

SALT TOLERANCE IN *ANDROGRAPHIS PANICULATA* ACCESSIONS

I. Rajpar¹, Y. M. Khanif¹ and M. S. Saad²

¹Department of Land Management, ²Department of Crop Sciences,
Faculty of Agriculture, Universiti Putra Malaysia,
43400 UPM, Serdang, Selangor, Malaysia

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ABSTRACT

Andrographis paniculata, commonly known as Kalmegh is an important source of phytochemicals (andrographolide and neo-andrographolide) that have hepatoprotection, hypoglycemic, anti-bacterial, analgesic, anti-inflammatory, vermifugal, anti-acene, anti-typhoid and anti-malarial effects. In addition, *A. paniculata* can grow well on wide range of soils even on lands with low fertility status. The growth and herbage yield depend on the environmental and genetic consistency, and the information on the salt-tolerance of *A. paniculata* accessions may be of great importance. These plants may or may not tolerate salts stress or there may be inter-accessions variability for salt-tolerance. Seven accessions (Acc. 11225, Acc. 11228, Acc. 11234, Acc. 11316, Acc. 11345, Acc. 11348 and Acc. 11349) of *A. paniculata* were evaluated for salt-tolerance. Seedlings were grown for 4 weeks in artificially salinized soil with 4, 8 and 12 conductivity (EC_e $dS\ m^{-1}$) levels in polyethylene bags. The results of the study revealed that increasing soil EC_e decreased significantly plant height, number of fully expanded leaves on the main-stem and herbage yield. At soil EC_e of 4, 8 and 12 $dS\ m^{-1}$, the dry herbage yield was decreased by 35, 63 and 91%, respectively. The adverse effect of salinity was greater at 8 and 12 EC_e ($dS\ m^{-1}$) level. With the exception of Acc. 11345, all accessions could not survive at the highest EC_e level (12 $dS\ m^{-1}$). The Acc. 11228 appeared to be the most sensitive to all EC_e levels than the other accessions tested. Despite having lower response at EC_e 4 $dS\ m^{-1}$, the Acc. 11345 showed some tolerance to salinity followed by Acc. 11225. The seedlings grown at EC_e 4 and 8 ($dS\ m^{-1}$) had higher Na^+ and lower K^+ content and showed lower K^+/Na^+ ratio in tissues. The sensitive accessions like Acc. 11228 with smaller height and low herbage yield had higher Na^+ and lower K^+ in tissues. The sodium/potassium ratio was generally higher in those accessions (Acc. 11345 and Acc. 11225) which exhibited some tolerance to salinity.

Key words: Salinity, medicinal herb, growth, yield

**TRANSMISSION OF PEPPER YELLOW LEAF CURL VIRUS BY THE
INSECT VECTOR *Bemisia tabaci* Genn. (HEMIPTERA : ALEYRODIDAE)**

**Sri Sulandari¹, Sri Hendrastuti Hidayat², Rusmilah Suseno², Jumanto Harjosudarmo³ and
Soemartono Sosromarsono²**

¹) Department of Plant Pests and Diseases, Gadjah Mada University, Bulaksumur,
Yogyakarta 55281, Indonesia

²) Department of Plant Protection, Bogor Agricultural University,
Jalan Kamper – Darmaga Campus, Bogor 16680, Indonesia

³) Indonesian Center for Agricultural Biotechnology and Genetic Resources Research and Development,
Jalan Tentara Pelajar 3A, Bogor 16111, Indonesia

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ABSTRACT

The yellow leaf curl disease caused by a geminivirus is a serious problem to the pepper plantations in Indonesia. The epidemic of the disease which started in 2000 is assumed to have a relationship with the vector activities, that is, tobacco whitefly (*Bemisia tabaci* Genn.). Basic studies was carried out to elucidate the characteristics of pepper yellow leaf curl virus (PYLCV) transmission by its vector, *B. tabaci*. It was found that a single whitefly was able to transmit the virus to chili pepper. The insect vector could transmit the virus in a persistent manner, but it is not transovarially transmitted. Acquisition and inoculation feeding period of the whitefly to transmit the virus was identified to be optimum in the range of 3 to 6 hours. The virus needs at least 9 hours in the vector to complete latent period, while the retention period is until the insect dies. The transmission efficiency will increase with longer acquisition and inoculation feeding period of the insect and a higher number of insects per plant. The female tobacco whitefly is more effective in transmitting the virus compared to the males.

