such (100%WW) had inhibitory effect on seed germination in two locations. But the dilutions, viz. 3:1 (75%WW), 1:1 (50%WW) and 1:3 (25%WW) showed no inhibitory effect on seed germination, especially in location II. The range for germination % from highest to lowest WW concentration, was from 25 to 90 for sorghum, 15 to 87.5 for okra and 12.5 to 75 for cotton in location I, while in location II was 50 to 95 for sorghum, 20 to 90 for okra and the germination ranged between 20 and 90% for cotton. Regarding the seedling growth, the WW (100%) had the greatest depressive effect, followed by 3:1 and 1:1 dilutions, while the WW with 1:3 (25%WW) had no inhibitory effect on seedling growth. Survival, appearance and growth of plants of sorghum, okra and cotton were relatively better in dilution treatments as compared to 100%WW. The highest mean of seedlings growth was recorded in sorghum seedlings, followed by okra seedlings and the lowest means of seedling growth was recorded from cotton seedlings in both locations, this indicated that sorghum was relatively tolerant. Moreover, the seedlings were chemically analyzed by AAS to determine concentrations of CrIII, Na, and S. The crops irrigated with different concentrations of WW (T1 to T4) from the mouth of the

stream reflected higher amounts of Cr, Na and S than tail of the stream. The concentration of Cr in sorghum seedlings was higher than that in okra and cotton. Thus, it is concluded that the WW effluent from GTC is unfit for agricultural use, and it may have deleterious effect on soils when used for irrigation purposes.

4.4. 3 Susceptibility of the Cotton Flea Beetle, *Podagrica puncticollis* (Weise) (Coleoptera: Halticidae), to Imidacloprid and Thiamethoxam as Seedling Protectants

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Key words: Cotton Flea Beetle, Shot-hole, Gaucho®, Cruiser®

ABSTRACT

The cotton flea beetle (CFB) is considered the first insect pest that appears at the beginning of the season and attacks cotton seedlings in both irrigated and rain-fed areas. CFB causes great damage to seedlings and threat cotton production in the Sudan. Therefore, great effort has been put to control it. The distinct symptom of CFB damage is shot hole on the cotton leaves. The main objective of this study was to test the susceptibility of the CFB towards two neonicotinoid insecticides, viz. Gaucho® (imidacloprid) and Cruiser® (thiamethoxam), which are normally used as seed dressing treatment. This study was conducted during season 2007/2008 at the Bioassay Laboratory, Entomology Section, Crop Protection Center, the Agricultural Research Corporation, Wad Medani - Sudan. The experimental design used in this study was completely randomized design (CRD) with 4 replications. Cotton seeds were treated with the insecticide Gaucho® 70 WS at different doses: 1, 3, 5, 7 (field recommended rate), and 9 g/Kg seeds, in addition to the untreated control. The insecticide Cruiser® 350 FS was tested at doses: 1, 2, 3 (field recommended rate), 4, and 5 ml/Kg seeds and a control was included. The treated and untreated seeds were sown in pots (11 x 11 cm); 3-5 plants/pot and the data was collected 2, 4, 6 and 8 weeks after emergence. CFB adults (4) were kept in plastic cups with perforated cover. A hole was made on the center of the cover to insert leaf petioles on another cup with water. Two parameters were observed during the study. These included the number of the adult CFB (alive and dead), and the level of damage caused by the adult of CFB. The results showed the effectiveness of imidacloprid at rate 8 g/kg seeds ($LC_{90} = 7.94$ g/kg seeds) at 2 weeks after sowing (WAS), but this effectiveness continued for only 4 weeks and significantly decreased after 6 and 8 weeks. The results of the study suggested the increase of FRD to 8 g/kg seeds ($=LC_{90}$) instead of 7 g/kg

seeds. Thiamethoxam did not show satisfactory control to CFB at doses around the field recommended dose (FRD = 3 ml/kg seeds). The highest percentage mortality was 62% at 2 WAS and 12.5% at 4 WAS.

