

Summary of presentation

Study on micropropagation of disease-free Cavendish banana (AAA)

*Le Vu Ngoc Hoa, Nguyen Thi Dieu Hien, Bui Thi Ngoc Lan,
Nguyen Thanh Binh and Le Thi Thu Hong*

SUMMARY

Micropropagation of virus disease-free of three clones Cavendish banana was succeeded by apply the following process: shoot tip from young sucker banana was culture on MS medium supplement with 4 mg/l BAP and 0,5 mg/l IAA for shoot bud induction then subculture to MS medium supplemented with 5 mg/l BAP plus 80 mg/l Adenin and 0,1 mg/l IAA for shoot multiplication. Shoot bud was transferred to MS medium supplemented with BAP 2mg/l plus active charcoal 0,1-0,15% (w/v) for elongation and rooting. Cavendish banana plantlets was hardened in mixed medium including: poultry manure: carbonized rice hull: coconut fiber: soil (radio 1:1:1:1) under green house condition 80-90% relative humidity, light intensity was 1200-1500 lux and temperature 25-8oC (11-12/2004).

Study of the genetic diversity of *Phaeoramularia angolensis*, the causal agent of the citrus leaf and fruit spots disease in Africa

*Bui Thi Ngoc Lan, Christian VERNIERE **

** Trung tâm Nghiên cứu Nông nghiệp Pháp (CIRAD-FLHOR)*

SUMMARY

Phaeoramularia angolensis, appeared out of the main citrus area production and quickly spread over tropical Africa. Amplified Fragment Length Polymorphism (AFLP) markers were used to determine genetic diversity and population structure of *Phaeoramularia angolensis*. A total of 109 isolates collected from Cameroon, Guinea, Gabon and Burundi were analyzed. Genetic analysis was based on polymorphism for 107 AFLP markers. Analyses of genetic distance between AFLP patterns based on the jaccard index indicated that 89 isolates could be assigned to a single clonal lineage. Twelve isolates from Cameroon are separated from this main group. A low level of genetic diversity was observed for most of the populations ($H= 7,7\%$). Observation of the multilocus linkage disequilibrium suggests that sexual reproduction is absent in this population. The presence of some different isolates suggests the presence of migration events from other population by the transport of infected plant material. Additionally, the observed structure suggests that there was a founder effect associated with the appearance of *Phaeoramularia angolensis* on citrus.

Keywords: Citrus leaf and fruit disease, Phaeoramularia angolensis, genetic diversity, population structure, AFLP (Amplified Fragment Length Polymorphism).

Preliminary results of mutation induced on adventitious shoot buds of Duong mandarin (regenerated in-vitro) by gamma irradiation

*Nguyen Thanh Binh, Tran Thi Thu Yen, Nguyen Thi Dieu Hien,
Le Vu Ngoc Hoa and Nguyen Thanh Nhan*

SUMMARY

Shoot buds regenerated from hypocotyl of Duong mandarin was succeeded when 0.5 cm hypocotyl segments were cut longitudinally with the cut surface up, cultured first 21 days in the dark followed by an incubation in the light with a 16/8 h light/dark cycle at 25±2°C, in the MT medium with 3% sucrose supplemented with 1.00 mg.l⁻¹ BAP and 20 mg.l⁻¹ Adenine. In these conditions, the regeneration system allows adventitious shoots formation in 100% and an average of 7.8 well differentiated shoots per explants. The hypocotyl explants were exposed to 1-5Krad of gamma radiation after ten days cultured on the above medium, and maintained for three months in the same medium. LD₅₀ was at 3.5 Krad and almost regenerated shoot buds are highly variability on their leaf shape, leaf size and shoot high especially on those treatments from 2.5-5 krad as compared to control treatment.

Clonal selection of Daxanh pummelo variety in the South of Vietnam

*ao Thi Be Bay, Tran Thi Oanh Yen, Nguyen Nhat Truong, Nguyen Ngoc Thi,
Nguyen Van Hung and Pham Ngoc Lieu*

SUMMARY

Daxanh pummelo has been grown rather popularly because of its good quality and high yield. Trials were conducted 1998-2004 and we found that the clone BDX30 at Bentre province was vigorous and have good fruit quality as its showing: brix 11%, ph: 4,8, juicy: 32,4%, total acid: 0,49g/100ml, vitamin c: 31,9mg/100ml), high flesh/fruit weight ratio, green skin, red pink flesh, 26 seeds. Its yield was 160.3 kg.tree⁻¹.year⁻¹ (17 years old with an average fruit weight of 1304 g.)

Seedless sweet orange selection from nature mutation

Tran Thi Oanh Yen, Nguyen Ngoc Thi, Nguyen Nhat Truong and Pham Ngoc Lieu

SUMMARY

*The selection of seedless clones of sweet orange from natural mutation protected by Farmers were done after two years of observation. Observation of their pollens showed that ratio of empty pollens was more than 99%. It is concluded that seedless characteristic of these clones is stable as they performed seedless even in cases of being pollinated by pollens of king mandarin (*C. nobilis*), da xanh pummelo (*C. maxima*), day orange (*C. sinensis*), soan orange (*C. sinensis*), duong mandarin (*C. reticulata*), nam roi pummelo (*C. maxima*). In addition, the pollination made an incersing of fruit setting as compared to that of control (natural pollination.)*

Evaluation on growth, yield, and fruit quality of Tangelo orlando (introduced variety from France) in provinces of Mekong delta

*Nguyen Nhat Truong, Tran Thi Oanh Yen, Nguyen Ngoc Thi, Pham Ngoc Lieu,
Gian Duc Chua, Philippe Cao Van and Nguyen Minh Chau*

SUMMARY

Tangelo orlando was introduced from France in 1996 and grown for evaluating at districts of Tiengiang province: Chau Thanh, Cho Gao, Cai Lay and Cai Be from 1997 to 2004. The results showed vigour growth, high yield (80-105kg.tree⁻¹.year⁻¹). Fruit has orange yellow colour and thin peel (2,6-3,9mm with fruit weight around 201,0-278,3g. fruit juice is much 49,2-52,8% with brix: 7,0-8,2%, number of seeds per fruit: 6,5-7,5 seeds. The variety is rather sensitive to phytophthora spp.

