STUDY ON THE TRACK WHEELED VEHICLE DESIGNING FOR OFF-ROAD OPERATIONS ON SNOWY AND WET TERRAINS

N. AGHAZADEH, H. TAGHAVIFAR

ABSTRACT. Off-road vehicle trafficking is of interesting subjects for agricultural, mining and civil engineering purposes. The traversing over snowy and wet terrain is of greater importance regarding the sinkage and terrain properties. The motion resistance, traction, sinkage, and vehicle stability are functions of wheel-terrain interactions and particularly the contact patch characteristics. As adoption of wheeled vehicles on snowy terrain is difficult, tracked wheel vehicles are of greater interest and applicability. In this paper, the designing and analysis of tracked wheel system mounted on a light weight all-terrain vehicle (ATV) is addressed. The designing considerations are based on semi-empirical models (Bekker and Mohr-Coulomb criterion) and experimentally obtained data on the snow mechanical properties for the test region. Based on the analysis, it is observed that the greatest value of total deformation for the front and rear chasses are obtained at 0.00028485 and 0.00026229 m, respectively. The von Mises yield criterion addresses that the yielding of materials starts when the second deviatoric stress invariant gets to a critical value close to failure. Furthermore, the greatest values of von Mises stress for the front and rear tracked wheel chassis are equal to 64.60 and 62.48 MPa, respectively. The similarity is that the critical point is situated at the coincidence point between the inclined and longitudinally oriented rods (joint point). It is concluded that the developed vehicle could serve as a functional vehicle to perform on different off-road operational condition particularly wet terrains.

Key words: Tracked wheel; ATV; Off-road vehicle; Snow.

WATER EFFICIENT CROPPING SYSTEMS FOR SEMI-ARID REGIONS IN PAKISTAN

A. AHMAD, Z.I. AHMED, M. SHEHZAD, I. AZIZ, K.S. KHAN, M. SHOAIB, T. MEHMOOD, K. MUBEEN

ABSTRACT. Water scarcity and land degradation are emerging threats to global food production. The dry land regions of world are affected by climate change to a greater extent and facing food insecurity. The current pattern of food production has been estimated to be inadequate to meet demands of growing population and required around 38% increase to meet world`s food demands by 2025. Food insecurity in erosion hit dry land regions of Pakistan also demands development of resource-efficient cropping systems to meet the food needs of population growing. The research studies involved different cropping patterns such as fallow-wheat, mungbean-wheat, sorghum-wheat, fallow-lentil, mungbean-lentil, sorghum-lentil, fallow-barley, mungbean-barley and sorghum-barley. The organic amendments involved farmyard manure, NPK, poultry manure, compost and inoculation by phosphorus solubilizing microbes. The effect of cropping systems and soil amendments were evaluated at field scale in terms of water use efficiency measured in terms of economic terms. The results of the studies revealed that double cropping (mungbean-lentil and mungbean-barley) was feasible option in the dryland regions of Pakistan if integrated with the use of poultry manure as alternate

environmental-friendly strategy to cut down the use of mineral fertilizers and eliminate summer fallowing.

Key words: Water use efficiency; Mineral fertilizers; Soil amendments; Cropping systems; Dry lands.

POTASSIUM SULFATE IMPROVED EARLY GROWTH OF WHEAT UNDER CONTROLLED CONDITIONS

A.A. ALILOO

ABSTRACT. Experiments were conducted to evaluate NPK fertilizer effects on early growth of wheat (*Triticum aestivum* variety Azar-2). Chemical fertilizers including urea (100, 200, 300, 400, 500 and 1000 $mg.L^{-1}$), triple superphosphate (10, 20, 30, 30 and 60 $mg.L^{-1}$) and potassium sulfate (100, 200, 300, 400 and 800 $mg.L^{-1}$) were used along with control in three replications. The used concentrations imitate possible status of the fertilizers in the soil solutions. The results showed that fertilizers did not alter seed germination percentage. However, there was a significant influence on seedling performance. Seedling growth under potassium sulfate applications was significantly enhanced, which was followed by triple superphosphate, but urea decreased the values. The root to shoot ratio was influenced by potassium sulfate and the ratio was decreased in all concentration. Triple superphosphate did not significant effects on seedling properties, while urea decreased seedling performance. It was concluded that the response of wheat to the fertilizers application was different and among the used materials potassium sulfate could be effective on seedling growth of wheat.

Key words: Fertilizers; Germination; Seedling growth; *Triticum aestivum* L.

COEFFICIENT ANALYSIS AND ASSOCIATION BETWEEN MORPHO-AGRONOMICAL CHARACTERS IN COMMON BEAN (*PHASEOLUS VULGARIS* L.)

