

Adaptability of Holland Anthurium Varieties to Lanao del Sur Conditions

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Anthurium (*Anthurium andreanum* Andre) is a tropical and perennial plant belonging to the family Araceae. It is grown chiefly for its colorful, long-lasting flowers. The portion of the plant commonly referred to as the flower consists of the spathe, the spadix and the peduncle (Figure 1). The most attractive part of the flower is the spathe which is actually a modified leaf (Lantin-Rosario, 1991). The color is either red, pink, orange, coral, or green in combination with other colors. The flower has a very long vase life which may last up to three weeks or more at room temperature (Valmayor, 1988). It is one of the six cutflowers with export potential aside from orchids, gladioli, roses, heliconias and chrysanthemums (Sarmiento, 1992).

At present, many flowergrowers raise anthurium because they are easy to culture, propagate and market. Known for its comparatively high potential in terms of financial return per area, anthurium growing is suitable for compact livelihood projects that benefit many individuals. According to Valmayor (1988), the cutflower industry which includes anthurium production provides one of the solutions to the country's rising unemployment problem.

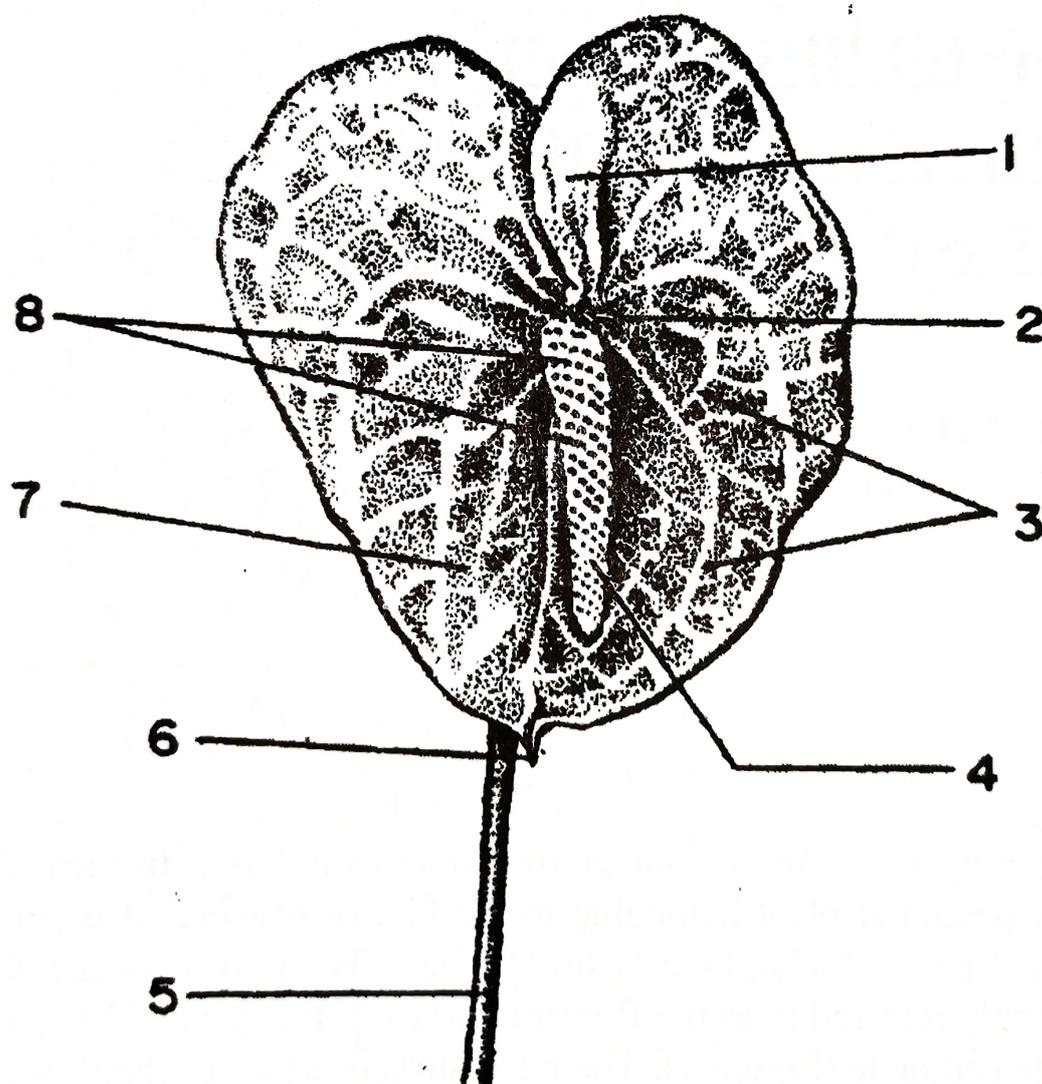


Fig. 1 Parts of the Anthurium Flower: (1) lobe, (2) notch, (3) ridged vein, (4) spadix, (5) petiole, (7) spathe, (8) true flowers (adopted from Rosario, 1991)

Lanao del Sur is endowed with a cool climate which is very suitable for anthurium production. It is therefore not surprising to find plenty of anthuriums grown in the backyard of many homes in the province. As anthuriums are not endemic in the Philippines all cultivars grown locally are introductions from other countries (Lantin-Rosario, 1991). Majority of anthuriums grown in Lanao del Sur, however, are restricted to those bearing red and orange flowers.

If the anthurium industry of the province is to flourish, outstanding varieties with different colors like those coming from Holland should be made available to the local growers to be able to meet the requirements of great quantity and good quality. The performance of these superior varieties, however, must be evaluated first to test their adaptability to Lanao del Sur before they are released to the growers to minimize expenses and prevent the spread and establishment of pest and diseases.