Clones selection of Rongrien rambutan variety

ao Thi Be Bay, Nguyen Huy Cuong, Le Minh Tam and Pham Ngoc Lieu

SUMMARY

The Rongrien rambutan variety (Nephelium lappaceum linn.) introduced from Thailand in 1996 was grown for trial at Cailay, Tiengiang during 1997-2004. After six years of survey, we selected three best clones (coding rr1, rr2 and rr7) from rambutan populations in the South of Vietnam. Results on trial showed some good characteristics of the variety. They are vigour, easy to flower and setting fruit, high yield, excellent in fruit quality: very sweet, thick aril, the aril free from seed, thin shell, high flesh/fruit ratio and tolerant to common pest.

Clone selection of Ri-6 durian variety

*Nguyen Nhat Truong, Nguyen Ngoc Thi, ao Thi Be Bay, Nguyen Van Hung,
Le Quoc Dien, Pham Ngoc Lieu and Nguyen Minh Chau*

SUMMARY

Durian (Durio zibethinus murr.) has been grown at the south of Vietnam with many varieties. One of the good varieties is ri-6 durian variety. During six years of selection, we selected one clone (s2vl) of ri-6 variety at Vinhlong province. It is 16 years old with characteristics as high yield (226,7-33,0kg.tree⁻¹.year⁻¹), fruit having high ratio of flesh, and good quality: creamy, less fibre and high ratio of seedless.

Clonal selection of Artocarpus spp. and testing the performance of some promising clones of P. heterophyllus in the Southeast region of Vietnam

Phan Van Dung, Nguyen Van Hung, Chau Van Toan, Mai Van Tri and Bui Xuan Khoi

SUMMARY

Jackfruit (Artocarpus spp.) is popularly grown in Viet Nam. The fruit tree is highly cross pollinated and is mostly propagated by seed. As a result it exhibits a wide variation in size, shape, fruit bearing and sensory quality of fruits. One of the major constraints for

improved production of jackfruit is lack of quality planting materials. In this research, an attempt has been made to characterize and initially evaluate the genetic diversity of jackfruit in the southeast region through a farmer's survey and laboratory analysis during 2000-2004. The result showed that there has been no designated cultivar of jackfruit before but two main groups are recognized and these are Ta and To Nu. In Ta group, three types are recorded including Nghe, Dua and Uot meanwhile recorded three types from To Nu group are Hat Lep, To Tay and To nu. From collected populations, five excellent individuals of Ta group (namely M 06H, M 09H, MBRVT32H, M 02H, and MBRVT33H) and seven excellent individuals of To Nu group (namely MTNBRVT02, MT N03, MT N04, MT N05, MT N06, MT N08, and MT N09) were selected as quality planting materials.

Results on evaluation of papaya hybridizations

Tran Thi My Hanh, Tran Thi Oanh Yen

SUMMARY

A trial on the purity of six selected papaya varieties and evaluation of five hybridizations were carried out at SOFRI in 2004. The results showed that six papaya varieties: Sunrise solo, Kapoho solo, Ma lai lun, Niensee, Dai loan tim, and local papaya were stable in some evaluated characteristics after the 2nd generation of self – fertility. In hybridizations, the combinations of Sunrise solo and Ma lai lun, Dai loan tim and Kapoho solo, Niensee and du du dia ph ng, du du dia ph ng and Dai loan tim resulted that many hybrids performed better than their parents in some desirable characteristics.

The trials on hybrids of Binh Thuan dragon fruit and red flesh dragon fruit (reciprocal) at Tiengiang, Longan and Binhthuan

Tran Thi Oanh Yen and Pham Ngoc Lieu

SUMMARY

A total of 12 selected hybrids from 188 hybrids of Binh Thuan dragon fruit and red flesh dragon fruit (Comlombia) hybridization, and two parental varieties have been grown for trials at Tien Giang, Long An and Binh Thuan. at Tien Giang and Long An, the hybrids were evaluated on growth, quality and yield. At Binh Thuan, the hybrids had not given enough fruits for data analysis, only some notes were showed. The results of trials in Tien Giang and Long An showed that the hybrids with codes as h14, h2, h15, h3, h11 are vigour growth, good quality and high yield. Especially, clone h14 has good fruit shape, bright red peel, rather firm flesh, sweetness (brix: 16-17%), low total acid: 0,3g/100ml, high vitamin c: 9-11mg/100ml, and high yield: 22kg/tree/year, (22 tons/ha), in dragon fruit orchard 2 years old.

The preliminary results on determination of maximum limit of rate of N,P and K effect on the yeild and fruit quality of hoa loc mango (*Mangifera indica. L*)

Nguyen Thanh Hieu and Vo The Truyen

SUMMARY

Many previous studies on mango shown that the use of mixed formula of N, P, K resulted in increase fruit yeild and quality in the given experiment. But, so far, no maximum limit of rate of N, P, K which affected on fruit yeild and quality were determined yet. This study aimed to find the effect of different dosages of K_2O with the same amount of N and P_2O_5 on the yeild and fruit quality. The results showed that the treatment of 327,5 K_2O g/tree/year produced fruits of better quality and the application of higher K_2O doses gave no increasing on fruit quality. The maximum fruit yeild and quality of the three-year old Hoa Loc mango tree was obtained with the treatment of 440g N - 520g P_2O – 327,5g K_2O .

Improving fruit set and controlling fruit drop on Hoa Loc mango (*Mangifera indica. L.*)

Vo The Truyen and Nguyen Thanh Hieu

SUMMARY

30 of Three-year old CHL mango trees were subjected for the study. Chemicals like NAA, 2,4-D, Borax, $CoSO_4$ were applied twice (at haft flower panicle growth and a week later) at various concentrations and times as treatments except the water sprays were made continously 7 days (2hours/day in mid-day), untreated trees were used as the control. The results showed that Borax 500 ppm and 1000 ppm made highest effect in improving fruit set while NAA 10 ppm and 20 ppm, Borax 500 ppm and 1000 ppm, $CoSO_4$ 250 ppm and 500 ppm served well in both the purposes - improving fruit set and controlling fruit drop. Inaddition, $CoSO_4$ 250 ppm could also increase brix level of the fruits while NAA 20 ppm increseased the fruit Vitamin C content. The treatments as NAA 10 ppm and 20 ppm, Borax 500 ppm and 1000 ppm, $CoSO_4$ 250 ppm and 500 ppm sprays were recommenced to used as the the contrl measures for the aforementioned problem.