Keywords: geminivirus, whitefly

ACTIVITIES OF SOIL ENZYMES IN CORN FIELDS ENRICHED WITH MANURE

Sri Yusnaini¹, Abdul Kadir Salam¹, Masanori Nonaka²

¹Department of Soil Science, Faculty of Agriculture University of Lampung
Address: Jl. Prof. Sumantri Brojonegoro No. 1
Bandar Lampung 35145, Indonesia e-mail : yusnaini@unila.ac.id

²Laboratory of Soil Biochemistry Faculty of Agriculture, Niigata University,
Ikarashi Niigata Japan e-mail : nonaka@agr.niigata-u.ac.jp

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ABSTRACT

Elevated enzyme activities in soils have been reported to be associated with enhanced contents of organic matter and total nitrogen (N). This research sought to evaluate the changes in enzymatic activities in cornfield soil enriched with organic matter. Corn field plots had been treated for 8 seasons with increasing amounts of green manure or barnyard manure (0 – 100% of 20 ton ha⁻¹) and decreasing amount of chemical fertilizers (100 – 0% of 300 kg Urea + 200 kg SP-36 + 100 kg KCl ha⁻¹). Soil samples were taken at the maximum vegetative stage and at harvest time, and analyzed for enzymatic and chemical properties. The results clearly showed that enrichment with barnyard manure significantly increased alkaline phosphatase activity. Both manures did not affect the activities of acid phosphatase, arylsulfatase and β -glucosidase. The greater effect of barnyard manure on alkaline phosphatase was closely related with increases in soil pH, available P, and microbial activities. Barnyard manure also significantly increased organic C and total N content. The activities of acid and alkaline phosphatase, arylsulfatase, and β -glucosidase showed high and significant correlations with soil pH, organic C, total N, and available P. Acid phosphatase showed a significant correlation with corn yield.

Key words: barnyard manure, chemical fertilizers, green manure

EFFECTS OF SOIL WATER DEFICIENCY ON SEED GERMINABILITY AND VIGOUR DURING SEED MATURATION IN PEANUT

Takashi Shinohara¹ and Akihiro Isoda²

¹Tokyo University of Agriculture, Faculty of International Agriculture and Food Studies, Sakuragaoka 1-1-1, Setagaya, Tokyo, Japan

²Chiba University, Faculty of Horticulture, Matsudo 648, Matsudo, Chiba, Japan

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ABSTRACT

Poor seed quality causes low field emergence in general, but relatively few reports about effects of abiotic factors on peanut (*Arachis hypogaea* L.) seed quality have been documented. This study was initiated to collect information about the relationship between peanut seed germinability and seed vigour, and soil water deficit during maturation using a major Japanese peanut cultivar 'Chibahandachi' grown in the Kanto district. Seeds which matured in drought condition (T₂) did not lose viability, but had a lower germination at 15 °C and more cations leaked from seeds to water than seeds which matured in the absence of moisture stress (T₁). Nearly 25% of seeds produced from T₂ had dark plumules, whereas less than 5% were found in the seed lots from T₁. Field emergence of seeds from T₂ did not differ from that from T₁, but about a quarter percentage of seeds developed abnormal seedlings characterised as missing foliage leaves. These results suggest that peanut seed vigour is reduced by soil water deficit during maturation stage. Hypothesis that this vigour reduction may be associated with calcium deficiency is discussed.

Key words: *Arachis hypogaea* L., drought stress, seed quality

**IDENTIFICATION OF POTATO CYST NEMATODE POPULATIONS PREVAILING
IN EAST AND CENTRAL JAVA, INDONESIA,
BASED ON MORPHOMETRIC AND MORPHOLOGICAL CHARACTERISTICS**

Lisnawita¹, Meity S Sinaga², GA Wattimena³, Supramana² and Gede Suastika²

¹ Doctoral student, Post Graduate School, Bogor Agricultural University
(Email: itamuis@yahoo.com),

² Lecturer, Department of Plant Protection, Faculty of Agriculture, Bogor Agricultural University

