BIOLOGICAL SCIENCES DIVISION

CYTOGENETIC AND MOLECULAR ANALYSES OF *Oryza sativa* L. x *O. officinalis* WALL. ex WALL. DERIVED PROGENIES

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Cytogenetic and molecular techniques were used to characterize *Oryza sativa* L. RFLP (MAAL), *O. officinalis* (CC), their F1 hybrid (AC), and backcross progenies. Hybrid nature of the F1 was confirmed by the presence of 24 chromosomes predominantly univalents and by the mitotic abnormalities causing male sterility. Limited chromosome pairing in the F1 and pattern of genomic DNA hybridization on Southern blots indicated little homology between *sativa* and *officinalis* genomes.

Cytogenetic analysis of BC1F1 progenies revealed their allotriploid nature (2n-30, AAC) except for three plants which behaved like the F1 in terms of chromosome number and isozyme and RFLP patterns. Embryo sac analysis in these plants did not show evidence for apospory or diplospory types of apomixis. Isozyme and RFLP techniques identified the extra chromosome(s) as well as introgressed alleles of *O. officinalis* in the MAAL and other hyperploids (2n=26, 28, 30, 34, 35). However, the two disomic progenies (2n=24) did not show

introgression for isozyme or RFLP alleles of *O. officinalis*. Isozyme and RFLP patterns indicated chromosome 6 as the extra chromosome in the MAAL.

SPORE CULTURE OF *Asplenium nidus* L.

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Asplenium nidus L. is an economic fern which is locally known as bird's nest or pakpak-lawin. It is used as an ornamental and for orchid potting.

This study was conducted to determine gametophyte and sporophyte development of *Asplenium nidus* in culture media through spore culture. The spores germinated 10-20 days after sowing. Prothallial development was of the *Adiantum* type. Formation of sporophytes occurred 51-60 days in culture. The sporophytes were transplanted in potting media and were grown in the CAS Fernarium.

EFFECT OF NaCl AND NEUTRAL OSMOTICA ON THE LEAF ELONGATION RATE (LER) OF RICE*

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The objective of the study was to investigate the response of leaf elongation rate (LER) of rice shoots to NaCl or osmotica using young seedlings grown under axenic conditions. A method of producing an axenic whole plant inside a test tube from germination until the 3rd leaf stage with optimum growth was developed. To determine if NaCl has an osmotic effect that can be observed for several days, the LER of axenic Nona Bokra seedlings grown in NaCl or mannitol at isoosmotic concentrations, i.e., 300 mOs to 2 mOs, which also resulted in higher LER of

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seedlings in 300 mOs of NaCl or mannitol within 5 d suggests that the osmotic effect of NaCl can last for several days and not only hours. Moreover, the recovery of NaCl-stressed Nona Bokra plants within 24 h after the concentration was reduced from 300 mOs to 2 mOs, which also resulted in higher LER than the control within 2 d, suggests that the growth reduction within 5 d was due to an osmotic effect. Furthermore, the same decrease in LER at isoosmotic concentrations of NaCl or neutral osmotica, e.g., raffinose or melibiose, within 2 d indicated those growth reduction during salinity can be partly explained by the osmotic effect of NaCl.

It is known that uninhibited influx of salts accounts for the long-term toxicity of even low external salinities in rice and that ways to reduce or eliminate excessive ion entry should be incorporated for the development of salt-tolerant rice varieties. Results from this study suggest that since at high salinity, low osmotic potential of the medium can also reduce growth, then, screening for "osmotic shock" resistant rice varieties, e.g., through osmotic adjustment, during the initial stages of salinity should also be considered as a component in the development of salt tolerant rice varieties.

THE ECOLOGY OF THE MIGRATORY LOCUSTS, *Locusta migratoria manilensis* MEYEN

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The migratory locust is an endemic pest of the Philippines. Infestations have been recorded as early as the 1500s by Augustinian friars. However, until now there is a dearth of information as far as the ecology of this pest in the Philippines is concerned.

Recent findings regarding flora and fauna associated with locusts in breeding areas; updated morphometrics of solitary and gregarious phases; new behavioral observations; correlates of soil properties and egglaying; and recent factors about migration of locusts in Central Luzon and other parts of Luzon are discussed.

A SURVEY OF BOVINE, BUBALINE, AND SWINE SARCOCYTOSIS IN THE PHILIPPINES

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In a survey conducted during the months of January to December, 1994, muscle tissues in twelve out of twenty-two slaughtered carabaos, ages 8-17 years, and obtained from the Food Terminal, Inc., Abbatoir in Laguna showed numerous white and creamy elliptic-shaped soft bodied macrocysts in the throat muscles. Microscopic examination of the throat and cardiac muscle tissues revealed the presence of fusiform-shaped microcysts. Our observations are consistent with previous reports incriminating *Sarcocystis fusiformnis* as the most important etiologic agent of bubaline sarcocystosis in the country. In a survey of bovine sarcocystosis in muscle tissues of imported Australian cattle (Brahman Breed) and native cattle obtained from various slaughter houses in Manila and suburbs, prevalence rates of 17.0% (98/577) and 3.2% (1/31) were noted, respectively. Sarcocysts were predominant in skeletal muscles and to a lesser extent in cardiac, esophageal, and diaphragm muscle tissues. Light microscopic examination of sarcocysts morphology suggests *Sarcocystis cruzi (= Sarcocystis bovis),* and *Sarcocystis hominis (=Sarcocystis bovihominis)* or *Sarcocystis hirsuta (=Sarcosystis bovifelis)* as the likely etiologic agents of bovine sarcosystosis in the country. Of the 225 swine examined, only muscle tissues from a 6-month old swine revealed very young sarcocysts (metrocytes). A review of available documented studies on sarcocystosis suggests that, to date, our findings may represent the first data on the prevalence of bovine and swine sarcocystosis in the Philippines.

ALLOZYME VARIATION AMONG GEOGRAPHICALLY ISOLATED POPULATIONS OF *Apis cerana* F. IN THE PHILIPPINES

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Genetic variabilities within and between natural populations of *Apis cerana* F. from Bicol, Quezon, Laguna, Batangas, Mindoro, and Palawan were compared using horizontal starch gel electrophoresis. The frequency of occurrence of the allozyme esterase (Est), malate dehydrogenase (Mdh), isocitric dehydrogenase (Idh), and alkaline phosphatase were determined. In terms of presumptive allelozymes, S (slow), M (moderate), and F (fast) forms were noted. Polymorphism was observed in esterase in all areas showing the three genotypes at the Est locus. Malate dehydrogenase, also with three forms, was polymorphic except in Mindoro. Isocitric dehydrogenase was polymorphic in three areas (Bicol, Laguna, Mindoro) while alkaline phosphatase polymorphism was observed only in Palawan, Batangas, and Mindoro). Both enzymes showed only two genotypes as their loci.

Populations within each area showed high degrees of genetic identity with low variation in their types of alleles. The genetic distances were, therefore, quite low. Comparison of the genetic identities and distances between areas, however, showed significant differences.