

**OVIPOSITION PREFERENCE AND DEVELOPMENT OF THE FRUIT
PIERCING MOTH, OPHIUSA CORONATA FABRICIUS (LEPIDOPTERA:
NOCTUIDAE) ON FOUR HOST PLANTS**

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ABSTRACT

Four plant species known to be hosts of the fruit-piercing moth, *Ophiusa coronata* F., i.e. *Combretum quadrangulare* Kurz, *Quisqualis indica* L., *Terminalia catappa* L., and *T. chebula* Retz. were evaluated under laboratory conditions for differences in moth oviposition preferences and their effects on larval development. In general, the results showed a positive correlation between egg-laying preference and larval weight gain. Female moths laid the greatest number of eggs on *Q. indica* plants, averaging 86.5 ± 9.8 eggs/female, and the developing larvae also had the greatest mean weight increase, 201 ± 7.0 mg/day. Conversely, moths laid the fewest mean number of eggs, 14.9 ± 5.9 , on the host plant and the larvae had the smallest mean weight gain, 81 ± 2.0 mg/day. Larvae feeding on the plant *Q. indica* completed their development in an average of 22.3 ± 0.5 days, whereas larvae feeding on *T. chebula* completed their development in 43.7 ± 3.8 days. Similarly, the resultant pupae from the *Q. indica* plants weighed on average $2,337.4 \pm 75.2$ mg. This was significantly greater ($P < 0.05$) than the mean weight of pupae from the *T. chebula* plants, $1,915.1 \pm 127.2$ mg. The mean fecundity of females that developed from larvae feeding on *Q. indica* was 505 ± 85.2 eggs/female, significantly higher than the mean fecundity of females that had developed on *T. chebula*, 80.2 ± 16.3 eggs/female. The mean longevity of these adults were 23.2 ± 2.3 and 19.8 ± 1.2 days, respectively.

The most suitable host plants in terms of *O. coronata* oviposition preferences and larva, pupa, and adult growth and development are (in descending order) *Q. indica*, *T. catappa*, *C. quadrangulare* and *T. chebula*. The results demonstrate a selective behavior by adult female *O. coronata* toward host plant species that provides the greatest developmental benefit for the resulting offspring.

Key words: host-plant preferences, fecundity, growth, longevity, *Combretum quadrangulare*, *Quisqualis indica*, *Terminalia catappa*, *Terminalia chebula*

**AGRONOMIC PERFORMANCE AND INDUSTRIAL
CHARACTERS OF SELECTED SUGARCANE VARIETIES UNDER
FINCHAA VALLEY CONDITIONS**

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ABSTRACT

A field experiment to evaluate and select the desirable agronomic and industrial characters of seven sugarcane varieties was initiated in 1998 and repeated in 1999 through to 2001 cropping seasons in Finchaa valley. A randomized complete block design (RCBD) with four replications was used on two soil types (Luvisol and Vertisol). Variety CO421 performed better than the existing commercial varieties on both Luvisol and Vertisol soil in terms of number of tillers (200 x 103 and 120 x 103 ha⁻¹), cane yield (213 and 140 t ha⁻¹) and sugar yield (30.2 and 17.4 t ha⁻¹) with better tolerance to lodging. CO1001 and Mexico54/245 varieties also out yielded the present two commercial varieties (B41227 and CO449) in Luvisol soil but resulted in lower cane and sugar yield in Vertisol soil than any of the four commercial varieties. Of the commercial varieties NCO334 had high numbers of millable canes in both soil types (120 x 103 and 101 x 103 ha⁻¹) but possessed the least weight per plant (1.65 and 1.47 kg, respectively). B52298 had thicker cane girth (3.11 and 2.92 cm) and higher cane yield (184 and 141 t ha⁻¹). The present investigation evaluated the seven sugarcane varieties for their desirable characters only on plant canes (first cutting). The overall yield stability of sugarcane is, however, the resultant effect of both plant cane and ratoons. Since disease and other undesirable characters are expressed mostly in the ratoon canes (second and third cuttings) than in plant cane (first cutting), there should be sufficient information on the ratoon canes of these varieties. Hence, repeating a similar study on both plant and ratoon cane is worth considering for future investigation.