4.4.4 Seasonality and Relative Distribution of *Chrysoperla carnea* (Stephens) among Different Crops and Locations in Merowe Locality, Northern Sudan

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Abstract

The green lacewing *Chrysoperla carnea* is the main common insect predator prevailing in northern Sudan. Therefore, regular field surveys were carried out during 2009/2010 to study the seasonal abundance of *C. carnea* among four major crops (viz., Berseem, hyacinth bean, okra and snake cucumber) and between four locations (Noori, Merowe, El-Gorair and Shiba) in Merowe locality, Northern Sudan. The predator was found to attack different pests on these crops throughout the year, including mainly several species of aphids in winter and immature stages of whiteflies and other soft body insects in other seasons. The seasonality study revealed that *C. carnea* is abundant all the year round. No significant differences were detected between the population levels of the predator on each crop, whether between seasons or among the different locations. Nevertheless, winter season revealed relatively higher population than the other seasons. Also, no significant differences were found among the different crops in all locations. Accordingly, it is concluded that the green lacewing (*C. carnea*) is adapted to various habitats and prey species in Merowe area, and proved to be the most abundant natural enemy of agricultural pests. This species is recommended to be studied as potential candidate for biological control of different pests in this area.

Keywords: Major crops; seasonal abundance; *Chrysoperla carnea*; Merowe, Northern Sudan.

4.4.5 Efficacy of two seed dressing insecticides and Neem seed extracts against aphids, *Aphis craccivora* (Homoptera:Aphididae) in faba bean in Northern Sudan

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This study was conducted carried out during 2002/03, 2003/04 and 2004/05 seasons in the Northern and River Nile States to evaluate the effectiveness of two seed dressing insecticides, Gaucho70 WS (imidacloprid) and Cruiser 350 FS (thiamethoxam) at the dosage rates of (1.8, 2.4 and 3g/kg seed) and (1.8, 2.4 and 2ml/kg seeds) respectively, and Neemseed extracts (3, 5, 5 and 6 kg powder/feddan) for the control of (*A. craccivora*) in faba bean varieties (Hudeiba 72) and (SM-L) were sown in River Nile and Northern States, respectively, under improved cultural practices. Results showed that, Gaucho at 3g/kg seeds, Cruiser at 3ml/kg seeds and Neem at 5kg powder/feddan was very effective in controlling aphids in faba bean. The practical budget analysis indicated that the tested compounds with their effective doses increased net profits.

Keywords: North Sudan, Faba bean, Aphids, Seed dressing, Imidacloprid, Thiamethoxam, Neem

4.4.6 Environmental Consideration in Crop Protection Research

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In Sudan high crop losses are encountered due to the attack by different pests and diseases. Cotton (Main cash crop is attacked by numerous insect pest complex, e.g. early season pests (Cotton Flea Beetle, The cotton Jassid) Mid season pests (The African bollworm) and late season pests (The cotton whitefly and the cotton aphids). An example of the economic importance of the damage caused by some of these pests was studied and the results showed that the African bollworm could cause 65% shedding of fruits. On the other hand Vegetables crops (e.g. Tomato) are also seriously attacked by various insect pests, e.g. The African bollworm. As a result both the main cash crop (cotton) and the main vegetable food crop (Tomato) are heavily sprayed with insecticides. At Present the main Method to combat insect pest is Chemical

Control using pesticides. However this strategy has a negative impact on the environment evident through environmental contamination, development of insecticide resistance, side effects on beneficial and non target organisms. Efforts should focus on an area-wide integrated pest management approach to enhance pest management. This is important for food security, introduction of sustainable agricultural systems, reduce losses and pesticide use and preserve biological diversity. Organic farming is an important approach to environmentally combating agricultural pests. In this approach weeds are controlled mechanically; manure is used for fertilization; and insects are controlled with pheromones, crop variety selection and parasite releases. Experience from organic farmers shows that alternate methods of insect control can work economically. Examples can be found in every segment of agricultural production. Integrated Pest Management (IPM) techniques are also very important tool for pest management. They include the use biological controls and selective insecticides as well as, tillage, mowing, planting resistant crop varieties (for example, Bt. cotton), altering planting and harvest dates, and rotating crops. More research have to be done to see what insect controls would actually work . The elements of IPM will be discussed in the paper.

