

## **Industrialization of New Varieties of Roses Under Condition in the Cordillera, Philippines**

**Young Bae Park<sup>1\*</sup>, Jin Ki Kim<sup>1</sup>, Ju Chean Hwang<sup>1</sup>, and Araceli G. Ladilad<sup>2</sup>**

<sup>1</sup>*Flower Breeding Research Institute, Gyeongnam ARES, Changwon 641-920, Korea*

<sup>2</sup>*Department of Horticulture, Benguet State University, La Trinidad, Benguet, Philippines*

**Abstract.** In days to calyx-flex stage test, flower development affected by light intensity, light duration and the prevailing temperature. As, 'Jacaranda' variety shorter in under 46 days of flower bud formation and 13 days of calyx-flex stage than the other variety with 'Queen Elizabeth' control variety. About cut flower only 'Grand Vicki Brown' (as within 46 days of flower formation, 13 days of calyx stage and 'Jacaranda', both with shorter plants than the other varieties produced cut flower classified as short and medium-stemmed cut flowers. 'Jacaranda', 'Vicki Brown', 'Golden Times', 'Champagne', 'Osiana', and 'Queen Elizabeth (control variety)' flowered earlier from 46.7 to 50.8 days from pruning. Flower development was likewise faster in all the above mentioned cultivars; while 'Tineke' had significantly delayed flower development reaching calyx-flex stage from 0.5 cm bud size after 51.0 days. The top ten high yielding varieties were 'American Orange', with a net income of ₱3,081,676.00; 'Yellow Island' with ₱1,572,874.00; 'Frosty Pink' with ₱1,085,183.00; 'Champagne' with ₱980,620.00; 'Coral Pink' with ₱959,669.00; 'Lara Pink' with ₱918,444.00; 'Lara Orange' with ₱714,252.00; 'Grand Gala' with ₱705,787.00; 'Golden Times' with ₱806,489.00; and 'Lady X' with ₱778,060.00 net returns.

**Key words :** baguio, cut flower, dalat, environment, flowing, globalization, industry, marketing

### **Introduction**

The domestic cut flower market consists of mainly cool growing types which include roses. This cut flower crop still ranked number one in marketability among the different cut flowers grown in the country. The bulk of rose cut flowers traded in the domestic market comes from Baguio - Benguet in the Philippines. By far, Benguet still remains to be the seat of cut flower industry in the Cordillera. Production figures in 1992 show greater production for gladiolus, chrysanthemum and roses. However, rose cut flower production in the area is the lowest with only approximately 3 million dozens compared to 9 million dozens for gladiolus and 8 million dozens for chrysanthemum (DTI, 1993).

The volume of production, marketing operations and strategies of 126 rose growers in Bahong, La Trinidad, Benguet in the Philippines were obtained for January to November, 1996. Volume of production recorded from

November, 1995 to September, 1996 shows a total of 330,311 dozens for 11 months period (Ladilad, Esiong, and Licpaen, 1997). Volume of production varies from month to month depending on the prevailing weather conditions since all of the rose growers practice field culture in rose cut flower production. Highest volume of production was recorded in the month of July with 46,283 dozens followed by 44,804 dozens in April and 42,241 dozens in February. Smallest volume of harvest was recorded in August due to continuous rains with only 18,061 dozens.

### **Materials and Methods**

Collected and evaluated varieties were 'Lady X', 'Champagne', 'Osiana', 'Vivaldi', 'Lara Pink', 'Lara Orange', 'Vicki Brown', 'Lou Blessy', 'Jacaranda', 'Golden Times', 'Popsickle', 'Grand Gala', 'Noblesse', 'Demi', 'Marilyn', 'First Lady', 'Konfetti', 'Black Bacarra', 'Naranya', 'Queen's Day', 'Alvaro', 'Frosty Pink', 'Doc's Court', 'Bonfire', 'Coral Pink', 'Sonia', 'American Orange' and 'Twingo', and compared their perfor-

\*Corresponding author: ybpark@hanmail.net  
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**Table 1.** Vase-life, flower bud size at calyx-flex stage and number of petals per flower.