This study, however, was conducted to test the adaptability of Holland anthurium varieties under Lanao del Sur conditions. The study commenced in December, 2000 and ended in December 2001.

Materials and Methods

Three Holland varieties, namely, Sultan, Priscilla and Champagne were tested for their adaptability in the province of Lanao del Sur.

A total of one hundred and fifty plants per variety were arranged in a complete randomized design under a netted area in the College of Agriculture, MSU, Marawi City. All plants were applied with the standard rates of fertilizers recommended for anthurium production. Pest control measures, however, were not applied to the data plants (15/ per variety) to determine their resistance to pest and disease under natural field conditions.

Fifteen plants were sampled monthly which started in December, 2000. Data gathered include the following:

Table 1. Characteristics of the Holland anthurium (*Anthurium andreanum*), varieties grown under Lanao del Sur conditions. MSU, Marawi City, December, 2000 – November 2001.

NAME	Spathe color	Spathe texture	Spathe shape	Relative spathe size	Suckering ability	Spadix color	Position
Sultan	Pink	ridged, medium	broad heart open lobes	small to medium	very poor	pink	reclining
Priscilla	White	ridged, medium	broad heart open lobes	small to medium	excellent	pink	upright
Champagne	White	ridged, medium	broad heart open lobes	small	very poor		reclining

Note: Color description was made when the spathe had just unfurled. Color changed as the flower matured.

The performance of three Holland varieties in terms of their mean height (cm.), mean number of leaves, flowers, suckers, pest and diseases rating is presented in Table 2.

Among the three varieties, Priscilla exhibited a faster growth rate, attaining a height of 27.84 cms., followed by Champagne, 27.09 cms. and Sultan, 25.65 cms., respectively (Fig. 5). Statistical analysis, however, showed that there were no significant differences among the three varieties in terms of their growth rate.



Fig. 2 Mature spathe of Sultan.