Effect of NPK rates and organic fertilizers, some kind of organic fertilizers on yeild and quality of “Cát Hoà L c” mango

Tran Nguyen Lien Minh and Nguyen Minh Chau

SUMMARY

The effect of NPK rates and organic fertilizers, some kind of fertilizers on yeild and quality of “Cát Hoà L c” mango. The result showed the treatment such as 690 g N – 450 g P_2O_5 – 675 g K_2O + 5kg Dynamic lifter, 460 g N – 300 g P_2O_5 – 450 g K_2O + 10kg Dynamic lifter, 690 g N – 450 g P_2O_5 – 675 g K_2O + 5kg greenfield, gave significant effect on yeild compared to the farmer control. 460 g N – 300 g P_2O_5 – 450 g K_2O + 10kg Dynamic lifter, 460 g N – 300

g P₂O₅ – 450 g K₂O + 10kg Greenfield gave the best result in increasing quality of Cat Hoa Loc mango. The treatments 20kg Dynamic lifter, 20 kg greenfield gave similar yield with control treatment and increase quality of fruit. Nitrate accumulation in Cat Hoa Loc mango was very low and negligible.

Effect of foliar fertilizers on fruit yield and quality of mangosteen (*Garcinia mangostana* L.)

Nguyen Van Tho, Le Thi Khoe, Huynh Van Tan and Nguyen Minh Chau

SUMMARY

Foliar spray of several fertilizers was applied to improve fruit yield and quality of mangosteen at three different timings 15 days after full bloom at 7 days interval. The application Grow-more (20-20-20) was found to increase fruit number, weight, yield, marketable fruit number (>80g) and better fruit rind colour and consequently draw more incomes. However, there was no any effect on the total soluble solids (Brix%), pH and percentage of flesh-fruit was obtained among these treatments.

Effect of some foliar fertilizers on flowering in mangosteen (*G. mangostana* L.)

Nguyen Van Tho, Le Thi Khoe, Huynh Van Tan and Nguyen Minh Chau

SUMMARY

“Effect of some foliar fertilizers on the improvement of flowering in mangosteen” was conducted at Cho Lach, Ben Tre province. The data showed that MKP at 100gr/8 litres of water gave the best result in enhancement of earlier flowering, intensity of flowering per shoots and thus resulted in increasing crop load and earlier harvest of higher yield and economic. These treatments, however, produced fruits with dark crimson rind colouration. Other parameters i.e. Brix (%), pH, the percentage of flesh per fruit, fruit weight, leaf area and dry weight exhibited no significance to control and among themselves.

Influence of technologies on the emergence of new shoot in mangosteen (*G. mangostana* L.)

Nguyen Van Tho, Le Thi Khoe, Huynh Van Tan and Nguyen Minh Chau

SUMMARY

*Lopping and Thiourea (0.5%) were employed to induce new shoot growth in mangosteen (*Garcinia mangostana* L.) grow in Cho Lach, Ben Tre province. The treatments lopping combine Thiourea (0.5%) and Thiourea (0.5%) in this trial surpassed to all the other treatments in respect of enhancement of earlier new shoot growth, flowering and harvesting date and fruit yield (fruit number and yield/plant), flesh percentage, intensity of flowering per shoots and marketable fruit number. These treatments were also proved to be the best in increasing dry leaf weight, and rind colour, fruit weight, pH but there was no significant different as compared to control and among themselves.*

Investigation on the application of advanced practices for mangosteen quality improvement

Nguyen An e, Mai Van Tri and Bui Xuan Khoi

SUMMARY

Mangosteen (Garcinia mangostana L.) is a high economic value fruit introduced in the South Vietnam for hundred years. A demonstration of intensive cultivation with advanced practices was established on the basaltic soil in the Southeast region. These included pruning, fertilization, irrigation, flowering inducing, pest control and mulching. The results of its demonstration gave yield increasing of 23%, and increased the export standard ratio of 11,15%, these lead to increase 5,8% of income and to reduce 56,25% bad quality flesh-hardened fruits.

Forecasting rootstock - scion incompatibility in citrus between king mandarin, Tieu mandarin and introduced rootstocks

Vo Huu Tho i, Nguyen Huu Hoang and Nguyen Minh Chau

SUMMARY

To dertermine whether an early diagnosis of incompatibility in citrus is possible by examining union structure. The method of grafting used in the study involed interchanging a complete ring of bark between seedling os rootstock and scion cultivars. Ring grafting is a simple and effective means of producing reciprocal graft combinations for examination. The experiment results showed that the roostocks of Troyer citrange, Citrange C35, Carrizo citrange and Goutou S. orange were unable in compatibility with King mandarin and Tieu (Hong) mandarin scions. The Volkameriana and Cleopatre mandarin were the suitable rootstocks for King mandarin and Tieu (Hong) mandarin scions by using interchanging ring grafting method.

Effect of nitrogen, Phosphate and potassium fertilizer rate on yield and quality of pummelo Duong la cam variety in Vinh Cuu, Dong Nai

Huynh Ngoc Tu, Nguyen Van Hung and Bui Xuan Khoi

SUMMARY

A field experiment was conducted from 10/2002 to 10/2004 in an eight- year- old pumelo orchard, Duong la cam variety was planted in distance 6m x 6m at Vinh Cuu district Dong Nai province.

The experiment was laid out RCB design with 7 treatments and 4 replications. All trees in experiment were chosen in uniform and the orchard is not effected by any important disease.

The result of experiment show that applied 800N : 700P₂O₅ : 700K₂O or 800N : 700P₂O₅: 700K₂O (gr/tree/year) effect in the Duong la cam vegetative growth better, increased fruit number, fruit weight, yield, and economic better than another treaments. However, we didn't found distinct effect of fertilizer rate on total seed in fruit of treatments.

Effect of NPK and organic fertilizers on yield and fruit quality of Nam roi pummelo (*Citrus maxima* (Burm.) Merr.)

Vo Huu Thoai and Nguyen Minh Chau

SUMMARY

The investigation was carried out at SOFRI farm during 2003 - 2004 on 3 years old trees. Bio-control measures as green ants, yellow traps and bio-products were also used to control pest. The preliminary result of the experiment showed that organic fertilizer treatments did not reduce yield of Nam roi pummelo in comparison to NPK fertilizer treatments after 2 years experiment; application of NPK and organic fertilizers improved efficiently in pH of soil and humus content in soil; nitrate accumulation in fruit of Nam roi pummelo at all treatments was very low and negligible. However, there are no significant difference in fruit quality of Nam roi pummelo among treatments. Bio-control measures were efficient in pests and disease control in pummelo orchard.