Variety	Vase life (days)	Flower bud size (cm)	No. of petals per flower
Queen Elizabeth (control)	6.10 <sup>hi@</sup>	3.83 <sup>cde</sup>	28.60 <sup>def</sup>
Lady X	8.07 <sup>f</sup>	4.27 <sup>bc</sup>	31.43 <sup>cd</sup>
Champagne	6.37 <sup>h</sup>	3.96 <sup>cd</sup>	39.17 <sup>a</sup>
Osiana	6.10 <sup>hi</sup>	3.97 <sup>cd</sup>	29.83 <sup>cde</sup>
Golden Times	6.57 <sup>h</sup>	3.53 <sup>de</sup>	28.07 <sup>defg</sup>
Vivalde	7.20 <sup>g</sup>	3.88 <sup>cde</sup>	27.23 <sup>defg</sup>
Popsicle	6.40 <sup>h</sup>	3.83 <sup>cde</sup>	28.23 <sup>defg</sup>
Vicki Brown	5.53 <sup>i</sup>	3.36 <sup>e</sup>	24.03 <sup>g</sup>
Lou Blessy	7.40 <sup>g</sup>	3.90 <sup>cde</sup>	37.50 <sup>ab</sup>
Lara Orange	6.03 <sup>hi</sup>	3.91 <sup>cde</sup>	28.60 <sup>def</sup>
Jacaranda	6.53 <sup>h</sup>	3.42 <sup>de</sup>	27.63 <sup>defg</sup>
Lara Pink	11.00 <sup>c</sup>	3.47 <sup>de</sup>	33.33 <sup>c</sup>
Noblesse	11.00 <sup>c</sup>	4.21 <sup>c</sup>	34.00 <sup>bc</sup>
Demi	15.00 <sup>a</sup>	6.00 <sup>a</sup>	30.67 <sup>cd</sup>
Grand Gala	13.00 <sup>b</sup>	5.92 <sup>a</sup>	39.33 <sup>a</sup>
First Lady	9.00 <sup>e</sup>	4.00 <sup>cd</sup>	26.00 <sup>efg</sup>
Marilyn	9.00 <sup>e</sup>	4.75 <sup>b</sup>	33.67 <sup>fg</sup>
Konfetti	13.00 <sup>b</sup>	3.50 <sup>de</sup>	25.00 <sup>fg</sup>
Red Success	10.00 <sup>d</sup>	3.50 <sup>de</sup>	25.33 <sup>defg</sup>
Tineke	11.00 <sup>c</sup>	5.50 <sup>a</sup>	27.00 <sup>a</sup>

@Mean separation within columns by Duncan's multiple range test at 5% level.

mance with three old varieties which served as check varieties which are 'Red Success', 'White Teneke' and 'Queen Elizabeth'. For the first collection 'Grand Gala' was the tallest at 80.69 cm, while the shortest was 'Vicki Brown' at 37.70 cm at flowering. Delayed flowering was noted in 'Grand Gala', 'Demi', 'Marilyn', 'Nobleese', 'First Lady' and 'Red Success' with 0.5 cm buds noted after 85.83 to 93.83 days from pruning. Earlier flowering were noted in 'Vicki Brown', 'Jacaranda' and 'Champagne' with means of 46.80 to 49.33 days from pruning. On the second collection 'American Orange' was the tallest at farmers' fields with 201.00 cm at flowering, while 'Twingo' was the shortest at 87.33 cm, 'Frosty Pink', 'Coral Pink', 'American Orange' and 'Yellow Island' produced higher volume of long-stemmed cut flowers for one year duration. More short-stemmed cut flowers were produced by 'Bonfire' and 'Doc's Court' together with 'American Orange'.

Data were subjected to an analysis of variance and means were compared by Duncan's multiple range test

(DMRT) at 5% significant level.