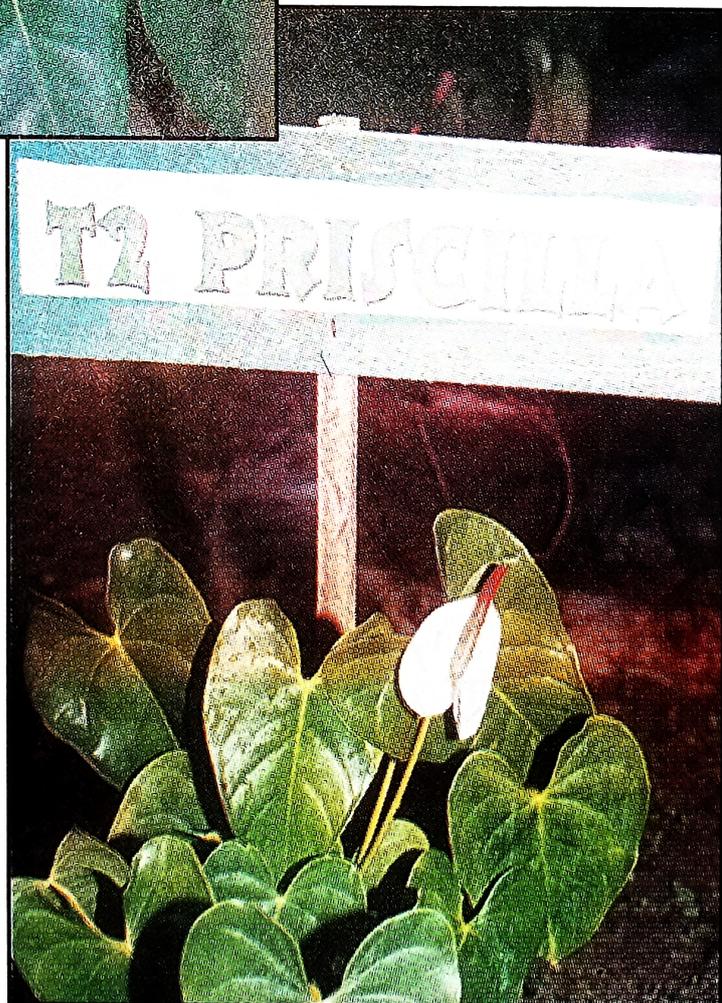


Fig. 3 Mature spathe of Priscilla.



Fig. 4 Mature spathe of Champagne.

Statistical analysis further revealed that the three varieties differed significantly in terms of the number of leaves, flowers, and suckers produced. Priscilla consistently produced the greatest number of leaves (15.05/mo), followed by Sultan (5.19/ mo), and Champagne (4.36/mo) (Fig. 6). Priscilla was also an excellent producer of suckers (Fig. 7) which accounted for its great number of leaves, but it was also a poor flower producer (Figs. 8 & 9). Sultan produced more flowers with a total of 12.18 in one year ($x=0.08/\text{mo}$) (Fig. 10), followed by Champagne, 6.37 flowers ($x=0.42/\text{mo}$) (Fig. 11) and Priscilla, 1.05 flowers ($x=0.07/\text{mo}$) (Fig. 9). Many of Priscilla plants did not produce even a single flower for the whole year (Fig. 12).

Champagne was most susceptible to the attack of insect pests and diseases compared with the other two varieties. Results of the study, however, showed that the three varieties possessed a high degree of resistance, based on the established pest and disease rating scale (Fig. 13).

Cutworms (*Spodoptera litura*) and thrips (*Chaetanapothrips orchidii*) were the two common insect pests that attacked anthurium plants. Cutworms generally cut the foliage (Fig. 14) of the plants. Thrips infestation started during the bud stage of the spathe, causing white streaks to develop, thus making the plant unmarketable (Fig. 15). An unidentified leaf-footed bug likewise caused damage to anthurium flowers. The feeding of the bug led to the production of small, black lesions giving the spathe an unsightly appearance (Fig. 16).