4.4.7 Chromium III Tannery, Wastewater in Gezira , Wad Medani, Sudan

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Keywords: Gezira, Tannery, Bioindicator conformation

This study was initiated to investigate the level of chromium III in Gezira Tannery Wastewater and compared with the permissible limit standard for chromium III. Also the study was initiated to investigate the potential of lettuce (*Lactuca sativa L. var. buttercrunch*) seeds as a bioindicator (BI), or a biological tool for detecting the presence of one of the toxic materials used in tanning industry using the germination percentage as a parameter (indicator). This can help in reduction of cost analysis and might be a substitute for the high sophisticated analytical equipments.

Samples of Gezira Tannery Corporation (GTC) wastewater (WW) were collected from both the mouth and the tail of the drainage stream. These samples were analyzed to determine the concentrations of Cr using atomic absorption spectrometric (AAS) method.

Lettuce seeds (10/Petri dish, replicated 3 times and each experiment was repeated 3) were treated by GTC WW.

Results of AAS method showed high quantities of Cr III (1.85%), i.e. above the permissible limit (0.0001%). The bioassay experiment revealed that the seeds were intoxicated (i.e. reduced the germination percentage), when exposed to the WW. And clearly was: 35.5. The slope of the log-dose probability lines showed that the BI response to all treatments was homogeneous (>2). Lettuce seeds satisfied almost all the required properties of the ideal BI.

5.4.1 Differential response of some sorghum varieties and planting date to sorghum stemborer, *Chilo partellus* (Lepidoptera: Pyralidae) incidence in South Kordofan

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This study was conducted at Kadugli Research Station Farm in South Kordofan State during 2005/06 and 2006/07 seasons. Seven sorghum varieties (local and improved) i.e. Karamaka, Yellow, Mogod, Red Mogod, Wad Ahmed, Tabat, Fetarieta and Gadam El hamam and four planting dates early, optimum, late and very late sowings (i.e. 17/6, 3/7, 16/7 and 2/8, respectively) were effected to study the response of sorghum varieties and effects of different planting dates to the sorghum stemborer, *Chilo partellus*, incidence in the area. Local varieties karmaka; Red Mogod and Yellow mogod were more susceptible and more damage was incurred to the above mentioned varieties. Whereas, Gadam El hamam, Tabat and Wad Ahmed exhibited good performance against the pest and less damage was reported. Red Mogod had the highest yield that means this variety is tolerant to stemborer damage. Early sowing date was found to be the best practice to avoid the pest ravage.

5.4.2 Studies on central shootfly, *Atherigona socatta* (Rondani) resistance in sorghum (*Sorghum bicolor* (L.) Moench) under Gedarif rainfed conditions

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Keywords: Gedarif, Shootfly, Sorghum, Resistance, Morphological character

Field experiment was conducted in Gedarif State during the seasons, 2008 / 2012 to study the relationship of different morphological plant characters and shoot fly resistance in sorghum. The results obtained showed that a positive correlation was found between the leaf glossiness and the shootfly oviposition and dead hearts. The oviposition percentage on 14th and 21st days after seedling emergence was significantly positive when correlated with mean number of dead heart. Leaf trichome density on adaxial and abaxial leaf surfaces were significantly negative when correlated with mean number of dead hearts. The leaf trichome density revealed higher magnitude of resistance may be due to non-preference for oviposition. Seedling vigour recorded less association with dead heart percentage. Genotype correlation confirmed that the number of trichomes on both surfaces of lamina and leaf glossiness contributed to the resistance to shootfly. Thus these characters can be used as selection criteria for breeding shootfly resistance genotypes.