## Results and Discussion

### 1. Base life and Quality

#### 1.1. Flower bud size

The biggest flower buds measured at calyx-flex stage were obtained from 'Demi' with 6.0 cm; 'Grand Gala' with 5.92 cm; and 'Tineke' with 5.50 cm, which was statistically comparable as shown in Table 1. 'Vicki Brown' had the smallest flowers measuring only 3.36 cm across at calyx-flex stage, while the others measured from 3.38 to 4.57 cm.

#### 1.2. Number of petals per flower

Table 1 shows that the highest number of petals counted were obtained from cut flowers of 'Grand Gala' with 39.33 petals, 'Champagne' with 39.17 petals, and 'Lou Blessy' with 37.50 petals per flower. Again, 'Vicki Brown' had the lowest number of petals with only 24.03 per flower. Statistically however, it was comparable with

**Table 2.** Cut flower quality.

Variety	Vase life (days)	No. of thorns	No. of petals
Frosty Pink	9.33 <sup>a@</sup>	26.67 <sup>cd</sup>	26.33 <sup>cd</sup>
Bonfire	5.33 <sup>c</sup>	16.00 <sup>dc</sup>	17.00 <sup>c</sup>
Doc's Court	6.33 <sup>bc</sup>	53.67 <sup>b</sup>	24.67 <sup>cd</sup>
Coral Pink	7.00 <sup>bc</sup>	33.67 <sup>c</sup>	41.00 <sup>a</sup>
Sonia	7.00 <sup>bc</sup>	31.33 <sup>c</sup>	32.33 <sup>bc</sup>
Yellow Island	7.33 <sup>b</sup>	31.33 <sup>c</sup>	27.67 <sup>cd</sup>
American Orange	7.67 <sup>ab</sup>	78.67 <sup>a</sup>	21.33 <sup>dc</sup>
Twingo	9.33 <sup>a</sup>	7.67 <sup>ab</sup>	36.67 <sup>ab</sup>

<sup>@</sup>Mean separation within columns by Duncan's multiple range test at 5% level.

the petal count of 'Golden Times', 'Vivalde', 'Popsicle', 'Jacaranda', 'First Lady', 'Yineke (control variety)', which had means of 25.00 to 28.07 petals per flower.

### 1.3. Vase life

The duration from holding the rose cut flowers in tap water only under ambient conditions to the onset of senescence (yellowing of leaves, wilting, and dropping of petals) was recorded as the vase life. Table 2 shows that longer vase life were exhibited by cut flowers of 'Frosty Pink' and 'Twingo' averaging 9.33 days of aesthetic life. On the other hand, the shortest vase life with earlier signs of senescence were shown by cut flowers of 'Bonfire' with only 5.33 days and 'Doc's Court' with 6.33 days. The other introductions had cut flowers showing signs of senescence after means of 7.00 to 7.67 days from holding in tap water at calyx-flex stage.

### 1.4. Number of thorns

Thorniness is an important cultivar characteristic which makes a new variety acceptable or rejected by growers and consumers. Varieties with plenty of big and small thorns along its stems are difficult to pack since the thorns damage leaves and petals of flowers.

The highest number of thorns counted in a 35 cm long stems of cut flowers was in 'American Orange' with 78.67. 'Doc's Court' follows with 53.67 thorns per stem, while significantly fewer thorns were counted in 'Twingo' with only 7.67 thorns and in 'Bonfire' with 6.00 thorns per stem. Slightly fewer number of thorns were counted in the stems of the other varieties with 26.67 to 33.67 thorns per 35 cm long stems.

### 1.5. Number of petals per flower

Petals give fullness to a rose flower bud. Results show that 'Coral Pink' had the highest number of petals with

41.00 at loose-bud stage; while 'Bonfire' had the least number with only 17.00 petals per flower. The other varieties had petal count that ranged from 21.33 to 36.67 per flower at loose-bud stage.