N. AKHSHI, F. NAZARIAN FIROUZABADI, K. CHEGHAMIRZA, H.R. DORRI

ABSTRACT. Pulses are important food sources for human consumption. In an attempt to study the associations between common bean (*Phaseolus vulgaris* L.) morpho-agronomical traits, twelve genotypes and inbred lines were evaluated in a randomized complete block design (RCBD) with three replications in 2010-2011 crop season. Seed yield and 20 other morpho-agronomic characters were recorded. Analysis of variance (ANOVA) revealed a significant ($p \leq 0.01$) difference among genotypes with respect to almost all traits. Correlation analysis demonstrated that seed yield had a strong positive correlation with both seed number per plant and seed number per pod, suggesting the usefulness of these traits in common bean breeding programs. Step-wise regression analysis pointed out that the pod weight, seed number per pod and 100 seed weight contributed to the seed yield prediction, whereas other traits did not contributed to the seed yield prediction. These traits explained almost 99% of total seed yield variations. Path analysis showed that the maximum direct and positive effect was related

to pod weight. Furthermore, factor analysis revealed that four factors, explained almost 71% of the total variance. The results of this research showed that biologic yield, pod weight, straw weight, number of pod per plant and seed number per plant were the most closely related traits to the seed yield.

Key words: Yield; Correlation coefficient; Factor analysis; Path analysis.

DIFFERENTIAL RESPONSE TO SEA SALT SALINITY BY NITRATE AND ANTIOXIDANT SYSTEM IN SIX SOYBEAN VARIETIES

K.M. SAAD-ALLAH

ABSTRACT. Six varieties of soybean (*Glycine max* L.) plants were grown for 30 days under three levels of sea salt salinity (0.0, 8.0 and 16.0 mS/cm^2) for studying the effect of sea salt on uptake of nitrate and response of the antioxidant system for these salinity doses. Salt treatments resulted in a gradual decline in nitrate uptake by increasing sea salt concentration, which mean that this will bring negative consequences on nitrogen assimilation. However, salt treatments induced the accumulation of hydrogen peroxide and glycinebetaine in the leaves of all soybean verities as an adaptive strategy to cope with salt stress. On the other hand, there was a differential response in phenolic compounds among soybean verities as a function of salt concentration and the studied variety, which means there has a decline in phenolics under salt stress in the varieties Crawford, G21, G22 and G83, but in contrary in G35 and G82, phenolics has accumulated in response to salinity. Isozymes electrophoretic banding showed changes in peroxidase activity with sea salt, however superoxide dismutase showed stability in number and intensity of bands with salt treatments. Esterase enzyme was more sensitive to salinity and showed a gradual decline in activity by increasing salt concentration.

Key words: Soybean; Salinity; Antioxidants; Phenolics; Isozymes.

EFFECTS OF DIFFERENT NUTRITIONAL SYSTEMS ON SEED GERMINATION AND EARLY SEEDLING GROWTH IN MEDICINAL PUMPKIN (*CUCURBITA PEPO* L.)

D. ZAREI, **G. SHABANI, M. REZA CHAICHI, M. KHANAHMADI**, **A. AKBARABADI**

ABSTRACT. This study was carried out to determine the effect of different nutritional systems (chemical, biological and integrated) on germination and seedling growth in medicinal pumpkin (*Cucurbita pepo* L.). The statistical design was a randomized complete block design with four replications. Four levels of different fertilizing systems including chemical (T1), biological (a combination of nitrogen bacteria, *Azospirillum brasilense* and *Glomus mosseae*) (T2) and integrated fertilizing systems (biological fertilizer + 50% chemical fertilizer) (T3), and control (without fertilizer) (T0), were employed. The results indicated that the maximum seed germination was 95% and the highest seed germination rate with 30.4 per day was observed in the intergraded nutritional treatment. The experimental results showed that all nutritional treatments had positive effects on seed germination compared to control. The highest level of germination percentage with 95% and the highest rate of germination with 30.4 seeds per day were obtained in integrated nutritional treatment. However, the integrated

nutritional system required more time to demonstrate its positive effect on the growth and yield of medicinal pumpkin compared to chemical system. The results of present experiment indicated that integrated nutritional treatment had the greatest positive impact on germination characteristics in medicinal pumpkin. Designing and developing such nutritional systems can guarantee and facilitate the achievement of long-term objectives of sustainable agriculture.

Key words: Nutritional systems (chemical, biological and integrated); Germination characteristic.