Effect of Boron and GA₃ on fruit set, yield and quality of “Tiêu da bò” longan

Bui Thi My Hong, Tran Nguyen Lien Minh and Nguyen Minh Chau

SUMMARY

The aim of this study was to examine the effect of Boron (B) fertilization and GA₃ on fruit set, yield and fruit quality of “Tiêu da bò” longan. The results showed that GA₃ at 5ppm in combination with Boronate at 50 gr/tree, gave the best result in increasing fruit set and yield. Whereas the quality of fruit harvested is not different among the treatments and the control.

Effect of NPK rates on the yield and quality of Monthong durian fruits grown in Binh Phuoc

Huynh Van Tan và Nguyen Minh Chau

SUMMARY

The “effect of NPK rates in combination with Dynamic lifter organic fertilizer on yield and quality of Monthong durian fruits” was investigated. The result showed that treatment of NPK 1600 1200 1600 and 2 kg Dynamic lifter, significantly increased, number of fruit, weight of fruit, yield and edible flesh of fruit.

Suitable container medium component, dosage of NPK and planting depth for tissue banana culture plantlets during nursery period

Mai Van Tri and To Thi Diem Ca

SUMMARY

Tissue-cultured banana plantlets grow weakly compared to the banana suckers at nursery period of planting. Therefore, suitable practices for care of plantlets to become more hardiness are essential. The report showed the results of evaluation and selection of the suitable container medium components, NPK application dosages and planting depths for tissue culture plantlets during nursery period. The result revealed that the best container medium component was rice husk: coconut fiber: basaltic soil: 2:2:5; the best NPK

application dosage was NPK 16-16-8-13S (18g.plantlet⁻¹.3months⁻¹) plus Urea (3,6g.plantlet⁻¹. 3months⁻¹); and the best planting depth from medium surface was 1-2cm. The discussions and recommendations are also detailed in the report.

Investigation on insect pests and the management of mites and thrips on mangosteen

o Hong Tuan, Nguyen Duong Tuyen, Le Quoc Dien and Nguyen Van Hoa

SUMMARY

The investigation of insect on mangosteen was conducted from January to October 2004 at Cho Lach district – Ben Tre province and Thuan An district – Binh Duong province. Preliminary results showed that there were 13 species of insect pests presences on mangosteen. Among them, mites and thrips were more prominent and caused much damage on fruit peel surface due to the high population. The two were rearing in Lab condition for recording their characteristics and identification. The year 2004, we tried SK Enspray 99 EC on the periods of fruit with six treatments. Results showed that there were two treatments showing good effect to control thrips and mites on mangosteen, they are unblown and flowering from one per cent to five per cent and days after economic effect is the same.

The preliminary studies on Thrips and its control methods on Mango

Nguyen Thi Kim Thoa, Le Quoc Dien và Nguyen Van Hoa

SUMMARY

On mngo, thrip is raising to be an important pest, especcially during flowering stage. The results from the investigation shown that thrip presented in all mango tree at flowering stage. Now aday, farmers are using many insecticides to control it, which may lead the thrip resist to defferent insecticides. The results also shown that there were diversity of thrip species.

Of them, Scirtothrips dorsalis was more common. The life cycle of Scirtothrip dorsalis studied showed that the duration from egg to adult is 12 - 14 days, they attacked the trees at flowering and fruiting stages, the population raised during dry and hot weather condition.

Amongt the mango varieties, Trung Quoc, Namdormai, Buoï, cat Chu varieties were more susceptible to thrip than that of Hon Phan and cat Hoa Loc varieties. The combination of Bitadin and DC - tron plus showed good potential in control of thrip on mango.

Effect of some insecticides on orange and pomelo crops

Do Hong Tuan, Nguyen Duong Tuyen, Le Quoc Dien and Nguyen Van Hoa

SUMMARY

Effect of some insecticides to control pests on orange and pomelo was tested from January to December 2004 at Cai Be and Chau Thanh district – Tien Giang province, with four trials. The first trial was monitor pests and their population on King Mandarin' orchard without any insecticides. The second trial was the control citrus leaf-miner on Sweet orange using bio-

insecticide, AZTron DF and Bitadin WP. The third trial was the control red-mites on Long-pomelo using insecticides, bioinsectides and oil with seven treatments. The fourth trial was the control pests on King-Mandarin using Confidor and oil with five treatments. Results showed that orchard without any insecticides was high population of citrus leaf-miners, psyllids, aphids, mealy bug, leaf-roller. Most of them can be controlled effective by Az tron DF 10 gr. ai/8l water, Confidor 1,5ml/tree/month, SK Enspray 0,4% as in the second trial to the fourth trial.

Effects of some pesticides in mango insects contriopl of *Sybulus sp.* *Alcidodes frenatus* Faust and *Chlumetia transversa* Walker

Huynh Thanh Loc, Le Quoc Dien, Nguyen Duong Tuyen and Nguyen Van Hoa

SUMMARY

*Out of 17 mango insects, shool borer seem to be more common and causes much damage. In this investigation, we recorded four most important species,i.e., *Sybulus sp.*, *Alcidodes frenatus* Faust, *Chlumetia transversa* Walker and *Plocader ruficornis* Newman. They mostly attacked and caused damaged to young shoot (growth stage, flowering stage). Of these *Sybulus sp.* was most common and caused much damage. Adult *Sybulus sp.* could survive for 16 days (8-21 days) under no food condition (T: 26°C, H: 57%). Karate 2.5 EC was effective to control *Sybulus sp.*, *Alcidodes frenatus*, *Chlumetia transversa*. Highly effective to control of this pest was removing them by hand.*

Effects of some fungicides on Mangosteen leaf spot disease

Nguyen Huy Cuong and Nguyen Van Hoa

SUMMARY

*Mangosteen leaf spot disease caused by *Pestalotia sp.*, wich reduces the photosynthesis of the leaf. This investigation, was carried out the find the efficient fungicides for controlling it. The results revealed that under Lab. Conditions the fungi was highly resistance to Coc 85, resistance to Champion, and still susceptible to Carbenzim, Antracol, Dithan 45M, Topsin M. In the field conditions, Coc 85, Antracol, Topsin M, Carbenzim, Dithan 45M and Champion performend good control of this disease.*

Preliminaryresults on effets of vapor heat treatonent to elimenated fruit fly eggs on Dragon fruit, Cat hoa loc Mango and Mangosteen fruits.