5.4.3 Varietal Susceptibility of Potato to the Black Cutworm, *Agrotis ipsilon* (HFN) (Lepidoptera: Noctuidae)

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ABSTRACT

The black cut worm (BCW), *Agrotis ipsilon* (HFN) (Lepidoptera: Noctuidae), is a highly polyphagous pest of several winter crops and became a major potato pest in lighter soils of Khartoum state. BCW inflicts serious damage on the tubers, resulting in drastic yield losses annually. Despite its economic importance, little attention has been directed to this pest in the Sudan.

Field experiments were conducted for two seasons at Karari, Khartoum state, central Sudan, to evaluate 10 potato varieties (lines/accessions) for resistance to BCW damage. The percentage damaged tubers numbers (%DTN) and weight (% DTW) as parameters were used for evaluation. Differences in both parameters were very highly significant, due to varieties and seasons ($P < 0.001$ for both parameters). The interaction between the varieties and seasons was also very highly significant ($P < 0.001$). Two parameters were found to correlate strongly and significantly ($r = 0.83$). The 10 potato varieties (lines/accessions) were also subjected to a series of no – choice tests in the laboratory for two seasons. The tests included testing the larval and pupal developmental rates on potato tubers. Significant differences were noted in larval weight gains (LWGs), due to differences in potato varieties across the various feeding tests. Alpha, Lesita and Bright varieties showed higher levels of resistance both in the field and in the laboratory, while Desiree and Spunta showed the highest level of susceptibility. Factors governing the causes for resistance were discussed.

5.4.4 Host plant range, resistant tomato varieties and natural enemies of potato tuber moth, *Phthorimaea operculella*, (Zeller) (Lepidoptera: Gelechiidae) AE,

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Keywords: PTM; *Phthorimaea operchlella* (ZELLER); Host plant, Solanaceae

The potato tuber, PTM, *Phthorimaea operculella* (Zeller) (Lepidoptera: Gelechiidae), is the most damaging insect pest of potato in the developing world. It can attract a limited number of plant species of the family. In the Sudan, it was recorded in 1940's from infested potato imported from Egypt and in a very short time it attained damaging levels as a pest of potato grown in Khartoum area. On tomato it was only identified in central Sudan in early 1990s and cause a real worry to tomato growers. Moreover, scanty ecological information of the pest in Sudan was available. Field and cage experiments were conducted to study some of the ecological aspects (host range, resistance and natural enemies). The results obtained showed that the host plants of the PTM in the Gezira Scheme were still limited to the Solanaceae family i.e. tomato, gubbein and eggplant among all plants examined in the field and the cage. The commercial tomato varieties, strain B, Peto 86, and Castle Rock showed a high susceptibility to the PTM (more than 80%) and the local land races 271, 573, 624 and 275 showed low infestation (0.1-0.4%). No infestation was recorded on the land races 677, 765, 268, 270, 277 and 543. No parasitoid was observed in association with the PTM in the Gezira area during this study.

5.4. 5 Survey for natural enemies and varietal susceptibility of some date palm to green pit scale and its natural enemies in northern Sudan

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A survey was undertaken in four locations highly infested with the date palm green pit scale insect in Northern Sudan. The date palm varieties surveyed Barakawi, Gondeilla, Waddlagi and Jaw, and visited monthly for five months, from August to December, 2006. Leaf samples were taken from many trees and all developmental stages (alive or dead) of the green pit scale insect were counted per leaf. For natural enemies' ten trees were chosen at random from each variety grown in farms with intercropping or without intercropping. The four date palm varieties under test showed different levels of infestation. The Results indicated that Gondeilla variety was the most susceptible. The infestation of Barakawi and Jaw were moderate, and the least affected variety was Waddlagi. The results showed that the infestation is not affected with intercropping or the direction or the position of the leaves on the tree. Two predatory species of *Coccinellids* were recorded including the predatory mite. Exit holes were noticed in some adult females as evidence that attacked by a parasitoid. (*Aphytis* species).