### 1.6. Flower bud size and length at calyx-flex stage

Table 3 shows that the biggest flower buds measured at calyx-flex stage were obtained from 'Frosty Pink' with 4.20 cm by 3.37 cm bud length and diameter; and in 'Yellow Island' with 4.23 cm by 3.10 cm. The smallest blooms were noted in 'Doc's Court' measuring 2.80 cm by 3.20 cm and in 'Sonia' with 3.07 cm by 2.90 cm bud length and diameter at calyx-flex stage. The other introductions had medium-sized buds with bud lengths from 3.33 to 3.93 cm; and bud diameter of 2.80 to 3.40 cm at calyx-flex diameter of 2.80 to 3.40 cm at calyx-flex.

### 1.7. Flower bud size and length at loose-bud stage

With further flower opening; bud length and width significantly increased in 'Bonfire' with bud length and diameter from 3.3 cm by 2.80 cm to 3.93 by 6.20 cm. Other introductions with bigger flower buds at loose bud-stage were 'Frosty Pink' with 4.57 cm by 4.00 cm, 'Coral Pink' with 4.53 cm by 4.00 cm, and 'Yellow Island' with 5.00 cm by 4.10 cm bud length and bud diameter. 'American Orange', 'Sonia', 'Doc's Court' and 'Twingo' had comparable bud sizes with bud lengths from 3.07 cm to 3.83 cm and bud diameter from 3.37 cm to 4.37 cm.

## 2. Cost and return analysis

Table 4 shows the cost and return analysis on rose cut-flower production per hectare for one year cropping under open field conditions.

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**Table 3.** Flower bud size and length at calyx-flex stage and loose bud stage.

Variety stage	Calyx-flex stage (cm)		Loose bud stage(cm)	
	Bud length	Bud diameter	Bud length	Bud diameter
Frosty Pink	4.20 <sup>a@</sup>	3.37 <sup>a</sup>	4.57 <sup>ab</sup>	4.00 <sup>b</sup>
Bonfire	3.33 <sup>bc</sup>	2.80 <sup>c</sup>	3.93 <sup>bc</sup>	6.20 <sup>a</sup>
Doc's Court	2.80 <sup>c</sup>	3.20 <sup>ab</sup>	3.07 <sup>d</sup>	4.37 <sup>b</sup>
Coral Pink	3.93 <sup>ab</sup>	2.93 <sup>bc</sup>	4.53 <sup>ab</sup>	4.00 <sup>b</sup>
Sonia	3.07 <sup>c</sup>	2.90 <sup>bc</sup>	3.30 <sup>cd</sup>	3.37 <sup>c</sup>
Yellow Island	4.23 <sup>a</sup>	3.10 <sup>abc</sup>	5.00 <sup>a</sup>	4.10 <sup>b</sup>
American Orange	3.40 <sup>bc</sup>	3.10 <sup>abc</sup>	3.60 <sup>cd</sup>	3.83 <sup>bc</sup>
Twingo	3.07 <sup>c</sup>	3.40 <sup>a</sup>	3.83 <sup>bcd</sup>	3.37 <sup>c</sup>

@Mean separation within columns by DMRT at 5% level.

**Table 4.** Cost and return analysis on rose cut flower in cost of production/ha for first year cropping under open field culture.

Supplies and materials	Quantity	Unit price	Approx. value
Planting materials - 2 year old budded rose plants	52,800 pcs	₱ 25/pc	₱ 220,000*
Fertilizers			
slow release 14-14-14 500 g/pack	1,408 packs	₱ 145	204,160
chicken manure (decomposed)	300 packs	₱ 65	19,500
Pesticides			
· Fungicides	48 liters/kgs	₱ 625	30,000
· Insecticides	48 liters	₱ 625	30,000
Irrigation, Pesticide Spray, Land Preparation			
· Motor oil	60 liters	₱ 100	6,000
· Gasoline	400 liters	₱ 33.29	13,316
· PVC Pipe moldex 2 inch diameter	500 m	₱ 3,800/60m	31,700
· PVC Pipe moldex 3 inch diameter	100 m	₱ 138/m	13,800
Farm Tools			
· sickles, heavy duty	4 pcs.	₱ 150	600
· grubhoes with handle	4 pcs.	₱ 300	1,200
· Japanese hoe with handle	2 pcs.	₱ 450	900
· pruning shears, heavy duty	4 pcs.	₱ 250	1,000
<b>Sub-total</b>			<b>₱ 569,176</b>

