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Floral Biology, Psychophily, Anemochory and Zoochory in *Chromolaena odorata* (L.) King and H.E. Robins (Asteraceae)

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(received August 25, 2010; revised January 6, 2011; accepted January 18, 2011)

Abstract. The study investigates the pollination biology of *Chromolaena odorata* an exotic species of India, and also its importance as forage source for insects especially butterflies. The plant possesses floral characteristics typifying psychophily. It is an important nectar source for insects and attracts butterflies, hawk moths, bees, wasps, flies and other insects, which act as facultative pollinators while collecting the forage. Among the butterflies, Nymphalids play a prime role in the pollination. Seed set rate is very high in each head inflorescence in open pollination. Seed dispersal is by both anemochorous and zoochorous modes but former is the principal one.

Keywords: *Chromolaena odorata*, nectar, psychophily, insects, anemochory, zoochory, pollination, butterflies

Sustaining Soil Productivity by Integrated Plant Nutrient Management in Wheat Based Cropping System Under Rainfed Conditions

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(received April 14, 2010; revised July 27, 2010; accepted August 18, 2010)

Abstract. The study of the use of organic (FYM) and inorganic (NPK) nutrient sources with biofertiliser on wheat-fallow and wheat-maize cropping system under rainfed environment revealed significant increase in biometric parameters of wheat during winter and summer seasons of two years. During both the seasons, application of $\frac{1}{2}$ NPK + $\frac{1}{2}$ FYM + Biopower (brand) produced the highest grain yield (3684 kg/ha) and (3781 kg/ha) of wheat with the maximum N uptake of 357 kg/ha, P uptake of 51 kg/ha and K uptake of 215 kg/ha. Wheat-maize cropping system was found to be profitable economically with integrated use of mineral and organic and/or Biopower under rainfed conditions of Pakistan.

Keywords: integrated plant nutrient management, wheat-maize cropping, wheat-fallow cropping, rainfed area, biofertiliser, farm yard manure

Combining Ability Study in a 6×6 Diallel Cross of Maize

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Abstract. The F_1 generation of 6×6 diallel cross in maize was evaluated for combining ability under irrigated conditions of Dera Ismail Khan, Pakistan. Based on the variance data, general combining ability (GCA) and specific combining ability (SCA) showed the importance of additive gene effect in some characters under study like kernel rows/ear, kernels/row, kernels/ear, 1000 grain weight and grain yield. The results showed that F_1 mean squares due to GCA were highly significant for all the parameters under observation. Higher magnitude of GCA components of variance (%) for kernels/ear, 1000 grain weight and grain yield, indicated predominance of additive and additive type of gene action while for kernel rows/ear, and kernels/row, nearly equal importance of both additive and non-additive gene effects were observed. The estimates of GCA effects revealed that parents Jalal and Sarhad White were good general combiners for most of the traits under discussion. The crosses, Kisan \times Azam and Azam \times Sadaf showed good SCA effects with excellent mean performance for most of the traits studied in F_1 .

Keywords: combining ability, diallel cross, *Zea mays* L.

Reduction of Aflatoxin B₁ Contamination in Pakistani Wheat Varieties by Physical Methods

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(received April 29, 2010; revised August 30, 2010; accepted November 16, 2010)

Abstract. In the study of effect of physical treatments, such as washing and heating, on the AFB₁ contaminated wheat varieties, it was observed that the reduction of AFB₁ was directly proportional to washing time in all the varieties. The concentration of AFB₁ was reduced more by heating than washing. The level of AFB₁ in dried wheat decreased to more than 50% and 90% by heating in oven at 150 and 200 °C, respectively. However, the reduction of AFB₁ in wet wheat in which water (10%) was intentionally added was higher on heating at 100 °C for 30 min than that in the dried wheat.

Keywords: wheat, aflatoxin B₁, toxicity reduction, washing, heating

Studies on Transplantation of Marine Turtle Nests at Karachi Coast (Sindh), Pakistan

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(received April 29, 2010; revised August 2, 2010; accepted September 16, 2010)

Abstract. Egg clutches of two species of marine turtles, namely *Chelonia mydas* and *Lepidochelys olivacea*, were collected during 1974 to 1997 and transplanted to the protected enclosures. The emerging hatchlings were released to the natural environment. The experiment helped to produce an average of 19495.5 hatchlings per year of green and 1174.5 per year of olive ridley turtles.

