



Creation of a white inflorescence colour cultivar of *Alpinia purpurata* through the combination of intergeneric hybridization and mutagenesis



L. Fereol^{1,2,3}, F. Luc-Cayol¹, L. Luce⁴ & M. Guitteaud¹

1. Antilles Biotechnologies, S/C Miguel Guitteaud, 55 bld Amilcar Cabral, Lotissement de Cluny, 97200 Fort de France, Martinique (W.I.); 2. CIRAD, Station de Petit Morne, 97232 Le Lamentin, Martinique (W.I.); 3. INRA, BP 515, 97165 Pointe à Pitre, Guadeloupe (W.I.); 4. Centre Hospitalier Universitaire, Service Oncologie, 97110 Pointe à Pitre, Guadeloupe (W.I.)

<http://antilles-biotech.com>; E-mail: info@antilles-biotech.com

INTRODUCTION

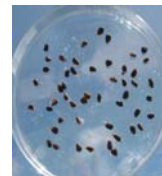
Alpinia purpurata an ornamental species of the *Zingiberaceae* is the most important commercial cut flower of the West Indies for export to Europe and North America. Nevertheless, only two colours are commercially available in this species, the red *A. purpurata* (no cultivar name) and its pink cv. Eileen McDonald. Therefore, research is in progress using tools for improving and obtaining new colour type cultivars.

Introduction traits from other genera *Etilingera elatior* (Jack) R.M. Smith increase the range of variation (Luc-Cayol and Fereol 1997).

Mutagenesis is also an important tool, particularly for morphological variations and colour type, in different ornamental plants. Fereol, Louis et al. (1996) reported that this technique has potential for increasing the genetic variation in *Alpinia purpurata*.

The objective of this investigation was to explore the possibility of introducing new genes for inflorescence colour and shape through the combination of intergeneric hybridization and mutagenesis.

INDUCED MUTAGENESIS



Seeds gamma irradiated at 30 Gy dose



Plantlets from irradiated seeds

A population of 300 seeds from this back-cross was treated with gamma radiation at a dose of 30 Gy.

After treatment, these seeds were planted in 30x40-cm trays in the green house, and they were transplanted to the field 3 months later for evaluation and comparison to the parents.

Plantlets morphological characteristics were observed. They were grown to 14-month old flowering plants to observe their floral characteristics.

Irradiated plants showed a number of morphological abnormalities. These are of interest in ornamental horticulture. Abnormal plantlets were called "off-types". Selection based on individual stalks was continued for five generations until the "off-types" were stable. Variations became stable from the C4 generation.

INTERGENERIC HYBRIDIZATION



X



♀ *Alpinia purpurata*

♂ *Etilingera elatior*

Field grown plants of a pink-bracted selection ("Eileen McDonald") of *A. purpurata* were cross-pollinated with a rose-pink selection of *E. elatior* under field



Alpinia purpurata

conditions. Both species are $4x=48$. *A. purpurata* was the pistillate parent. Intergeneric hybrids between both selections were achieved with relative ease.

About 20% of the pollinations yielded viable hybrid seeds. Hybrid seedlings differed from *A. purpurata* by increasing production of flowers. A total of 88 hybrids observed revealed they were fertile and produce more flowers than *A. purpurata*, and fruits were formed from these flowers without manual pollination, traits similar to the staminate parent.

Comparatively, in a series of reciprocal intra-specific crosses in *A. purpurata* over 3 years, using the red-bracted and the pink-bracted selections, the crosses yielded only 10% fruit set.

OBTENTION OF A WHITE GINGER

« MADIKERA WHITE N°2 »



Vigorous vegetative morphology



Spike like inflorescence Having obloid morphology



Well over lap bracts



Numerous inflorescences

From this investigation, it was found that one plant possessed the characteristics of white inflorescence.

The characteristics of such new cultivar can be summarized as follows:

- Vigorous vegetative morphology similar to *Alpinia purpurata*,
 - Attractive spike-like inflorescences having obloid morphology like *A. purpurata*, bearing well overlapping bracts of white colour,
 - Bracts acute tip shape but large at the base,
 - Inflorescence size up to 25 cm,
 - Vase life of these inflorescences up to 20 days,
 - Number of inflorescence /plant/year about 60.
- It has been called, white ginger "Madikera white N°2".

White ginger" Madikera white N°2 "

BACK-CROSS



♀ *Alpinia purpurata*

X



♂ *Alpinia purpurata*

The intergeneric hybrids plants were back-crossed with *A. purpurata* pink-bracted selection ("Eileen McDonald") under field conditions.



Population of seeds coming from the back-cross

These intergenic hybrids were pistillate parent. Pollinated flowers were tagged and seeds were collected 3 months later. About 30% of the pollinations yielded viable hybrid seeds.

CONCLUSION

Intergenic hybridization between *A. purpurata* and *E. elatior* was a way to increase fertility in *Alpinia purpurata*. Induced mutagenesis was the way bringing more variation concerning the colour type.

PERSPECTIVES

Other new colours, shapes and sizes are seeking out. A team of growers and breeders is doing this work of improving *Alpinia purpurata*.

References :

- . Fereol, L., S. Louis, et al. (1996). "Effects of gamma radiation on *in vitro* plantlets of *Alpinia purpurata*." *Journal of Horticultural Science* 71(2): 243-247.
- . Luc-Cayol, F. and L. Fereol (1997). "X *Alpinia purpurata* (Zingiberaceae): An intergeneric Hybrid between *Alpinia purpurata* and *Etilingera elatior*." *HortScience* 32(5): 914-915.