Key words: Cane yield, lodging, millable cane, plant cane, ratoon cane

**TREATMENT OF EFFLUENT FROM SHRIMP FARM USING
WATER MIMOSA (*NEPTUNIA OLERACEA* LOUR)**

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ABSTRACT

This study was aimed at investigating the quality of the effluent from the black tiger shrimp *Penaeus monodon* ponds in freshwater area after being treated with water mimosa. The biomass of the water mimosa and the time taken to treat the effluent were varied. General indicators of water quality namely, nitrate, ammonia, biological oxygen demand, total phosphorus, suspended solids, pH, salinity and biomass were studied. In addition, concentrations of heavy metals such as lead, mercury and cadmium in the biomass and the effluent were measured. The experiments took place in Pichet Farm, Prachinburi Province during the period November, 2003 to March, 2004 and were carried out using 5 x 3 factorial arrangements with four replications for the water quality's indicators, the biomass of water mimosa and heavy metals. Plant biomasses of 0.2, 0.4, 0.6 and 0.8 kg at 10, 20 and 30 days treatment time were evaluated. Untreated effluent was used as a control group).

The results showed an inverse relationship between water mimosa biomass or treatment time and the concentrations of nitrate, ammonia, biological oxygen demand, total phosphorus and suspended solids. The pH tended to decrease when the biomass increased, but tended to increase when treatment time increased. Salinity of the effluent was 0 ppt. When the biomass of 0.2 kg was employed, the biomass itself increased as time passed whereas the biomass of 0.4, 0.6 and 0.8 kg decreased when time elapsed. Although the biomass of 0.8 kg and the treatment time of 30 days were found to be optimal for all water quality's parameters studied, the biomass deteriorated when biomasses above 0.4 kg were used. It can therefore be said that the biomass of 0.2 kg and the treatment time of 30 days was possibly the best condition for the water quality and biomass aspects in this experiment. Heavy metals concentrations in the effluent and the biomass were at the acceptable level. It is therefore viable to use water mimosa to treat the effluent from *P. monodon* pond in freshwater areas, the effluent quantity and the biomass of water mimosa should be at optimal levels.

Key words: water mimosa, water quality, effluent, biomass, heavy metal.

**SECRETION OF ECDYSTEROID FROM ISOLATED PROTHORACIC
GLANDS IN RESPONSE TO PROTHORACICOTROPIC
HORMONE IN VITRO**

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ABSTRACT

The reactivity of prothoracic glands (PGs) to prothoracicotropic hormone (PTTH) was examined in vitro under various conditions. The PGs from the last instar larvae of the common armyworm, *Pseudaletia separata*, were cultured in the MGM-450 medium without serum. The PGs from two- to four-day-old larvae showed high reactivity to PTTH. The reactivity of PGs to PTTH increased in a dose-dependent manner up to the concentration of 0.25 brain equivalent per ml. The reactivity of PGs to PTTH decreased quickly and almost lost at 48 hrs in the medium. The effect of adding ecdysteroid precursors to the culture medium on secretion of ecdysteroid was obscure under the condition applied in this study.

Key words: insect endocrinology, *Pseudaletia separata*, organ culture

FARMERS' NEEDS FOR INFORMATION AND TRAINING ON TIGER PRAWN PRODUCTION IN SOUTHERN THAILAND

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A BSTRACT

This study aimed to investigate the information and training needs of tiger prawn farmers problems associated with information access, and factors associated with the need for farm information. Systematic sampling was employed for sample selection and personal interviews were assigned as a method of data collection. One hundred and seventy farmers in Ranot district, Songkhla province were interviewed.

Most farmers agreed that tiger prawn production was often detrimental to natural resources and the environment. About 50% of the farmers participated in efforts to improve the community freshwater situation, and conservation of natural resources. Salesmen and friends were the major personal sources of information, while printed material and television were the main mass media sources. The local fishery extension officer was perceived to be the best source of information about farming. The major problems related to information access for farmers were as follows: late and impractical information; private corporations often distorted messages and there was a lack of information centers. With reference to farm information needed, most required information in five major areas - pest management, disease diagnosis, selling price and marketing channels for farm produce and commercial feed price. Training on production was needed. Exposure to personal sources of information was found to be positively correlated with the information need of farmers.