6.4.1 Seasonal abundance and characterization of larval habitats for mosquito fauna(*Culicidae*) prevalent in the Gezira irrigated area of central Sudan

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The present study was carried out to understand the distribution of larval habitats, occurrence of immature stages of different mosquito species and their associations with habitats characters and environmental factors in Gezira area of central Sudan during 2010.

Weakly cross-sectional larval surveys were carried out during condition of two months; cool dry (November – February), hot dry (March – June) and rainy (July – October) seasons of 2010 in Barakat and El-kareiba (urban and rural, respectively) sites in Wad Medani area. Standard dipping using enamel bowls (WHO, 1970) was employed for sampling larvae possible breeding sites and habitat characterizations were observed. All larval specimen were identified morphologically.

About 322 larval habitats were surveyed, out of which = 51.6% (166) were found positive for mosquitoes breeding (56.78%, 29.6%, 13.55%) for *Anopheles*, *Culex* and *Aedes* respectively), A total of 5525 collected larvae were identified as follows; as *Culex* (2617 = 47.37%), *Anopheles* (2600 = 47.06%) and *Aedes* (308 = 5.57%). A high proportion was reported during the hot dry seasons in both sites; Barakat ($\chi^2 = 10.641$, $p = 0.009$) and El-kareiba ($\chi^2 = 23.765$, $p = 0.0001$). The main breeding sites for *Anopheles* larvae were leakages from broken drinking water pipes (51.55%), irrigation canals (34.2%), hoof prints (6.4%), tires tracks (5.5%) and water tanks (2.43%). It is quite evident from the results that *C. Arabiensis* predominate other members of the family *Culicidae* (42% and 39.47% respectively). However, *Aedes aegypti* was the only Abden mosquito sporadically found in the area.

For control of the mosquito it is recommended, to maintain broken drinking water pipes and adopt intermittent irrigation cycles.

Keywords: Larvae, Mosquito, Characterization, Habitats

6.4.2 Larvicidal potentialities of *Solenostemma argel* extracts against the malaria vector mosquito, *Anopheles arabiensis* Patton (Diptera: Culicidae)

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**Keywords: *Solenostemma argel*, *Anopheles arabiensis*, Mosquito,
Larvicide, Mortality, Residual effect**

Different species of mosquitoes are vector of various human diseases in Africa. However, *Anopheles arabiensis* is the most important malaria vector distributed in most countries including the Sudan. The main control tactics adopted against

this species depend largely on the application of synthetic insecticides. But, the socio-economic and environmental drawbacks of these chemicals, besides the development of resistant mosquito strains, have complicated the problems of chemical control which necessitated the search for new environmentally safe alternatives. Therefore, this work was proposed to study the occurrence of *A. arabiensis* at different locations in Khartoum area which lies within the the semi and region of the country, and to evaluate various extracts of *Solenostemma argel* on its control. Leaves and seeds of the plant were extracted using water and organic solvents (petroleum ether and ethanol) and their phytochemical constituents were analyzed. Bioassays were conducted against the 4th instar larvae of the mosquito and the mortality and residual effects were compared. The relative abundance of *A. arabiensis* revealed higher occurrence (79.1%) around the River Nile (stagnant fresh water) than the other locations of dry or polluted (sewage) habits. The chemical constituents of the tested extracts showed variable levels of secondary metabolites, i.e. alkaloids, saponins, flavones, flavonoids, amino acids, triterpenoids and sterols. The highest mortality percent (90%) was achieved by the seeds petroleum ether extract at 24h post treatments (LD50 1000ppm), which used. This extract also gave the best residual activity after one month, However, the mortality means of different botanical treatments increased with concentrations and time of exposure,. In conclusion, the findings proved the potent insecticidal activity of *S. argel* against *A. ariensis*, and suggested more studies to be utilized commercially as natural mosquito larvicide.