EFFECT OF SALINITY ON NODULATION, GLUTAMINE SYNTHETASE AND GLUTAMATE SYNTHASE ACTIVITY IN NODULES OF ALFALFA (*MEDICAGO SATIVA* L.*)*

O. YOUNESI, A. MORADI

ABSTRACT. Bami cultivar of alfalfa (*Medicago sativa*) was inoculated with salt-tolerant *Sinorhizobium meliloti* in solution culture with different salt concentrations (0, 50, 75 and 100 mmoles l^{-1}NaCl) added immediately at the time of inoculation. The results indicated that *S. meliloti* formed an infective and effective symbiosis with alfalfa under saline and nonsaline conditions. Salinity significantly decreased shoot and root dry weight, nodule weight and mean nodule weight. Roots were more sensitive than shoots, and N_2 fixation was more sensitive to salinity than was plant growth. Analyses of ammonium assimilating enzymes in the nodule showed that glutamine synthetase appeared to be more tolerant to salinity than glutamate synthase, and that it limits ammonium assimilation under saline stress.

Key words: Alfalfa; Glutamine synthetase; Glutamate synthase; N_2 fixation; Salinity; *Sinorhizobium meliloti*.

HERITABILITY, GENETIC VARIABILITY AND CORRELATION ANALYSIS OF SOME IMPORTANT AGRONOMIC TRAITS IN RAPESEED ADVANCED LINES

V. RAMEEH

ABSTRACT. The efficiency of a breeding program depends mainly on the direction of the correlation between yield and its components and the relative importance of each component involved in contributing to seed yield.Twenty one rapeseed genotypes were evaluated based on randomized complete block design with three replications. Significant genotypes effects were exhibited for phenological traits, plant height, yield components except pod length and seed yield, indicating significant genetic differences among the genotypes. High broad sense heritability were determined for phenological traits, plant height and seed yield demonstrating selection gain for improving these traits will be high. Pods on main axis and pods per plant had high value of genetic coefficient of variation and also were significant correlated with seed yield. The results of factor analysis exhibited three factors including first yield components (plant height, pods on main axis and seed yield), second yield components (pods per plant,

seeds per pod and 1000-seed weight) and fixed capital factor (phenological traits). On the basis of cluster analysis, the genotypes were classified in three groups and the group with high seed yield had high mean values of plant height, days to maturity and pods per plant.

Key words: Coefficient of variation; Cluster analysis; Factor analysis; Seed yield.

BIOCHEMICAL PROPERTIES AND FRUIT QUALITY OF "JAHANGIRI" (*PRUNUS ARMENIACA* L.) APRICOT FRUIT UNDER CALCIUM CHLORIDE TREATMENT

S. YOUSEFI, M.E. AMIRI, M. MIRABDULBAGHI

ABSTRACT. Worldwide, the nutritional value and health benefit of apricot fruit (*Prunus armeniaca* L., Rosaceae) has been known. The present study was therefore undertaken to assess the effects of $CaCl_2$ pre harvest treatment on some of the biochemical properties and fruit quality of "Jahangiri" (*Prunus armeniaca* L.) apricot at harvest time and during four weeks cold storage at $0^{\circ}C$. The combined analysis of variances indicated that year had a significant influence on all studied parameters of "Jahangiri" cultivar. $CaCl_2$ pre harvest treatments also affected significantly the most of studied parameters. The interaction between year and Ca treatment was also significant. Results of these tests showed that pre-harvest application of Ca foliar spray increased some of biochemical properties (protein, free amino acid and non protein) and fruit quality (fruit density) of apricot cultivar "Jahangiri". In addition, the contents of fruit-Ca, -Mg, -N, and vitamin C were higher than those in the control at harvest time and after four weeks storage at $0^{\circ}C$. The characteristics that correlated best with the fruit Ca content included fruit pH, fruit density, vitamin C of fruit and fruit Mg. The results also showed that the most effective pre-harvest $CaCl_2$ application for apricot "Jahangiri " was found to be 0.5 % $Ca\ Cl_2$ in 46 days after full bloom.

Key words: "Jahangiri"; Calcium chloride treatment; Biochemical properties; Fruit quality.