\*Pro-rated for 6 years of productive flower

'Twingo' ranked number produced the highest volume of cut lowers with 289,041 dozens valued at ₱3,081,676 and a ratio of net returns over cost of production for year 1 of 1 : 3.67. 'Yellow Island' and 'Frosty Pink' ranked 2 nd 3rd with 194,042 and 150,560 dozens valued at ₱2,413,667 and ₱1,925,976; and ratio of returns over cost of production of 1:1 and 1:1.29 respectively, among 28 varieties evaluated surpassing the volume of cut flowers produced by the three check varieties 'Queen Elizabeth', 'Red Success' and 'Tineke' which produced only 132,424; 114,167 and 119,966 dozens valued at

₱1,276,418; ₱1,445,897 and ₱1,456,345, respectively. The check varieties ranked 17, 13 and 12 together with the 25 new varieties evaluated.

The lowest volume of cut flowers were produced by 'Popsickle', 'Lou Blessy', and 'Vivaldi' produced 75,003 dozens per year; while 'Popsickle' had 83,873 dozens per year. 'Popsickle' ranked 28 th with a gross income of ₱943,473 and a ratio of net returns over cost of production of 1:0.12, 'Lou Blessy' ranked 27 th with a gross income of ₱1,004,857 and ratio of net returns over cost of production of only 1:0.20; while 'Vivaldi' ranked 26

th with a gross income of only P1,016,145 per hectare per year under open field culture and a ratio of net returns over cost of production of only 1:0.2.

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## 필리핀 코르딜레라 고냉지 환경조건하의 장미 신품종 육성에 따른 시스템 연구 개발

박영배<sup>1\*</sup> · 김진기<sup>1</sup> · 황주천<sup>1</sup> · 아라실 지 레디레드<sup>2</sup>

<sup>1</sup>경남농업기술원 화훼연구소, <sup>2</sup>벵켄주립대 원예학과

**적 요** 우리나라 장미산업의 국제화에 대비하여 필리핀 코르딜레라 고냉지 지역에서 생산된 장미의 품질, 수량 및 우수 품종을 연구, 소득 분석을 요약하여 아래와 같이 산업화의 기초자료를 얻기 위해 본 실험을 수행하였다. 절화 내 질적 실험에서는 대비종에 비해 특히 'Jacaranda' 품종은 개화기간 46일, 13일정도의 꽃 받침 휩 정도보다 짧은 것으로 나타내므로, 광질, 조사기간 및 온도 등이 영향을 제일 많은 영향을 받는 것으로 볼 수 있었다. 절화 시 'Vicki Brown'와 'Jacaranda' 품종은(개화기간 49일, 13일 꽃 받침 휩 정도 이내) 중, 단초 절화로 분류되는 다른 품종에 비해 단축되는 경향을 보였다. 'Jacaranda', 'Vicki Brown', 'Golden Times', 'Champagne', 'Osiana' 및 'Queen Elizabeth' 품종은 전정에서 46.7일에서 50.77일까지 조기 개화되었으나 'Tineke' 품종은 전정 41일 후에 꽃 받침 휩 정도가 0.5cm에 이르게 되어 개화형성이 늦어짐이 뚜렷하였다. 여기에서 상위 10품종 장미의 순수익은 'American Orange' 품종 \$77072, 'Yellow Island' 품종 \$39322, 'Frosty Pink' 품종 \$27130, 'Champagne' 품종 \$24516, 'Coral Pink' 품종 \$23992, 'Lara Pink' 품종 \$22961, 'Lara Orange' 품종 \$17856, 'Grand Gala' 품종 \$17645, 'Golden Times' 품종 \$20163 및 'Lady X' 품종 \$19452 등 이다.

**주제어** : 개화, 국제화, 달랏, 마케팅, 바기오, 절화, 원예산업화 과정, 환경과 생태