³ Lecturer, Department of Agronomy and Horticulture, Faculty of Agriculture,
Bogor Agricultural University, Indonesia

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ABSTRACT

Potato cyst nematodes (PCN), *Globodera* spp., are worldwide important pathogens and have become one of the main obstacles to potato production in Indonesia. Since the first detection of PCN in East Java in 2003, the nematodes have caused significant losses in three main potato production areas in Indonesia, Sumber Brantas, Kota Batu, in East Java (1,600 – 1,800 m above sea level) and Karang Tengah, Banjarnegara in Central Java (1,700 m above sea level). As the nematodes were newly introduced into Indonesia, little was known about their characteristics. To manage the parasite effectively it is very important to identify the species and the pathotype of the nematode populations. Morphometric observations and morphological characterization were conducted including the measurement of Granek's ratio for randomly sampled cysts, second stage juveniles (J2), females, males, and eggs. All specimens collected from abovementioned areas were identified as golden potato cyst nematode, *Globodera rostochiensis*.

Key words: *Globodera rostochiensis*, cyst, second stage juveniles (J2), females, males, eggs

**ECONOMIC ANALYSIS OF HIGHLAND VEGETABLE CULTIVATION
IN BENGUET AND LAGUNA, PHILIPPINES**

Ma. Eden S. Piadozo¹ and Akimi Fujimoto²

¹ College of Economics and Management, University of the Philippines at Los Banos

² Faculty of International Agriculture and Food Studies, Tokyo University of Agriculture

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ABSTRACT

This paper attempts to clarify differences in economic performance of vegetable cultivation between the long established and newly established vegetable growing areas in the Philippines, based on a questionnaire survey of 50 farmers each in the highlands of Benguet and Laguna. Temperate vegetables such as cabbage, carrot and potato were grown in Benguet, while tomato, sweet potato, chayote, cabbage and beans were the major crops grown in the Laguna village. The former was a long established vegetable area in the country, whereas the latter was a relatively new area. Benguet farmers were market-oriented, and generated higher income and profit levels from vegetable production, whereas in Laguna temperate crops were not profitable, especially during the rainy season, but functioned to provide employment for the farmers. In well established areas, land area and fertilizer were the main determinants of vegetable income, and in the case of new areas, land and labor were more important in income determination

Key words: temperate vegetables, cultivation practice, cropping patterns, profitability, farm business analysis, income function

**INDUSTRY GROWTH AND INSTITUTIONAL CAPACITY BUILDING IN PHILIPPINE
MICROFINANCE: AN OVERVIEW**

Alessandro A. Manilay

Department of Agricultural Economics, College of Economics and Management
University of the Philippines Los Banos, College, Laguna, Philippines 4031

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ABSTRACT

The continuing growth of the microfinance industry in the Philippines resulted in an increased demand for microfinance professionals. Building the capability to train personnel is a concern that requires serious attention for the sustainability of the industry. This paper reviews past capability-building efforts of the microfinance industry; evaluates the training resources that have been developed; and proposes an approach to further strengthen capability-building. Data utilized were gathered through mailed questionnaires and interviews of key informants. Secondary data were obtained from the People's Credit and Finance Corporation and from a previous study published by the Asian Institute of Management, Philippines.

Funds for microfinance training were mostly provided by international development agencies and training service providers were established to train personnel of microfinance institutions (MFIs). Later on, some MFIs conducted in-house training after developing the expertise. Most of the training resources are concentrated in the Metro Manila Area. Facilities are limited for outlying provinces in Luzon, Visayas and Mindanao. As a recommendation, the paper proposes that linkages between service providers and selected academic institutions strategically located across the country be established to hasten capability-building in other areas of the country.

