OTHER PAPERS

OVERVIEW OF THE USWBSI WEB SITE

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ABSTRACT

The US Wheat and Barley Scab Initiative (USWBSI) maintains a web site (http://www.scabusa.org) that offers information and services in support of the USWBSI's mission. The web site employs many technologies to facilitate rapid communication of information to the community. Users can browse the site anonymously as guests with limited access to applications and information. They may also register and have expanded access to information as well as the ability to contribute data using the site's various applications. Several technologies employed by the USWBSI site will also push information to users who have subscribed to the appropriate services. Some of these technologies include the FHB Alert system, various mailing lists, and RSS feeds. This poster provides an overview of the USWBSI web site and some of the features and applications.

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GLEANINGS FROM THE 4TH INTERNATIONAL SYMPOSIUM ON FUSARIUM HEAD BLIGHT, NANJING 2012

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ABSTRACT

Relatively few members of the USWBSI community participated in the Symposium. For those who could not participate, I am providing a somewhat biased view of what I found interesting and informative. Sumai-3 is still considered the most resistant cultivar, but combining a level of resistance similar to Sumai-3 with high yield, etc. has not been accomplished yet for winter wheat. Dozens of exotic resistant lines were reported, but no resistant cultivars have been developed from adapted x exotic crosses. Dozens of QTL for resistance were reported. Except for *Fhb-1*, these make small contributions to the overall resistance, and use of MAS has not led to the release of any resistant cultivar. The most successful strategy for developing resistant cultivars has been to make crosses among adapted moderately susceptible to susceptible cultivars, select first for high yield and then select for resistance in inoculated, misted nurseries. Additive effects and transgressive segregation for resistance were reported frequently, and these were supported by molecular results showing hundreds of genes being involved in resistance. There were several reports on the degree of anther extrusion among wheat lines affecting the level of type I resistance. Closed flowering or high anther extrusion were associated with low levels of initial infection. The Sha-3/Catbird line used as a parent in some of my resistant ARGE lines has high anther extrusion.

There were several reports on the *Fusarium* species and chemotypes causing head blight around the world. Most of these reports showed that the pathogen population has been changing over the past several years. Expanded maize production was the major factor that has been associated with the increase in *F. graminearum*. *F. asiaticum* and 3A-DON chemotypes were more common in warm areas, whereas *F. graminearum* and 15A-DON chemotypes were more common in cool areas. NIV chemotypes of both *F. asiaticum* and *F. graminearum* also appear to be on the increase. There was concern, but no definitive evidence, that the pathogen has been evolving toward greater aggressiveness. In China, the wheat area affected by severe head blight has shifted from the Yangtze River region northward in response to increased maize production, and there was a widespread, severe head blight epidemic in 2012.

Growing moderately resistant cultivars and applying a fungicide at flowering are universally recognized as the two most important management practices for reducing losses and mycotoxins. Application technology that increases the amount of fungicide applied to heads increases efficacy. The Chinese have been using carbendazim since the early 1970s. Resistance to this fungicide was first found in 1992 and is now common. The Jiangsu Pesticide Institute developed 2-cyano-3-amino-3-phenylancryic acetate that is now being used for FHB.

COMPARATIVE USE OF BOTANICAL OIL EXTRACTS IN PEST MANAGEMENT

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OBJECTIVES

1. To emphasize the adoption of use of plant extracts in pest control.

2. To consider the potential of use of oil extracts in the control of Fusarium head blight

INTRODUCTION

Cowpea, (*Vigna unguiculata*) (L). Walp is the one of the most ancient crops known to man. It is an annual legume and is commonly referred to as Southern pea, black eye pea, etc. The largest production is in Africa, with Nigeria and Niger predominating. The cowpea is predominantly a hot weather crop. It is more tolerant to drought, water logging, infertile soils, and acid stress than common bean. Cowpea can be grown successfully under conditions that are totally unsuitable for the common bean. They are much less tolerant to cold soils than common bean. Cowpea is considered nutritious with a protein content of about 24.8%, fat content of 1.9%, fibre content of 6.3%, carbohydrate content of 63.6% & water content of 8-9%.

