FFTC Research Highlights

March 2003
RH2003-9

Use of CO_2, bee pollination, and seedling vernalization to increase self incompatible lines

in subtropical lowlands

THE USE of self-incompatibility (SI) genes in breeding hybrid vegetable *Brassica* crops has been widely used for *Brassica oleracea* and *B. rapa*. In 2000, the Tainan District Agricultural Improvement Station (Tainan DAIS) developed a seedling vernalization technique to overcome the insufficient low temperature requirement for cabbage seed production in the lowland. However, one major problem of the SI system is the effort and cost involved in seed production of the self-incompatible lines by bud pollination and isolation. In 2002, this technique was combined with CO_2 enrichment and bee pollination to increase the self-incompatible line of cabbage in a small greenhouse. This system was successfully applied to generate self seed of 'K-Y cross' cabbage in the subtropical lowland. Using this new method, each silique had 17.3 seeds while the control treatment only generated 0.3 seed per silique. The cost of seed product can be reduced by 90% compared with that of seed production using the conventional bud pollination.

News source: **Tainan District Agricultural Improvement Station, Taiwan, ROC**

For further information: dennis@mail.tndais.gov.tw

A novel rice mutation pool with wide variations

A NOVEL mutation pool of 'Tainung 67' (TNG67) variety was developed by seed sodium azide (NaN_3) mutagenesis containing more than 2,000 mutants (M12) with diverse variations including pathogen (*Pyricularia oryzae*, *Xanthomonas campestris* pv. *oryzae*) and insect (brown planthopper, white-back hopper) resistance, herbicide (bentazone and glyphosate), stress (UV, chilling) tolerance, chemical composition (starch, storage proteins, and aroma), taste quality, pericarp color of grain, and hundreds of agronomic variations in the growth stage, grain development, morphology, plant type, and yield capability. This mutation pool shall serve as a rice resource for use in traditional studies such as genetics, breeding, physiology, and plant-microbe interaction, as well as in recent genomics and proteomics.

News source: **Taiwan Agricultural Research Institute, Taiwan, ROC**

For further information: cswang@wufeng.tari.gov.tw

Germination of primed seed in spinach (*Spinacia oleracea* L.)

Influence of dried back treatment and storage temperature

PRIMED SEEDS of spinach (*Spinacia oleracea* L.) in osmotic solutions -0.8Mpa of polyethylene glycol '6000' (PEG) markedly improved germination rate at 15°C and 30°C. Primed seeds can be dried and stored for 30 days without losing their improved capacity. However, different temperatures for the dry back treatment of the primed seeds will more or less affect the germination rate. Results of the storage test for 30 days showed that there is an interaction effect between temperature for drying back and temperature for storage. Drying back the primed seeds by exposure to the atmosphere at 15°C and to room temperature appeared to exhibit greater cumulative germination rate. Storage temperatures of 20°C, 10°C, and 5°C had no significant effect on germination rate of all the seeds after drying treatments, but only those seeds dried back at room temperature can keep their improved capacity for 30 days at 30°C storage condition.

News source: **Taiwan Seed Improvement and Propagation Station, Taiwan ROC**

For further information: *ymhuang@www.tss.gov.tw*

FFTC: An international information center for small-scale farmers in the Asian and Pacific region

Food and Fertilizer Technology Center (FFTC)
14 Wenchow St., Taipei, Taiwan ROC
Tel.: (886 2) 2362 6239 Fax: (886 2) 2362 0478
E-mail: fftc@agnet.org Website: www.fftc.agnet.org

Vitamin E nutrition and its effects on the immune responses of the juvenile grouper

A SERIES of two experiments was conducted to study the effects of vitamin E nutrition on immunity of the juvenile grouper. In experiment 1, the grouper were fed for 12 weeks on one of seven diets containing 0, 7.5, 15, 30, 60, 120, and 240 IU vitamin E/kg dry diet to investigate dietary requirement for vitamin E. The results indicate that there was a significant difference among dietary treatments in terms of growth, and enhanced growth was observed when the dietary vitamin E was 50-60 IU/kg diet. However, there was no difference in survival rate and immunity. In experiment 2, the grouper were fed for 18 weeks on one of four diets containing 0, 50, 500, and 5000 IU vitamin E/kg diet to investigate dietary vitamin E nutrition and its effect on immunity. The results indicate that there was a significant enhanced immunity when the dietary vitamin E was 500 IU/kg. Thus, the test diet with 500 IU vitamin E/kg was more effective than the diet with 50 IU/kg, in affecting the level of immunity of juvenile grouper.

News source: **Mariculture Research Center, Taiwan Fisheries Research Institute**

For further information: fengchengwu@hotmail.com

Stimulation of sex change or ovarian development in protogynous grouper, *Epinephelus coioides*

Effect of dose of exogenous androgens

EFFICACY OF various doses of an androgen mixture containing testosterone (T), 17α-methyltestosterone (MT), and testosterone propionate (TP) in equal ratios, for the induction of sex reversal in protogynous orange-spotted grouper, *Epinephelus coioides*, was examined. All androgen mixtures at doses higher than 1000 µg/kg BW were capable of inducing sex transition and completion of spermatogenesis up to the functional male phase. It was concluded that the stimulation of sex change or ovarian development depends on the dose and time course of implanted androgens. Plasma T levels were correlated with the development of controlled male phase in protogynous grouper, *E. coioides*.

News source: **Mariculture Research Center, Taiwan Fisheries Research Institute**

For further information: tfritnb@pchome.com.tw

Genetic diversity of germplasm

Genetic diversity of collections of pea (*Pisum sativum* L.) revealed by molecular markers

THE GENETIC diversity of pea accessions collected by the NPGRC was evaluated via RAPD markers as reference for germplasm collection and breeding programs. The results indicated that all the pea accessions analyzed could be divided into three groups and five individual accessions. The polymorphic bands ranging from 3 to 11 were generated by 38 random primers, with an average of 6.1 bands each. The lowest and highest genetic similarity recorded were 0.626 and 0.978, respectively. The phylogenetic relationships were revealed accurately and genetic diversity tested in this research could be used to broaden the genetic basis in breeding programs.

News Source: **Taichung District Agricultural Improvement Station, Taiwan, ROC**

For further information, see *Research Bulletin*, Taichung District Agricultural Improvement Station.