Nguyen Thi Kim Thoa, Le Quoc Dien, Nguyen Van Hoa và Barbara Waddell

SUMMARY

*In a series of trials using young and mature eggs of fruit fly *Bactrocera dorsalis* with a range of fruit center temperature such as 42.5, 43.5, 44.5, 45.5, 46.5°C. The result shown that at 46.5°C gave best result in killing fruit fly eggs in fruits.*

On Dragon fruit, Cat Hoa Loc Mango and Mangosteen fruits, the fruit fly eggs were inoculated and tested in SURFRUIT Unit (the vapor heat treatment machine) by treated the fruits at 46.5°C for a range of period: 10, 20, 30, and 40 min. Results indicated that in Dragon

fruit, at 46.5⁰C (fruit center temperature) in 10 min, RH 80%, air ventilation at 2 mps were identified as the best kill of all fruits fly eggs in them. In Cat Hoa Loc Mango, at 46.5⁰C in 20 min, RH 80%, air speed at 2 mps gave best kill of fruit fly eggs in fruits. For Mangosteen, at 46.5⁰C in 40 min, RH 90%, air speed at 2 mps could kill all fruit fly eggs presenting in mangosteen fruits. So under this investigation, the vapor heat treatment condition were identified for elimination of fruit fly eggs in Dragon fruit, Cat Hoa Loc Mango and Mangosteen fruits.

Effects of some fungicides on Powdery mildew on Rambutan

Nguyen Huy Cuong and Nguyen Van Hoa

SUMMARY

Effects of some chemicals controlling of Powdery mildew (Oidium sp.) on Rambutan. Powdery mildew is an important disease on Rambutan during the flowering and fruiting period. The investigation was carried out to find out the chemicals suitable to control the disease. Results from the experiment under field condition shown that Score, Carbenzim, Anvil and Kumulus giving good control of the disease.

Study to the Antagonistic effects and growth of three selected strains of Trichoderma against the strains of Phytophththora spp. isolated from durian, longan and pineapple

Dang Thuy Linh and Nguyen Van Hoa

SUMMARY

To study the antagonistic ability of Trichoderma strains, three strains of Trichoderma named as SOFRI 1, SOFRI 2 and SOFRI 3 were tested. The results shown that SOFRI 1 and SOFRI 2 strains grew well and produced more spores in compassion with SOFRI 3 strain. In the antagonistic ability test, both the strains of Trichoderma showed good potential to prevent the development of three strains of Phytophththora isolated from durian, longan and pineapple. Out of three, SOFRI 1 and SOFRI 2 strains gave better results than that of SOFRI 3 did.

IPM on mango using combination of green ant Oecophylla smaragdina (Fab.) and soft chemicals

Le Quoc Dien, Hunh Thanh Loc, Nguyen Duong Tuyen, Pham tan Hao, Nguyen Phuoc Sang and Nguyen Van Hoa

SUMMARY

Weaver ants, Oecophylla smaragdina (Fab), can be used to control the main insect pests of mango plantations such as leaf cutting Caterpillar, Flower eating Caterpillar, etc. Therefore, this project focuses on integrated pests management program (IPM) using green ants as a major biological control agent together with cultural methods and soft chemical applications for controlling insect pests on mango in order to reduce the pesticide applications, increase the natural enemies and improve quality of fruit for consumers. After three years, the farmers recognized the importance of the main insect pests on mango and their management strategies.

The IPM model of using weaver ant plus soft chemicals together with suitable farming methods (intercropping systems of fruit gardens) was preliminary provided a powerful tool to control the main insect pest populations and the cost is lower than using chemical insecticides.

The yield in the treatment with ant only was not significant difference with other treatment of ants plus soft chemicals and with ants plus oil. However, this is only the preliminary result.

Integrated Management of *Bactrocera dorsalis* (Hendel) and *Bactrocera correcta* (Bezzi) on Dragon Fruit and Barbados cherry

Le Quoc Dien, Nguyen Phuoc Sang, Huynh Thanh Loc and Nguyen Van Hoa

SUMMARY

Dragon fruit and Barbados cherry are of immense appeal and value not only to the people of tropical regions but also the rest of the world as well because of their abundance both in term of quality and safety. Thus large – scale cultivation of fruit has bright prospects based on expected increase in local demand as well as export potential. The development of strategies of overall population management of fruit flies based on integratable control methods (IPM) such as : area- wide orchard sanitation, use of male lures, judicious pesticide application, SOFRI protein bait sprays. The protein bait sprays have been applied from equipment with low volume application, the preferred application now involves volume: 150 ml plus 4 ml Regent 5SC plus 1 lit water. The mixture is spot sprayed on the eastward side of the tree (50 to 100 ml per spot) at weekly intervals. Where the outbreak is serious the bait is applied at shorter periods (4 to 5 days intervals) until the fly population is reduced. Poison bait attract both male and female flies, it is important that the female flies be killed before the oviposit on the fruit. Results of experiment showed that treatment Batromat M-E (5 trap per ha) plus SOFRI protein good controlling fruit fly on Dragon fruit and Barbados cherry orchard.

Effects of some to control methods on mango fruit borer (*Deanolis albizonalis* Hampson)

Huynh Thanh Loc, Le Quoc Dien, Nguyen Duong Tuyen and Nguyen Van Hoa

SUMMARY

*Mango fruit borer (Mango seed borer) - *Deanolis albizonalis* Hampson - is an important insect causing damage on all mango cultivated areas and on all varieties of mango in the Mekong Delta of Vietnam. A lot of insecticides has been used by farmers leading to the chemical resistance of the insects. The results of the experiments showed that: Almost all farmers who grow mango use the same insecticide group*

*Fruit enveloping method or using chemical and bio-chemical: Biobit 32B FC (40×10^{12} IU/liter), Karate 2.5 EC (0,025 g.a.i./liter) and Success 25 EC (0,9 g.a.i./liter) were high effective on *Deanolis albizonalis*, while Naphthalene 98% was low effective on *Deanolis albizonalis*.*

Effects of some chemicals on controlling of Anthracnose disease (*Colletotrichum gloeosporioides*) of Dragon fruit