Table 2. Mean plant height (cms.), number of leaves, flowers and suckers, pest and disease rating of three Holland anthurium varieties. MSU, Marawi City. December 2000-November 2001.

Parameters	Variety		
	Sultan	Priscilla	Champagne
Mean plant height (cms.)	25.65 ns	27.84 ns	27.09 ns
Mean no. of leaves/plt/mo.	5.19 b	15.05 a	4.39 c
Total no. of leaves/plt/yr	77.91 b	225.77 a	65.83 c
Mean no. of flowers/plt/mo.	0.81 a	0.07 c	0.42 b
Total no. of flowers/plt/yr.	12.19 a	1.05 c	6.37 b
Mean no. of suckers/plt/mo.	0.34 b	4.18 a	0.33 b
Total no of suckers/plt/yr.	5.12 b	62.76 a	5.01 c
Pest and diseases rating	0.29 c	0.34 b	0.64 a

Rows having the same letter are not significantly different at (P=5%)

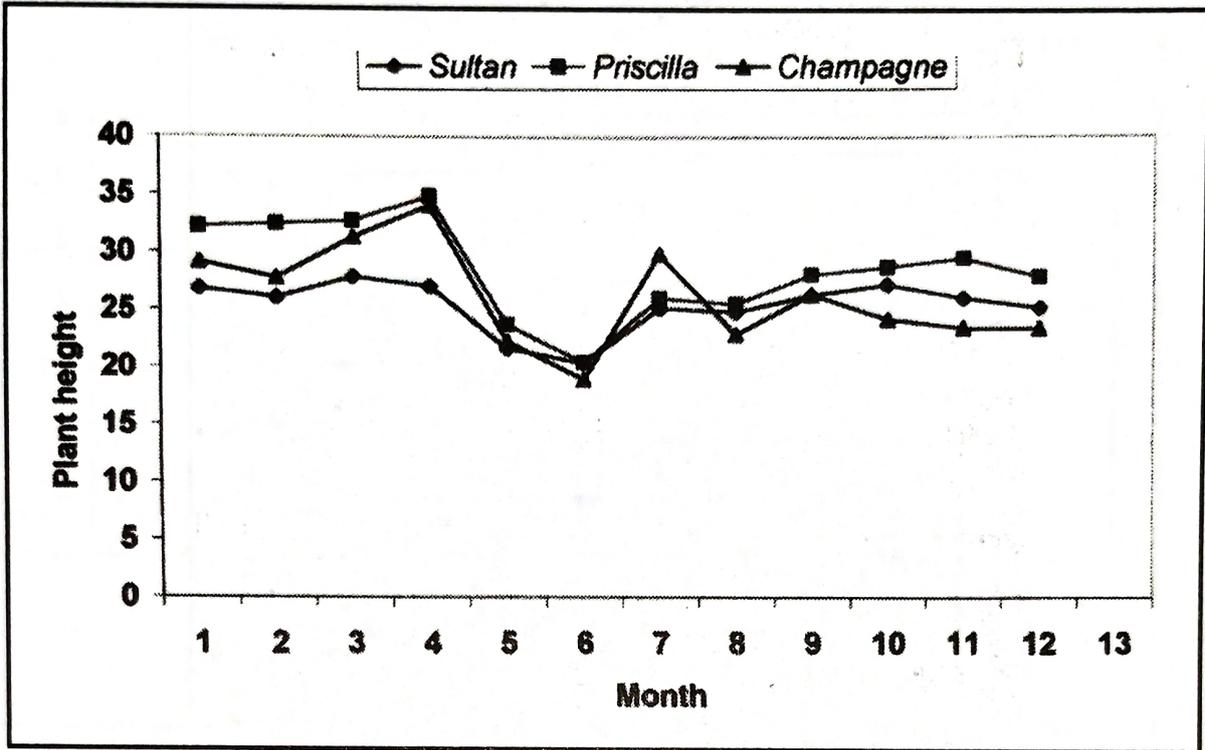


Fig. 5 Mean plant height of three Holland anthurium varieties.