The study implies that the future development of the tiger prawn industry should concentrate on availability and accuracy of information and also give considerable attention to allocation and distribution of freshwater, environmental concerns and new technology. Cooperation of entrepreneurs, academics, government officials, public organizations and the private sector should also be more focused on these central areas in order to protect the environment and allow sustainable development of the shrimp industry, which is economically important to Thailand.

Key words: shrimp, requirement, news, knowledge

**A CASE STUDY ON HYBRID RICE PRODUCTION IN THE RED RIVER
DELTA IN VIETNAM**

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ABSTRACT

A case study on the fertilization pattern of paddy rice in the Red River Delta, Vietnam, along with yield and yield components was carried out focusing on the difference between hybrid and inbred rice cultivars. The results showed the necessity to develop cultivar-based fertilization practices, especially in case of some hybrids, judging from yield component analysis. The data of 5 cultivars of hybrid and inbred rice on planting density, yield components, and yield are provided along with fertilization patterns and farm management cost distributions.

Key words: inbred rice, yield component, fertilization pattern

**IDENTIFICATION OF THE INSECTICIDAL PRINCIPLE
IN *POLYALTHIA LITTORALIS* BOERL. (ANNONACEAE) SEEDS TOXIC
TO AZUKI BEAN WEEVIL, *CALLOSBRUCHUS CHINENSIS* L.
(COLEOPTERA: BRUCHIDAE) AND *PLUTELLA XYLOSTELLA* (L.)
(LEPIDOPTERA: YPONOMEUTIDAE)**

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ABSTRACT

Due to increasing public concern over environmental pollution and pesticide residues from the use of synthetic insecticides, a search was done for novel and safer insecticides which are compatible with integrated pest management system. This study was conducted to evaluate the insecticidal activity of *Polyalthia littoralis* (Annonaceae) seeds against *Callosobruchus chinensis* L. (Coleoptera: Bruchidae) and to elucidate the active compound. The seed extract of *P. littoralis* was toxic to *C. chinensis*. Bioassay-guided fractionation led to the isolation of the active compound, 3-hydroxycyclohexa-3-en-13-hydroxymethyl-5-oic acid, C₂₀H₃₄O₄. The active compound was also active against *P. xylostella* larvae. LD₅₀ values were 6.2 and 4.7 µg/insect for *C. chinensis* and *P. xylostella*, respectively.

Keywords: Insecticidal activity, integrated pest management, seed extract

**EFFECT OF LIVELIHOOD ASSETS ON RICE
PRODUCTIVITY: CASE STUDY OF RICE-BASED
FARMING IN SOUTHERN THAILAND**

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ABSTRACT

Rice production in Thailand plays an important role by providing domestic food security as well as earning an export income of about 82164 million Baht (2003). Although rice is not the economically dominant crop in the southern region of Thailand, it constitutes the main source of livelihood for small farmers in the region since historic times. More importantly, the rice-based farming system in the southern region in particular, is confronted with a host of operational constraints ranging from socio-economic to environmental degradation issues, questioning the viability and sustainability of the livelihood of the rice based farmers. Marked differences are also observed in the productivity of farms as the rice farmers are heterogeneous in terms of their livelihood assets and resource endowments with differences in human, natural, financial, physical, and social assets. However, there are no clear empirical evidences examining the criticality and effect of livelihood assets on rice productivity in small farms. This paper tries to address this issue by analyzing the effect of livelihood assets of rice-based farmers on rice productivity in the Phatthalung province in southern Thailand. The livelihood assets have been measured by developing scales and constructing livelihood asset pentagons specific to three rice-based agrosystems in the province. The effect of selected variables representing livelihood assets on rice productivity has been determined using a step-wise multiple regression analytical framework. The study revealed that five explanatory variables under natural, social and physical assets determine significantly rice yield in the study area.

While natural assets, especially cropping intensity and water potential, had direct effect on rice yield, the effect of social assets in the form of participation with groups and access to agricultural information as well as access to physical assets, such as farm machinery have also been found to be critical factors determining the rice productivity in the selected agrosystems.