6.4.3 Snails' populatin dynamics and their parasitic infections with trematode in Barakat Canal, Gezira Scheme 2011

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Freshwater snails are the intermediate host for the most of trematode worms which are responsible for number of disease conditions in humans and many other vertebrates. Across sectional study was conducted in Barakat canal (June-July 2011) to explore the present snail species and their relation with trematode infection , with observation on environmental factors affecting them. Three surveys at different environmental conditions were conducted, first after canal-re-filling, the second after canal clearing and the third after vegetation re-grow. A total of 1540 freshwater snails were collected from the study site with overall species density *Cleopatra builmoides* (43%) *Lymnaea natalensis* (17.9%), *Bulinus truncatus* (14%), *Biomphalaria pfeifferi* (13%) *Melanoides tuverculata*

(7%), *Lanistus cariantus* (5%) and *Bulinus forskalii* (0.1%). The overall density in the three surveys was (27%), (37%), and (36%) respectively, Snails were screened for *Trematode cercariae* under artificial light, six of the seven species were shed different *Trematode cercariae* with infection rate in the three surveys 15%, 52% and 79% respectively, six *cercariae* morphotypes were shed longi-furcate pharyngeate Distome Monostome cercaria LPD, and two types of Xiphidiocercariae, Echinostomecercariae, Plurolophocercousercariae, Loggi-furcate pharyngeate Distome cercaria LPD and two types of Furcocercousercariae. A list of recommendations were made, since the planning of snail control reassures and evaluate their impact, knowledge of their ecology, population trends and dynamism are essential requirement towards understanding disease transmission and control.

6.4.4 Monitoring insecticide resistance in *Anopheles arabiensis* Patton (Diptera: Culicidae) in Karima- Merowi- Eldabba area, Northern State, Sudan

**Nadia A. E. Abdelgader,
Abelhameed Dardiry, Nugud, Yousif E. Himeidan**

As with order insects, resistance to insecticides has become a limiting factor in the use of insecticides in controlling mosquitoes. Mosquito control depended on the use of insecticides for a long time. The present study aimed to determine the susceptibility of *Anopheles arabiensis* populations of the Karima-Merowe-Eldabba stretch of the Northern State to some insecticides. The Study revealed that, *A. arabiensis* is predominate in the Northern State over other mosquitoes and the only *Anopheles* species prevalent during the study period. Control of the anopheline mosquito vectors of malaria by use of insecticide resistance in different settings necessitates surveillance studies to allow prompt detection of resistance should it arise and thus enable its management. Susceptibility test to DDT 4% (an organochlorine), fenitrothion 0.1% (an organophosphate), bendiocarb 0.1% (a carbamate), deltamethrin 0.05% and permethrin 0.75% (both pyrethroids) were carried out in three areas: Eldabba, Merowe –Nouri and Karima during the period May to July 2011, using standard WHO diagnostic kits and procedures. *Anopheles arabiensis*, collected as larvae from these areas, were reared and the emergent adult females (non – blood fed 24-48 hours old) were exposed to the discriminating dosages of the five insecticides mentioned above. During the exposure time the number of females knocked down was recorded every 10, 15, 20, 30, 40, 50, 60 minutes except for fenitrothion (2 hours exposure) The mortality, 24 hours post-exposure, was recorded. A total of

1875 female *A. arabeinsis* were tested. According to the WHO criteria the study showed that *A. arabeinsis* is fully susceptible to deltamethrin and fenitrothion tolerant to bendicarb and DDT in all sites. Evidence for resistance to permethrin *A. arabiensis* was clearly found in two areas (Merowe – Nouri, and Eldabba) with percentage mortalities $67.0 \pm 3.0\%$, and $65.0 \pm 7.2\%$ respectively. Based on the findings the study recommended that either fenitrothion or deltamethrin can be used as an alternative for indoor residual spraying campaign against *A. arabeinsis* in the area, monitoring of susceptibility must be performed every two years, and should be an adjunct to all vector control programs. Also the recommended that the resistance status to the DDT and bendiocarb needs to be confirmed by using other procedures.