The cowpea bruchid, *Callosobruchus maculatus* (F.) (Chrysomelidae: Bruchin), is a worldwide pest of stored cowpea grain (*Vigna unguiculata* (L.) Walp. Several methods had been adopted in its control. Some were effective while there were draw backs observed in some, especially in the use of synthetic chemicals.

Research in recent years has been turning more towards selective bio-rational pesticides, generally perceived to be safer than the synthetics (Anarson *et al*, 1989) and extensive works on the use of plant extracts in pest control have also been documented. Consequently, plant derived oils and powders have recently been evaluated and shown to be effective against a number of insect pests (Butler and Henneberry, 1990). This research work was based on the laboratory evaluation of use of three botanical oils in the control of insect pest of cowpea.

MATERIALS AND METHODS

This experiment was carried out at the Department of Plant Science and Biotechnology, Adekunle Ajasin University, Akungba-Akoko. The insect pest, C*allosobruchus maculatus* used was obtained from a culture of infected cowpea seeds maintained at ambient condition in the Department of Plant Science and Biotechnology Laboratory. Fresh plant leaves of *Hyptis suaveolens, Eucalyptus globulus* and *Cymbopogon citratus* was collected at maturity from different locations at Akungba Akoko,Ondo State, Nigeria during the rainy season. The leaves were detached from the stalk, washed and sun-dried for about 3 weeks before being pulverized using an electric blender.

The soxhlet apparatus (extractor) was used for the extraction of oils of *Eucalyptus* globulus, *Hyptis suaveolens* and *Cymbopogon citratus* and the different oils stored in McCartney bottle which was kept in a refrigerator at 5°C before use.

10ml of *Hyptis suaveolens* oil, *Eucalyptus globulus oil* and *Cymbopogon citratus* oil were prepared separately for the experiment while 40 seeds of Cowpea (*Vigna unguiculata*) were put in each Petri-dish, with three replicate and one control. The control was a petri dish of cowpea seeds without treatment application. Twenty (20) pairs consisting of 20 males and 20 females of *C. maculatus* were put in each Petri-dish and the botanical oils were applied at each setup. This experiment was monitored for 3 weeks. At the end of the experiment, data collection was based on mortality rate at each concentration levels and data was subjected to analysis of variance and means compared using Tukey's Honestly Significant Test at 5% level of probability.

RESULTS AND DISCUSSION

Tables 1 to 3 show the cumulative mortality rate of insect pests with the application of the three botanicals for three weeks.

In tables 1to 3 it could be observed that the three botanicals are significantly different, $P > 0.05$, compared to one another, which makes *Hyptis suaveolens* the most effective. The least performance observed in *Eucalyptus globulus* was not an indication of weak potentials as it has equally been reported in some research works as being effective. Consequently, this variance in potentials may likely be dependent on the concentration levels adopted in the research. Observations made in this experiment corroborate the view of several researchers on the adoption and use of plant oils in pest control. Consequently, the high infestation of cowpea at almost every stage of its growth and concomitant damage necessitate a proactive and promising approach to its control. Although the use of synthetics had been adopted but since its use were faced with several challenges, the use of botanicals had been gaining attention in recent times. The use of essential oils had equally been adopted and proven effective. Raja *et al*., (2001) reported that pulse stored in gunny bags and treated with aqueous extracts from leaves of *Melia azadirachta*, *Hyptis suaveolens* and tuber of *Cyperus rotundus*, were effectively protected without any infestation for up to 6 months. Kim *et al,* 2003 reported the insecticidal activities of aromatic plant extracts and essential oils against *Sitophilus oryzae* and *Callosobruchus chineensis.* Also, Keita *et al*, (2001) reported that seeds treated with botanical extract oils did not lose their viability and they also established that powder made from essential oil of different basils provided complete protection against *C. maculatus* and did not show any significant effect on the seed germination rate. In a similar experiment on pest control focused on the adoptive use of extract, Tapondjou *et al*., (2002) showed that the dry ground leaf of *Chenopodium ambrosioides* inhibited F_1 progeny production and adult emergence of the *Callosobruchus chinensis* and *C. maculatus*, while Olotuah (2010) reported that the use of Cashew Nut shell liquid is effective in the control of Okra field insect pests, *Podagrica uniforma* and *P. sjostedti*.