Key words: human assets, natural assets, financial assets, physical assets, social assets

**PLANT EXTRACTS TO CONTROL WILT DISEASE
IN BANANA SEEDLINGS**

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ABSTRACT

Wilt disease in banana caused by either *Fusarium oxysporum* and/or *Ralstonia solanacearum* has been known to cause serious damage in Bali island. Indonesia since 1997. Within two years (1997-1999) about 60% of the banana production dropped due to the disease.

Banana is commonly propagated through corm and those derived from diseased parents are mostly (85-90%) infected. This study was conducted as one of the efforts to eliminate banana wilt pathogens in infected corms for the production of healthy banana seedlings. Two types of plant extracts from *Piper betle* leaves and *Alpinia galanga* rhizomes (alone or in combination) at a concentration of 0.5% (w/v) were used to soak the corm cuttings before planting in polyethylene bags.

Treatment with a chlorothalonil synthetic fungicide was also examined. Three sets of experiments with the same treatments were performed on the following dates: January 2, 2003 to March 26, 2003, May 4, 2003 to June 28, 2003 and on August 10, 2003 to October 24, 2003.

The treatment using *P. betle* plant extract in combination with *A. galanga* effectively suppressed wilt disease in banana seedlings. About 90-93% of the banana seedlings derived from this treatment were healthy and ready for transplanting, while only 11-18% and 77-81% of the seedlings of control and chlorothalonil treated, respectively were healthy. These results suggest that the treatment can be used to reduce banana wilt pathogens in order to produce healthy banana seedling.

Key words: infected-corm, *Piper betle*, *Alpinia galanga*, healthy seedling

**BIOLOGICAL CONTROL OF TOMATO BACTERIAL WILT,
RALSTONIA SOLANACEARUM, BY *BACILLUS* SP. L32**

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ABSTRACT

Eleven soil bacteria were tested *in vitro* for inhibition activity against *Ralstonia solanacearum* in 10% King's Broth medium. Among them, *Bacillus* sp. L32 caused the highest inhibition. This isolate was tested further for the ability to control the bacterial wilt disease *in vitro*, in the green house and in the field. The effect of *Bacillus* sp. L32 was compared to 2 isolates of *B. subtilis* and 3 isolates of *Pseudomonas fluorescens*. *Bacillus* sp. L32 did not produce inhibition zones to *Ralstonia solanacearum* on some agar media, *Bacillus* sp. L32 did not express harmful activity to the growth of tomato seedlings. This biological control agent was able to increase the growth of tomato seedlings *in vitro* and in the green house. Application of the biocontrol agent by dipping the root of the seedlings in polyvinyl pots in the green house and on the plots in the open field caused index suppression up to 20% and 62%, respectively. The population of the biocontrol agent was still high, up to 107cfu/gram root at 24 days after application by pouring into the soil. Application of the biocontrol agents as seed treatment, soil contamination, and its combination did not cause significant effect on the disease index. Based on the characterization and identification of the partial sequence of 16S rDNA, the bacteria is *Bacillus cereus*.

Key words: *Bacillus cereus*, *B. subtilis*, *Pseudomonas fluorescens*, seed treatment

FARMERS' ADOPTION OF RECOMMENDED PRACTICES IN BANANA PRODUCTION FOR EXPORT IN SOUTHERN THAILAND

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ABSTRACT

The study aimed to evaluate farmers' adoption of recommended banana growing practices for export and identify factors affecting the adoption. Lamae District in Chumphon Province of southern Thailand was selected as the study area. The full population of 100 farmers who grew bananas was used as a sample. Personal interviews were used to collect data.

The findings revealed that most farmers used sword suckers as the major method of propagation and used an intercropping system where the bananas were grown mixed with other fruit crops. Of the recommended practices, a few used lime and manure but most used chemical fertilizers and practiced plant disease and insect control. Timing of banana harvest was primarily based on observing external appearance. Lack of water and the high cost of farm inputs were mentioned as major associated problems. It was also found that use of family labor, knowledge about banana production, attendance in short training courses and study tours, attitudes towards banana production, and attitudes towards the extension officers were positively correlated with the adoption of recommended practices in banana production.

Key words: recommendations, use, peasant, plantain