6.4.5 Resistance of *Anopheles, arabiensis* Patton Mosquito to DDT, Fenitrothion, Deltamethrin, Permethrin and Bendicarb in Dongola and Elburgage localities, Northern State, Sudan

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Insecticide resistance is a threat to the success of malaria vector control interventions which rely mainly on insecticides, in urban settings and elsewhere. In the Sudan, malaria vector control activities depend mostly on insecticides. Therefore, this study aimed to determine the insecticide resistance to the main malaria vector *Anopheles arabiensis*, in the Northern State. The study was conducted in two localities at Dongola and Elburgage. The standard WHO procedures for susceptibility tests were followed in this study. Laboratory reared adults (males and females) mosquitoes bred from larvae collected from different locations were morphologically identified as *A. arabiensis*. Of these a total of 1300 females (24 -48 hours old) were tested as non blood fed. The susceptibility tests were carried out using the diagnostic concentration of the following insecticides: DDT 4%, fenitrothion 1.0%, deltamethrin 0.05, permethrin 0.75% and bendiocarb 0.1%. The exposure time to insecticides was 1 hour, except for fenitrothion, which was 2 hours. The results obtained based on resistance status showed that *A. arabiensis* females were 100% susceptible to all insecticides tested. In all tests the control mortality was zero except when using deltamethrin where it was 8%. However, when mortality test was 100%. Abbot's formula was not applied (Abbot's formula was only used when the mortality in the test was 100%). From the results obtained it was no evidence of resistance in *A. arabiensis* to five tested insecticides. It is recommended that the obtained values of knockdown times 50% and 95% are considered as important base-line data in future monitoring development of resistance to the insecticides used for vector control.

Sudanese *Withania somnifera*: a potential control agent for plant and animal microorganisms

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Key words: Sudanese *Withania somnifera*, withanolides, *Fusarium nivale*, Swiss mice *Mus musculus*,

Abstract

The methanolic extract of the aerial parts of *Withania somnifera* (L.) Dunal (Solanaceae) showed interesting antifungal activity against *Fusarium nivale* (syn *Microdochium nivale*) and yielded many withanolides after column and preparative HPLC separation which were guided by this antifungal activity. The structures of withaferin A and 2, 3-deoxy 3-methoxy withaferin A were determined by NH₃-DCI-MS (and MS-MS) and NMR spectroscopy. Against Swiss mice *Mus musculus* these products showed no acute toxicity up to 20 g plant/kg body weight (the highest dose used). The potential for a direct use of such crude extract and powdered dried plant-parts against such plant microorganisms and animals' diseases under Sudanese environmental conditions was discussed.

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Residues of Organochlorine Insecticides in beef and lambs in Central Sudan

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Abstract

Sixty samples of beef and lambs were collected from Wad Medani town (central of Sudan). These samples were analyzed for the residues of the persistent organochlorine insecticides. The method described by de Fauber Maunder et al (1964) was used for the extraction and clean-up of the samples. The extracts

were analyzed by gas-liquid chromatography (GIC) using electron capture detector.

Residues of pesticides in soil and water samples from the Gezira Scheme

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Abstract

To determine the residues of some pesticides in water and soil in the Gezira Scheme, samples were collected from four sites, Torabi Office, Kab Aljidad Office and Barkat Office. These sites were cultivated with cotton and sprayed with polo, Endosulfan+Metasystox, talastar and Polo for the four sites respectively. Standard methods were used for extraction and clean-up of these samples. The analysis was carried out by gas liquid chromatography (GLC). Beside the above mentioned insecticides the analysis also included some persistent organochlorine insecticides.

No residues of any pesticide were detected in water samples. In soil samples the results revealed the presence of Lindane in the concentration of 0.005 ug/g (ppm) for the second and fourth sites respectively. Alpha Endosulfan was found in the concentration of 0.005, 0.008, 0.006 ppm for the first, second and fourth sites respectively.