ANATOMICAL, HISTOCHEMICAL AND ULTRASTRUCTURAL ADAPTATIONS OF THE ALIMENTARY CANAL OF THE *UROMASTYX AEGYPTIUS* AND THE *SPALEROSOPHIS DIADEMA* TO THEIR FOOD HABITS

A.A.A. BAIOMY, A.A. MANSOUR, H.F. ATTIA

ABSTRACT. This study deals with anatomical, histochemical and ultrastructural adaptations of the alimentary canal of the *Uromastyx aegyptius* and the *Spalerosophis diadema* to their food habits. Proteins and nucleic acids are highly pronounced in the alimentary tract mucosal cells of the studied two species. A variable distribution of proteins and nucleic acids was observed in the different regions of the alimentary tract mucosa of the studied two species. The activity of alkaline phosphatase showed obvious variations not only among different organs, but also between the two species. At the ultrastructural level, the oesophageal mucosal cells contained oval shaped euchromatic nucleus with condensed chromatin and the perinuclear cytoplasm contained some electron-light vesicles. The gastric mucosal cells contained oval

shaped euchromatic nucleus with condensed chromatin and the cytoplasm contained many rough endoplasmic reticulum, also many tonofilaments formed thick bundles which converged at the adherence junction in the lateral membranes. The small and large mucosal intestinal cells contained oval euchromatic nuclei and their cytoplasm contained few electron-light vesicles, also their lateral membranes showed many interdigitations. In spite of their difference in taxonomy, habitat, mode of feeding and their vital activities, they show more or less a similarity in the histochemical and ultrastructural patterns of their alimentary tract mucosa. This study can be applied to distinguish between different species of reptiles and for establishment of natural reserves.

Key words: Histochemistry; Lacertilian; *Uromastyx aegyptius*; Ophidia - *Spalerosophis diadema*; Electron microscopy; Alimentary tract mucosa.

SOLVENCY, INDEBTEDNESS, RATES OF RETURN AND INVESTMENT IMPACT ON ECONOMIC AND TECHNICAL ANALYSIS INDICATORS (CASE STUDY)

A. CHIRAN, Elena GÎNDU, A.F. JITĂREANU, C.R. VÎNTU, Adriana MĂGUREANU

ABSTRACT. The purpose of the performed and presented financial analyzes, in the case of the two units, does not allow major discrepancies between the estimated and achieved situation. The authors have based the research on the technical-economic and financial analysis of investments, which sets economic efficiency and investments viability and assumes forecast of revenue, expenses, profit and loss account, balance sheet and cash flow: a) static analysis of indicators; b) dynamic analysis of indicators, c) cost-benefit analysis. Analysis of economic efficiency and sustainability of investments aimes at both static indicators of investment analysis and dynamic analysis of economic efficiency. The goal of research was to improve analyzes and economic indicators for assessing the effectiveness and sustainability of investments and the objectives targeted technical and economic analysis, solvency and viability of investments and the impact of the investment on key indicators of economic and financial technical analysis. Case studies, carried out at S.C. NORD INTERMED CONSULTING GROUP S.R.L. Dorneşti, Suceava county and S.C. ANDIMIR TOP S.R.L. Mihălăşeni, Botoşani county, led to a series of measures to improve the financial analysis of economic efficiency and sustainability of investments.

Key words: Agriculture; Investments; EU funds; Efficiency.

REZUMAT. Solvabilitatea, gradul de îndatorare, ratele de rentabilitate şi impactul investiţiei asupra indicatorilor de analiză tehnico-economică (Studiu de caz). Scopul analizelor tehnico-economice şi finaciare, realizate în cazul celor două societăţi comerciale, a fost de a elimina unele discrepanţe majore în situaţia estimată şi cea realizată. Autorii au avut ca bază de plecare analiza tehnico-economică şi financiară a investiţiilor, prin care se stabileşte eficienţa economică şi viabilitatea investiţiilor şi presupune prognoza veniturilor, a cheltuielilor, a contului de profit şi pierdere, a bilanţului şi a fluxurilor de numerar: a) analiza statică a indicatorilor; b) analiza dinamică a indicatorilor; c) analiza cost-beneficiu. Analiza eficienţei economice şi a viabilităţii investiţiilor vizează atât indicatorii statici ai investiţiilor, cât şi analiza dinamică a eficienţei investiţiilor. Scopul urmarit a fost îmbunătăţirea analizelor şi a indicatorilor de stabilire a eficienţei economice şi a viabilităţii investiţiilor, iar

obiectivele au vizat analiza tehnico-economică, a solvabilităţii şi viabilităţii investiţiilor şi impactul investiţiei asupra principalilor indicatori de analiză tehnico-economică şi financiară. Studiile de caz, realizate la societăţile comerciale S.C. NORD INTERMED CONSULTING GROUP S.R.L. Dorneşti, jud. Suceava şi S.C. ANDIMIR TOP S.R.L. Mihălăşeni, jud. Botoşani, au determinat o serie de măsuri de îmbunătăţire a analizei financiare privind eficienţa economică şi viabilitatea investiţiilor.

Cuvinte cheie: agricultură; investiţii; fonduri europene; eficienţă.