Key words: Microfinance institutions, sustainability, training institutions, institutional linkages

**ACCOUNTING SYSTEMS OF SMALL-SCALE AGRIBUSINESS FIRMS IN THE
MUNICIPALITY OF NAGCARLAN, LAGUNA, PHILIPPINES**

Tricia C. Ascan

Department of Agribusiness Management, College of Economics and Management
University of the Philippines Los Baños
College, Laguna, Philippines

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ABSTRACT

The study sought to provide a general overview of the accounting systems of small-scale agribusiness firms particularly in the Municipality of Nagcarlan, Laguna, Philippines. It seeks to determine the nature and extent of the systems being used by these firms, the internal control practices, and the strengths and weaknesses of the existing systems. Majority of the firms have crude and almost non-existent accounting systems. One of the identified problems is that most owners lack the necessary skills to set up and maintain an accounting system. Another is the cost involved in the set up and maintenance. Internal control appears to be weak in some of cash control, inventory, sales, purchases, and property valuation. Small firms, given personnel and financial constraints, cannot justify many of the accounting system features and control procedures found in larger companies. The strength lies in the personal involvement of the owners in their business in which the owner acts as the internal control feature of the firm. Based on the findings of the study, the firms must first recognize the need of an accounting system and the benefits that could be derived from it.

Key words: internal control practices, financial statements, inventory, property valuation, cash control

**EFFECT OF CUTTING DATE AND CUTTING HEIGHT ON SUBSEQUENT GROWTH
AND YIELD OF DRY DIRECT-SEEDED RICE**

Anan Polthanee and Arunee Promkhambut

Department of Agronomy, Faculty of Agriculture,
Khon Kaen University, Thailand

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ABSTRACT

This study sought to investigate the effect of cutting date and cutting height on subsequent growth and yield of dry direct-seeded rice under greenhouse conditions. A factorial combination of three cutting dates at 30, 45 and 60 days after seeding, two cutting heights at 5 and 10 cm above ground surface and three rice cultivars KDML105, RD15 and RD23 were used in this experiment. Early cutting at 30 days after seeding (DAS) gave the maximum grain yield from the regrowth, but did not show any significant difference with cutting at 45 DAS. The crops, cut at 5 and 10 cm above ground surface, did not show any significant difference on grain yield from the regrowth. KDML105 and RD15 cultivars gave similar grain yield and both cultivars produced a significant greater grain yield than that of RD23 cultivar. Grain yield was not dependent on total soluble sugar and starch in the stem at various cutting dates.

Key words: regrowth, total soluble sugar, starch, grain production

DEVELOPMENT AND UTILIZATION OF BIO-PESTICIDES IN JAPAN

Keiko T. Natsuaki

Faculty of International Agriculture and Food Studies
Tokyo University of Agriculture

ABSTRACT

The increasing concern for safe agricultural production paved the way to search for other alternatives to agricultural chemical for plant protection. Although many consumers prefer vegetables and fruits without agricultural chemical residues, the pre- and post production loss is estimated at very high levels without chemical control. Hence, in Japan, chemical pesticides could only be registered after strict evaluation and their application is controlled by many laws.

Intensive efforts to search for alternative control measure are necessary because of the recognized influence of agricultural chemicals on the environment and others. Thus, it is recommended to integrate various control techniques such as cultural, physical, and biological controls to reduce the total amount of agricultural chemicals. Among the above enumerated control measures, biological control is the most promising technology. Antagonistic microbes to control diseases caused by fungi, bacteria, and viruses are commercially available upon official registration as pesticides. They are *Agrobacterium radiobactor* strain 84 to control crown gall diseases, *Pseudomonas fluorescens* to control bacterial wilt, *Bacillus subtilis*, *Trichoderma lignorum*, *Talaromyces flavus* to mention some. The efficacy of the product is based on the mode of action of antagonistic microbes like parasitism, competition, production of antibiotics and induction of resistance in plants. Biological herbicides using weed-pathogenic bacteria is also available to control weeds in golf courses in Japan. Inoculation of attenuated virus shows strong control ability for several viruses in plants.

Utilization and market of bio-pesticides in Japan is still very limited compared to agricultural chemical. Many farmers expressed that bio-pesticides are not easy to handle, more expensive, slow effect with narrow spectrum. This year, the Ministry of Agriculture, Forestry and Fishery, Japan, introduced integrated pest management (IPM) guidelines to strengthen the understanding of farmers and consumers on IPM. The guidelines explained that biological control as one of the options but not as a single option for pest management. Also, it is emphasized that integration of various plant protection technologies and agents including bio-pesticides plays an important role in plant protection. Scientists should look for more effective microbes as bio-pesticides and further detail study on mechanism of their action. At the same time, scientists will provide accurate update information on bio-pesticides and present evidence for the consumers to recognize the merits of bio-pesticides.