Dang Thi Kim Uyen, Nguyen Khanh Ngoc and Nguyen Van Hoa

SUMMARY

*Dragon fruit (*Hylocereus undalatus*) belonging to family Cactaceae, which originated from Mexico and Colombia (Humberto Lopez, 1996). In Viet Nam, dragon fruit was introduced to Binh Thuan since 18th century and to Long An and Tien Giang during. Unfortunately, it is heavily confected by Anthracnose disease (*Colletotrichum gloeosporioides*) especially during fruiting period. This unvestigation was conducted to find out the suitable method which can control this disease both at fruit bearing stage and post harvest. The results shown that Nustar, Antracol, Score can give good control of anthracnose disease on dragon fruit. Sincosin is a plant growth regulator can also help reduce the incidence of the disease. The chemical should be used 2 times 7 days interval starting from fruit setting stage, and the fruit bagging a day after second application could control the disease after harvesting.*

Using biological substances to control anthracnose disease on mango (*Mangifera indica*)

Nguyen Ngoc Anh Thu and Nguyen Van Hoa

SUMMARY

*Anthracnose disease caused by *Colletotrichum gloeosporioides* is an important disease of mango for both aspects of popularity and severity. Application of biological agents or resistant elicitors are advanced control strategies. In our the first trial, Stop15WP (*Chitosa Oligo sacarit*) could prevent the disease development similar to that of Antracol and Coc85 did. In the second experiment, the Song Lam 333 50ND (*Salicylic acid substrate*) and Stop 15WP also shown good potential to reduce the disease incidence and even better than that of Funomyl*

Effects of combination of hot water and fungicide treatment in controlling of Anthracnose disease (*Colletotrichum gloeosporioides*) on post harvest white and red flesh dragon fruits

Nguyen Van Hoa, Nguyen Khanh Ngoc and Dang Thi Kim Uyen

SUMMARY

*Dragon fruit (*Hylocereus undalatus* L.) is infected by *Colletotrichum gloeosporioides*, especially during post harvest stage and difficult to control. In this investigation, we tried the Songlam 333 50ND, the resistant elicitor, but it was not successful. In other experiments using combination of hot water and Carbenda fungicide, the results shown that, (i) In red flesh dragon fruit, the treatment using Carbenda 50SC at 500 ppm or hot water itself at 53⁰C in 10 minutes*

was sufficient to control *C. gloeosporioides*. In addition, the combination of Carbenda at 500ppm and hot water at 53⁰C in 5 to 10 minutes also shown good control, (ii) In White flesh dragon fruit, the treatment using hot water at 53⁰C in 5 to 10 minutes was sufficient to control the fungal growth or the combination treatment of 400ppm Carbenda and hot water at 50⁰C in 10 min was also good.

Effects vapor heat treatment and resistant elicitors to anthracnose disease on cat Hoa Loc mango

Nguyen Ngoc Anh Thu, Nguyen Khanh Ngoc and Nguyen Van Hoa

SUMMARY

In the attempt to control mango anthracnose, we carried out experiments using vapor heat treatment and resistant elicitors. For the vapor heat treatment, 46,5⁰C (central fruit temperature) in 30 min gave best control of disease at post harvest stage. In the resistant eliciting experiment, Song Lam 333 50ND (salicylic acid) give equalent result in controlling of the disease as used of Funomyl. Hence, Song Lam, a resistant elicitor, could perform potential efficacy of fruit anthracnose control.

Characteristics of Colletotrichum gloeosporioides isolated from red flesh dragon fruit

Dang Thi Kim Uyen and Nguyen Van Hoa

SUMMARY

Dragon fruit has been introduced to Vietnam since 19th (Phuc, 2002), which is widely grown in Binh Thuan, Long An and Tien Giang provinces. Recently, the red flesh dragon fruit (Hylocereus undulatus) was introduced. The same as white flesh dragon fruit, this variety is heavily infected by Colletotrichum gloeosporioides. This investigation was conducted to see any difference between the isolates from red and white flesh dragon fruit. Results shown that there was no significant difference between them on mycelial development, The pH suitable for both isolates to develop was from pH 5 to 7 and not grow well under the media having pH 4 or 8. The results from chemical treatments under Lab condition shown that they are susceptible to Nustar, Benomyl and Carbendazim but resistance to Antracol and Daconil.

Preliminary result on the heart rot disease of cayenne pineapple and chemical control in Southeast East

Hoang Huu Cu and Mai Van Tri

SUMMARY

Heart rot cause by Phytophthora cinamomi is an important disease on cayenne pineapple. Preliminary result from investigation showed that the heart rot disease presented in all cayenne pineapple areas in the South east. A chemical control trial was conducted with 5 fungicide activities including fosetyl aluminium (Aliette 80 WP) 800g a.i/ha⁻¹; Metalaxyl

(Ridomil 240 EC) 480g a.i/ha⁻¹; Copper Oxycloiride (COC 85 WP) 425g a.i.ha⁻¹; Kasugamycin (Kasumin 2L) 40g a.i.ha⁻¹; Phosphonat (Agri-Fos 400) 500g a.i.ha⁻¹. Sprayings were 3 times with interval 14 days. The result showed that all 5 fungicides were effective in controlling heart rot disease on Cayenne pineapple. In which the best control was fosetyl aluminum.

Anthracnose control (*Collectotrichum gloeosporioides*) on mango in the Southeast

Hoang Huu Cu, To Viet Diem Ca and Mai Van Tri

SUMMARY

Anthracnose disease cause by Collectotrichum gloeosporioides is a important disease on mango. It cause serious loses to mango from blooming to havesting.

The disease will be dangerous if the control programe are not good. The result of some studies from 2001 – 2004 have showed that :

- To join selection propergation with high yeild, resistant and tolerant well to anthracnose.*
- To join agromical technique with plant protection by chemical.*
- Maybe use fungicide activities as : Mancozeb, Propineb, Benomyl ... to spray on the times : After thining and cutting, begin blooming, blooming, set fruit and after set fruit, but should to final spraying from 20 to 30 days before havest.*

Effects of storage temperatures on quality and shelf life of mangoes (cat chu cultivar)

Nguyen Thanh Tung and Thai Thi Hoa

SUMMARY

Mango is classified in the climacteric fruit group and sensitive to low temperature. Most of mango varieties developed chilling injury after keeping below 10°C. Cat Chu mango is the second variety after Cat Hoa loc among the best mango varieties in South Vietnam. A test at different temperature has been done on Cat Chu mangoes, which obtained from Dong Thap province. Fruits were kept at 8, 12, 15°C and at room temperature (varied from 26 to 34°C). Shelf life and fruit quality attributes such as pulp and peel colour, firmness, sugar, acidity, ascorbic acid etc... were accessed every week. The test indicated that Cat Chu mangoes stored at 12°C have good quality and shelf life extended up to 3 weeks. Mangoes at 8°C indicated chilling injury symptom after 5 days storage. Other treatments such as coating and disease control should be studied in combination with cool storage in order to maximize shelf life and to improve quality.