Essential oils are used in perfumery, aromatherapy, cosmetics, incense, medicine, household cleaning products and for flavoring food and drink. They are responsible for the aroma and flavor associated with herbs, spices and perfumes. They are also called volatile oils because they easily diffuse into the air where they are then detectable by our olfactory senses. Essential oils are usually terpenoids another large class of secondary chemicals. Their presence in certain plant parts probably reflects their functions. It has also been reported that some organic pest control product such as Orange Guard use a citrus fruit peel base, such as from lemons and oranges. Citrus oils kill many flying and crawling insects on contact by destroying the waxy coating of the insect's respiratory system. Other organic pesticides use natural extracts to repel rather than kill pests. Some products use garlic or hot peppers and essential oils of herbs such as cloves to repel insects and other pest.

In addition to terpenoids, phenolic compounds are responsible for the aroma and flavour of some spices. For example eugenol is a phenolic compound found in both cinnamon (*Cinnamonum spp*) and cloves from *Syzygium aromaticum*. The functions of essential oils were once considered waste products. However, the biosynthetic pathways that yield essential oils are specialized and imply an expenditure of energy by the plant of their production. Another debated role for essential oils is to inhibit competing plants or allelopathy. For example, essential oils in sheds leaves can leach into the soil where they may inhibits the germination or growth of other plants competing for the same resources (e.g. light, minerals nutrient, water). As with many other secondary compounds, they are now believed to also defer herbivory and prevent infections by pathogens i.e. bacteria and fungi. Nature had provided plant extracts that make very effective pesticides and insect repellants, which seems to be cheaper, safer and more easily produced than the synthetic insecticides.

On the basis, the use of botanical oil extracts should be seen as an effective protective measure in pest control and adoption of use extended to other crops of economic value such as the control of the Fusarium head blight.

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Table1. Cumulative mortality rate of insect pests determined at different times at the first week of the experiment.

	2 MINUTES	4 MINUTES	6 MINUTES
Hyptis suaveolens	40.0±0.0a (100%)	0±0.0c (0%)	0±0.0b (0%)
Cymbopogon citratus	37.5±0.5b (93.75%)	2.5±0.5b (6.25 %)	0±0.0b (0%)
Eucalyptus globulus	27.0±1.0c (67.5%)	7.5±1.5a (18.75%)	5.5±0.5a (13.75%)
Control	0±0.0d (0%)	0±0.0c (0%)	0±0.0b (0%)

Means in each column bearing the same letter are not significantly different at the 5 % level of probability using Tukey's Test

Table2. Cumulative mortality rate of insect pests determined at different times at the second week of the experiment.

	2 MINUTES	4 MINUTES	6 MINUTES
Hyptis suaveolens	40.0±0.0a (100%)	0±0.0c (0%)	0±0.0b (0%)
Cymbopogon citratus	35.5±0.5b (88.75%)	4.5±0.5b (11.25%)	0±0.0b (0%)
Eucalyptus globulus	26.0±0.5c (65%)	8.5±0.5a (21.25%)	5.5±0.5a (13.75%)
Control	0.0±0.0d (0%)	0.0±0.0c (0%)	0.0±0.0b (0%)

Means in each column bearing the same letter are not significantly different at the 5 % level of probability using Tukey's Test

Table3. Cumulative mortality rate of insect pests determined at different times at the third week of the experiment.

	2 MINUTES	4 MINUTES	6 MINUTES
Hyptis suaveolens	40.0±0.0a (100%)	0±0.0c (0%)	0±0.0b (0%)
Cymbopogon citratus	38.0±0.5b (95%)	2.0±0.0b (5%)	0±0.0b (0%)
Eucalyptus globulus	28.0±0.5c (70%)	8.0±0.5a (20%)	4.0±0.5a (10%)
Control	0±0.0d (0%)	0±0.0c (0%)	0±0.0b (0%)

Means in each column bearing the same letter are not significantly different at the 5 % level of probability using Tukey's Test