Keywords: transplantation, turtles, *Chelonia mydas*, *Lepidochelys olivacea*, green turtles

Effects of Cowdung and Poultry Manure on Growth Performance of Indian Major Carps (*Catla catla*, *Labeo rohita*) and Exotic Carp (*Cyprinus carpio*) in Thatta District (Sindh), Pakistan

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Abstract. In the manuring trials conducted in earthen ponds of 120 m² for one year, the juveniles of Indian major carps (*Catla catla* and *Labeo rohita*) and exotic carp (*Cyprinus carpio*) responded positively during warmer months i.e. March to August. The mean weight increase and mean specific growth rate (SGR) were better in the ponds fertilised with cowdung. Total growth rate per day calculated for *Catla catla* was 32.96 g, for *Labeo rohita* 95.02 g and for *Cyprinus carpio* 14.37 g under the influence of cowdung. Moreover individual growth rates/day were also high i.e. 2.06, 2.50 and 1.43 g, respectively. Percent contribution in fish production was 23.15%, 66.74% and 10.09%, respectively. Total growth rate of the three was significantly higher in cowdung (142.36 g) as compared to that in poultry manure i.e. 106.64 g. Both the fertilisers significantly differed in terms of monthly and treatment variations ($P < 0.05$) except for treatment variation for *Cyprinus carpio*. Water temperature, light penetration, electrical conductivity, total dissolved solids, total suspended solids and nitrates were highly significant ($P < 0.05$) both for treatment and monthly variation except pH and dissolved oxygen.

Keywords: poly-culture, carp farming, organic manure, *Catla catla*, *Labeo rohita*, *Cyprinus carpio*

Morphological Variations, Patterns of Frontal Ambulacrum Pores and Paleoecology of *Heteraster renngarteni* Poretzkaja (Echinoidea: Spatangoida) from Aptian Sediments of Baghin Area, Kerman, Iran

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(received July 30, 2009; revised July 25, 2010; accepted August 30, 2010)

Abstract. Detailed macro- and microscopic analysis of spatangoid echinoid, *Heteraster renngarteni* Poretzkaja showed a remarkable variation in morphology and alternation of short and long pores in the frontal ambulacrum. The differentiation of pores in the frontal ambulacrum has been interpreted as an adaptive strategy for survival in a shallow shelf environment whereas, variation in morphology appears to be influenced mainly by grain size of the substrate.

Keywords: echinoids, Iran, ambulacrum pores, *Heteraster renngarteni*, Cretaceous, Kerman

Antibacterial Activity of Saponin and Alkaloidal Extracts of Whole Plant of *Phyllanthus niruri* L., (Syn. *P. franternus* Webster)

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(received April 2, 2010; revised June 7, 2010; accepted August 23, 2010)

Abstract. Saponins identified as phylagenin-13-O- α -D-glucopyranoside and phylangenin-25-O- β -D-glucopyranoside and alkaloid, extracted from the whole plant of *Phyllanthus niruri*, were tested for minimum inhibitory concentration (MICs) against *Staphylococcus aureus*, *Staphylococcus pyrogenes*, *Escherichia coli*, *Salmonella typhi* and *Klebsiella pneumoniae*. MIC of saponin against *S. aureus* SSH22 and SSH23 ranged from 5-15 μ g/mL, and against *E. coli* OAUTH71 and *K. pneumoniae* OAUTH 54, from 15-60 μ g/mL. MICs increased with the increase in concentration of cells used in the inoculum. *S. aureus* SSH22 exhibited a paradoxical biphasic response to saponin in nutrient broth, whereas bacterial activity against *E. coli* SSH31 increased with concentration up to the highest concentration of saponin tested. Activity against *E. coli* OAUTH71 was more pronounced in the phosphate-buffered saline than in the nutrient broth. The other active compound extracted (alkaloid) gave MIC values between 200 and 600 μ g/mL.

Keywords: *Phyllanthus niruri*, saponin, alkaloid, antibacterial activity

Development of a Predictive Model for Preparation of Banana Modified Drink

Daramola Bode

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(received January 30, 2010; revised July 13, 2010; accepted July 28, 2010)

Abstract. Fresh ripe banana drink was modified to produce non-carbonated, non-alcoholic food drink comparable to selected (four) commercial fruits juices mimic. The effects of a hydrocolloid (0.01-0.1 g), tart enhancer (0.005-1.000 g) and onion extract (0.02-0.2 mL) were concurrently studied using the central composite rotatable design on some product characteristics namely, titratable acidity, pH, relative viscosity and total soluble solids as responses. Preparations were compared with food commercial drink substitutes with respect to evaluated characteristics. Equations for predicting the responses were developed and their adequacy confirmed using analysis of variance and residual assessment. The empirical model could be useful as a base data for preparation and manipulation capable of yielding a peculiar banana base drink brand. This process provides an additional means for utilization of ripe banana fruits thereby lending enhanced economic value to producers consequently contributing to reduction in post harvest losses of banana fruits.

Keywords: banana drink, food grade additives, model for juice preparation