Effects of postharvest vapour heat treatment on quality of 'cat hoa loc' mango

Thai Thi Hoa, Nguyen Thanh Tung, Clark, C.J, Waddell, B.C.

SUMMARY

Heat treatment was known as a method of postharvest disease control and disinfestations or inhibition of chilling injuries. Effects of hot air treatment at 47°C for duration of 0-180

minutes on mango quality (var. cat Hoa loc) have been investigated at the Southern Fruit Research Institute (SOFRI) in 2004 season. Mangoes (Cat Hoa Loc cultivar) were exposed to hot and humid air at 47°C and 90% RH for 20, 40, 60, 90, 120 and 180 minutes by using the vapour heat cabinet SFU (Hort Research). Many fruit quality attributes and related parameters were evaluated on 3rd and 7th day after treatment. The results indicated that mangoes Cat Hoa Loc exposed to hot air at 47°C for within 20 minutes were not damaged by heat and quality has been improved. In contrast, mangoes after vapour heat treatment for 40 minutes or longer showed heat damage and other problems. Thus VHT gave good effects on quality improvement for cat Hoa Loc mangoes.

Effects of postharvest bagging and coating on shelf life and quality of cayenne pineapple

Thai Thi Hoa and Nguyen Thanh Tung

SUMMARY

Pineapple is the third most important tropical fruit in world production after banana and citrus. Seventy percent of the pineapple produced in the world is consumed as fresh fruit in the country of origin. Postharvest shelf life is limited by its sensitivity to low temperature and internal browning. Postharvest bagging with plastic film or coating have been reported that inhibit chilling injury and internal browning. Pineapple (Smooth Cayenne) were tested by polyethylene (PE) or polypropylene (PP) bagging and 1% chitosan coating. It was found that PE and PP bag significantly reduced internal browning incidence, weight loss and maintained greatest ascorbic acid in pineapple after 21 days storage at 18°C. PE bagging reduce up to 74% browning incidence as compare to control. Chitosan at 1% level showed less effective than PE and PP bagging. Bagging Cayenne pine apple with PE and PP bags did not affect flesh colour and firmness, total soluble solids, reducing sugars and total sugar after 21 day storage.

Effects of postharvest bagging and coating on shelf life and quality of red flesh dragon fruit

Thai Thi Hoa and Nguyen Thanh Tung

SUMMARY

Shelf life of fresh fruits and vegetables can be extended by storage in an optimum atmosphere with low oxygen, high carbon dioxide and relative humidity. Bagging fresh produce in plastic bags such as polyethylene (PE), polypropylene (PP), polyvinyl chloride (PVC) or coating with chitosan enable to create such atmosphere. This technique is known as modified atmosphere packaging (MAP). Red flesh dragon fruits, which harvested from the Southern Fruit Research Institute farm, were tested by MAP technique using PE, PP, PVC bags and 1% chitosan coating. The trial showed that PP and PVC bags are suitable for storage of red flesh dragon fruits. These two materials significantly reduced weight loss after 15 day storage at 10°C. Bagging did not affect fruit quality. Chitosan coating show less effect as compared to bagging. PVC was the most treatment in reducing postharvest fruit rot.

Effects of postharvest fungicide treatments on disease control and quality of red flesh dragon fruits (*hylocereus undatus*)

Thai Thi Hoa and Nguyen Thanh Tung

SUMMARY

Red flesh dragon fruit were introduced to Vietnam about 10 years ago. Because of its new introduction, studies on this variety are at the beginning. Some research such as optimum index for harvest and storage temperature have been done but many problems still exist. Postharvest life of fruits does not exceed 2 weeks as compared to that of local varieties. Postharvest disease is the main problem for storage of this variety. Some fungicide treatments were conducted with red flesh dragon fruits to reduce postharvest fruit rot. Fruits at the stage of 28-29 days after flowering were obtained from the collection farm in the Southern Fruit Research Institute (SOFRI). Harvested fruits were washed with chlorinated water and then dipped in benomyl or carbendazim emulsions at concentration of 0 ppm (as control), 500 ppm and 1000 ppm. Results showed that benomyl 500 ppm or 100m ppm treatments effectively reduced disease incidence as compared to carbendazim or control. Fungicide treatments did not affect fruit quality parameters such as fruit colour, firmness, acidity, total soluble solids, and sugars. Further research like heat treatment should be carried out in order to minimize postharvest losses and to maximize shelf life.

Information for market development of Dragon fruit

Ta Minh Tuan, Huynh Van Vu, Doan Huu Tien

SUMMARY

Dragon fruit has big potential of export, around 40-50% of total production has been exported in recent years to some countries. Among them, China is the biggest market. Post harvest technology with fruit fly heat treatment was paid attention for better exportation to EU markets. Red flesh dragon fruit weighted 4000gr is specific commodity product. More informations on dragon was mentioned in this paper as regards to other aspects.

Demand characteristics of consumers to durian in South Vietnam

Doan Huu Tien, Huynh Van Vu and Ta Minh Tuan

SUMMARY

The result of reseaching on demand and taste for durian in South Vietnam show that the size of seed, the colour and quality of fruit flesh are great factors which impact on consumer's disision to buy durian. Most of consumers like fruit of durian which is weight from 2 to 3 kg per fruit. The demand of durian is a homogenous function with income of consumer. The quantity of durian in per time of consumer to buy is opposite function to price of durian.

Investigation on the demand of quantitative consumption of rambutan in South Vietnam

Huynh Van Vu , Doan Huu Tien and Ta Minh Tuan

SUMMARY

The result of reseaching on demand and taste of rambutan in the South Vietnam showed that the size of seed, the colour of fruit peel and quality of fruit flesh are major factors that gave big impact on consumer dicision. Most of the consumers liked first class rambutan fruit both in domestic and export market. Recently, Nhan' rambutan is the most favor variety by consumer

Use of bacterial wilt tolerant rootstocks EG195 and EG203 eggplant varieties for tomato in Mekong delta

Tran Kim Cuong

SUMMARY

This invertigation showed that using of two eggplant rootstocks EG 195 and EG 203, grafted with commercial tomato shoots by tuber grafting method, could increase bacterial wilt disease tolerance and increase vigor to tomato crops. This technique may enable farmers to produce tomatoes even during off-season.

