

DANS LES UNIVERSITÉS...

UIT DE UNIVERSITEITEN...

IN THE UNIVERSITIES...

EN LAS UNIVERSIDADES...

Cette rubrique présente les thèses de doctorat concernant le développement rural défendues en Belgique au cours des derniers mois.

This heading presents PhD thesis defended recently in Belgium concerning topics linked to sustainable rural development.

Deze rubriek stelt de doctoraatsthesisen voor die betrekking hebben tot plattelandsontwikkeling en die in de loop van de laatste maanden in België verdedigd werden.

Este título presenta las tesis de doctorado defendidas en Bélgica durante los meses pasados referentes a asuntos ligados al desarrollo rural sostenible.

Use of the Wild Australian Species *Gossypium sturtianum* J. H. Willis and *G. australe* F. Muell to Improve *G. hirsutum* L.

L. Ahoton

Keywords: Cotton- Interspecific hybridization- *Gossypium hirsutum*- *G. australe*

Summary

In order to assess the possibility to use the wild Australian species *G. sturtianum* and *G. australe* to improve the main cotton cultivated species, several experiments were carried out in Benin and in Belgium. Pentaploids and monosomic addition lines were produced from the hexaploids 2(*G. hirsutum* x *G. sturtianum*) et 2(*G. hirsutum* x *G. australe*) to quantify genetic material exchanges occurring in these hybrid structures. This quantification was obtained through morphological and cytogenetic observations and through the use of chromosome *in situ* hybridization. The pollen fertility of the plant materials produced was also evaluated systematically.

For the first time, the 13 monosomic addition lines of *G. australe* on *G. hirsutum* were isolated. These lines constitute valuable genetic stocks to carry out fundamental and applied investigations. The observation of the progeny of the various hybrids allowed to quantify the frequency of alien genetic material exchanges. *In situ* hybridization appeared to be a very efficient tool to characterise the chromosomes of different genomic origins in cotton interspecific hybrids. The plants developed in this work constitutes potential parents to introgress interesting agronomic traits in cotton from *G. australe*, notably, the gossypol biosynthesis inhibition in the seed kernel, the production of narrow bracts, hanging bolls and extra white lint.

Language: French
Date: 1st February 2002
Bibliographic references: 247
Number of pages: 175
Number of figures: 43
Number of tables: 26
Number of annexes: 3

ISBN: None
Copyright registration: yes, according to the Belgian law of 22 March 1886.

Composition of the Thesis Committee

Dr. G. Mergeai and Professor J.-P. Baudoin, Promoters, FUSAGx, Gembloux, Belgique
Professor A. Théwis, President, FUSAGx, Gembloux, Belgique
Professors P. du Jardin, A. Falisse, A. Toussaint, FUSAGx, Gembloux, Belgique
Dr J.M. Lacape, CIRAD, France
Dr J.M. Jacquemin, CRAgX, Gembloux, Belgique.

Results: Ph.D. in Agronomy with honours.

Sustainable Development of Integrated Rice-fish Polyculture Systems in the Mekong Delta of Vietnam

Duong Nhut Long

Keywords: Ricefish culture- Fish polyculture- Fish production- Cost ratio profit

Summary

Fish polyculture in the rice fields has been experimented in 6 rice fields with 3 replications for each treatment, in two polyculture systems (6 and 3 species), at 4 stocking densities (1, 2, 3 and 4 fish/m²) with the same stocking structures. The ricefish polyculture with 6 species includes: silver barb (40%), tilapia (20%), common carp (15%), silver carp (10%), snake skin gouramy (10%) and kissing gouramy (5%), and polyculture system with 3 species: silver barb (50%), tilapia (30%) and common carp (20%). Agricultural by-products and pellets at two protein levels (18 – 25%) were used to supply fish at the feeding rate of 3%/total body weight of fish/day.

The eco-technological comparison between ricefish polyculture systems with 6 and 3 species shows that the higher number of fish species (6 species) leads to an increase in the interspecific competition process between silver carp, tilapia, snake skin gouramy and kissing gouramy, which decreases the natural foods. The mean final body weight of silver barb and common carp in a polyculture system with 6 species is higher at 1 fish/m² (177.5 and 443.7 g/fish) and at 2 fish/m² (155.8 and 425.8 g/fish) than in a polyculture system with 3 species at 1 fish/m² (126.2 and 335.5 g/fish) and at 2 fish/m² (122.8 and 321.5 g/fish). But the survival rate is lower. The fish yield in a ricefish polyculture system with 3 species at 2 fish/m² is slightly higher (823.4 kg/ha) than in a ricefish polyculture system with 6 species (807.7 kg/ha).

For the ricefish polyculture system with 3 species, the compared results at 4 stocking densities (1, 2, 3 and 4 fish/m²) show that the dissolved oxygen concentration is a little low with highest concentration at 1 fish/m² (5.2 ppm) and lowest at 4 fish/m² (3.8 ppm). The mean final body weight of silver barb, tilapia and common carp is significantly higher ($p < 0.05$) at the lowest fish stocking densities. The survival rate of silver barb, tilapia and common carp is also significantly higher ($p < 0.05$) at the lowest fish stocking densities. Through compared results, the highest fish yield (823.4 kg/ha), the highest farm net income (10,935,000 VND/ha), the best cost ratio benefit (2.08) and the best cost ratio profit (1.08) are reached with the stocking density of 2 fish/m² in the rice fields polyculture system with 3 species.

Regarding the ricefish polyculture system with pellet feeding at 18 – 25% protein levels, the results show that the water quality was improved which in turn leads to improved survival rate and fish production. The total fish yield with pellets at the 25% protein level (1,080 kg/ha) is significantly higher ($p < 0.05$) than at the 18% protein level (927 kg/ha). Pellet feeding give also higher fish yield than feeding fish with fresh farm by-products (823.4 kg/ha). Therefore, the home-made pellet feeding will be promoted in the large areas of the Mekong delta to increase the income of farmers and to improve their standard of living.

Language: English

Date: 19 September 2002

Bibliographic references: 131

Number of pages: 297

Number of figures: 19

Number of tables: 72

Number of annexes: 117

ISBN: 2-87037-382-1

Copyright registration: D/2002/1881/26

Composition of the Thesis Committee

Professor J.-C. Micha, Promoter, FUNDP, Namur, Belgique/Belgium

Dr. Nguyen thanh Phuong, Co-promoter, Can Tho University, Can Tho City, South of Vietnam

Professor P. Kestemont, FUNDP, Namur, Belgique/Belgium

Professor M. Rémon, FUNDP, Namur, Belgique/Belgium

Professor F. Pekar, HAKI- Hungary

Results/Résultats: Ph.D. in Sciences.