Effeciency of pesticides on shoot and fruit borer control in eggplant

Le Thi Huong Van

SUMMARY

*A trial was laid out to test seven pesticides including Viphensa 50ND, Vibasu 50ND, Fastac 5EC, Peran 50ND, Regent 800WG, Depel 6,4DF, and Vimipc 25BTN in controlling shoot and fruit borer (*Leucinodes orbonalis*) in eggplant. All the pesticides were sprayed three times at 13-day interval till the fruiting stage commencing from 60 days after transplanting. The result showed that number of shoots injured by the pest in sprayed treatments was lower than in control which was not sprayed any pesticide until 12-day after spraying. The lower percentage of injured fruits as compared to control at 8-day after spraying during three times of spraying was shown at all pesticides, except Vimipc. However, the benefit influence of pesticides on reducing injured fruits apperead decreasing at 12-day after spraying. The best effeciency was obtained with using Fastac, Peran, and Regent.*

Effect of Plastic Mulch Colors on Growth of Pak-choi (*Brassica campestris* L.)

*Le Thi Huong Van, Woo-Nang Chang**

SUMMARY

*Effects of plastic mulch colors including aluminum polyethylene, clear, green, red, and yellow plastics on growth of pak-choi (*Brassica campestris* L.) cv. 'Feng Jing' in greenhouse were investigated at three different croppings i.e. September, 2003, November, 2003 and January, 2004. Root temperature under mulches was higher than the nonmulch control during three croppings. The highest root temperature was shown under aluminum polyethylene and*

clear plastic which was 2.6 to 3.1°C higher than control at midday. Green, red and yellow plastics had similar effect on root temperature. Photosynthetic photon flux density (PPFD) tended to be increased on mulch surfaces, except red plastic. The highest PPFD were measured on aluminum polyethylene and yellow plastic which were 6-21% higher than in control at three croppings. The effect of mulch color on plant growth varied among different crops. Yield in Sept. crop was decreased in mulched treatments but it was increased in clear and yellow plastics by 19 and 31%, respectively, in comparing to control in Jan. crop. There were no differences in yield between mulches and control in Nov. crop, however, the differences among mulches were shown with higher yield in yellow plastic compared to aluminum polyethylene. Nitrate content in leaves grown in Sept. crop increased in mulched treatments but it decreased in mulching with yellow plastic in Jan. crop. Percentage of leaves injured by diamond-back moth (*Putella xylostella* L.) generally was decreased by mulching during three crops, however, yellow plastic was the most efficient mulch to reduce the leaf injury.

Effect of additional organic fertilizer application in production of safe leafy vegetables

Tran Kim Cuong

SUMMARY

The result showed that yield and economic income increased when increasing level of organic fertilizer. The highest values were recorded when applying organic fertilizer at recommended level. The result also showed that the yield will be decreased if continue cultivation of the crops in the same family.

Fied trial of some commercially hot pepper hybrid cultivars

Nguyen Thi Huong Lan and Tran Kim Cuong

SUMMARY

*Seventeen hot pepper cultivars including sixteen F₁ hybrid cultivars and Hungari variety as control variety were evaluated for their yield and disease resistance. The result showed that '404', 'LN 57', 'No 20', '2002', 'S ng vàng Châu Phi', '207' cultivars gave high yield (14,6; 9,1; 8,8; 8,2; 7,3 tons/ha, respectively). '404', '2002', '207' cultivars also resisted to *Collectotrichum* disease. 'LN 57' and 'No 20', 'S ng vàng Châu Phi' cultivars gave good quality fruit but were susceptible to *Collectotrichum* disease.*

The results of collection, evaluation and conservation some fruit vegetables (Tomato, Eggplant, Cucumber, Okra, Hot pepper)

Nguyen Thi Huong Lan and Tran Kim Cuong

SUMMARY

Eighty five varieties/lines were collected, include: 6 varieties of cucumber, 7 varieties of Okra, 9 varieties of Eggplant, 11 varieties of Hot Pepper, 52 varieties of Tomato,

- No. 1 and No. 2 cucumber varieties gave higher yield than other varieties. These cucumber varieties had fruit less attractive than hybrid cucumber varieties.

- Okra varieties No. 7, 8, 10, and 12 gave high yield, good quality so farmer referd to save the seed. Green star, Wulong, Red okra varieties were not refered because of strange colour.

- No. 4, 5, and 9 eggplant varieties had long fruit, good quality but low yield, should be used for breeding of objective.

- Hungary, Fan Rang, Bong Lun, No. 5, Ot chum, hot pepper varieties gave high yield and low indensity of *Collectotrichum* disease.

- India tomato varieties gave small fruits. Asean Vegetable Research and Development Centre tomato varieties gave larger fruits.

Investigation on the growth of some chrysanthemum (*Chrysanthemum* sp.), gloxinia (*Sinningia speciosa*) and African violet (*Saintpaulia ionantha*) varieties

Le Nguyen Lan Thanh and Nguyen Van Son

SUMMARY

Some varieties of chrysanthemum, gloxinia and African violet collected from Da Lat and Can Tho were grown in net house at Tien Giang. Their growth and other traits were recorded. The result showed that 4 varieties of chrysanthemum including Mong rong, Vang he, CN98 and CN93 can be used for cut-flower. Tho vang variety was suitable for pot production. Two varieties of gloxinia and one variety of African violet appeared to grow and develop well in the experimental condition.

Preliminary results on the collection, conservation and evaluation on tropical flower varieties/clones in Southern Vietnam

Nguyen Van Son and Le Nguyen Lan Thanh

SUMMARY

Sixty-nine varieties/clones belong to sixteen kinds of tropical flowers collected from Tien Giang, Dong Thap and Da Lat were good growth in net house at Tien Giang. Having good potential development are varieties: gerbera, anthurium, chrysanthemum, epiphyllum, *zygocatus truncatus*, gloxinia and African violet.

Results of evaluation of some promising gerbera varieties from Da Lat showed that these varieties have long stalk, big and beautiful flowers.