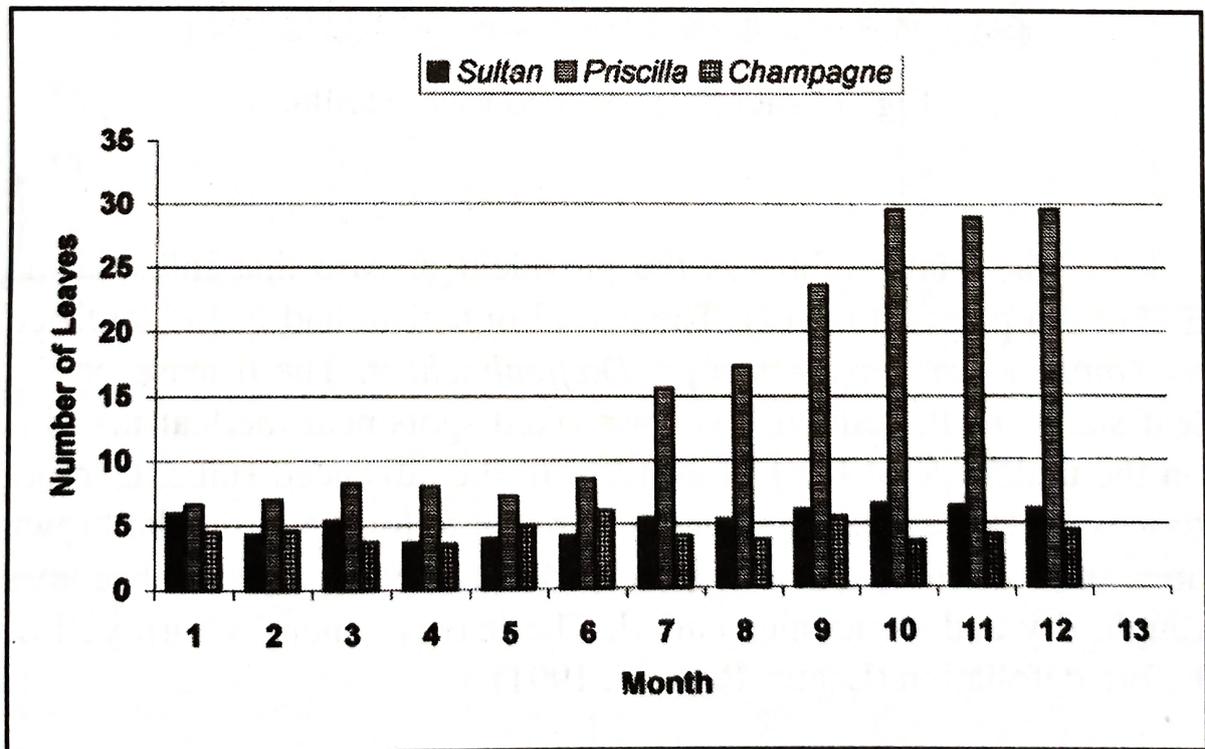


Fig. 6 Mean number of leaves of three Holland anthurium varieties.



Fig. 7 Suckers produced by Prescilla.

Bacterial blight was the prevalent disease that infested the anthurium plants (Fig. 17). The causal organism had been identified as *Xanthomonas campestris* pv. *Dieffenbachiae*. The disease on the leaf starts small, yellowish water-soaked spots near the leaf margins on the underside of the leaf surface. In the advanced stage, as more tissues are killed, the spots become circular to form an irregular brown area, surrounded by a light yellow border. The necrotic center becomes rough, dry and sometimes curled. The leaves generally turn yellow before defoliation (Lantin-Rosario, 1991).

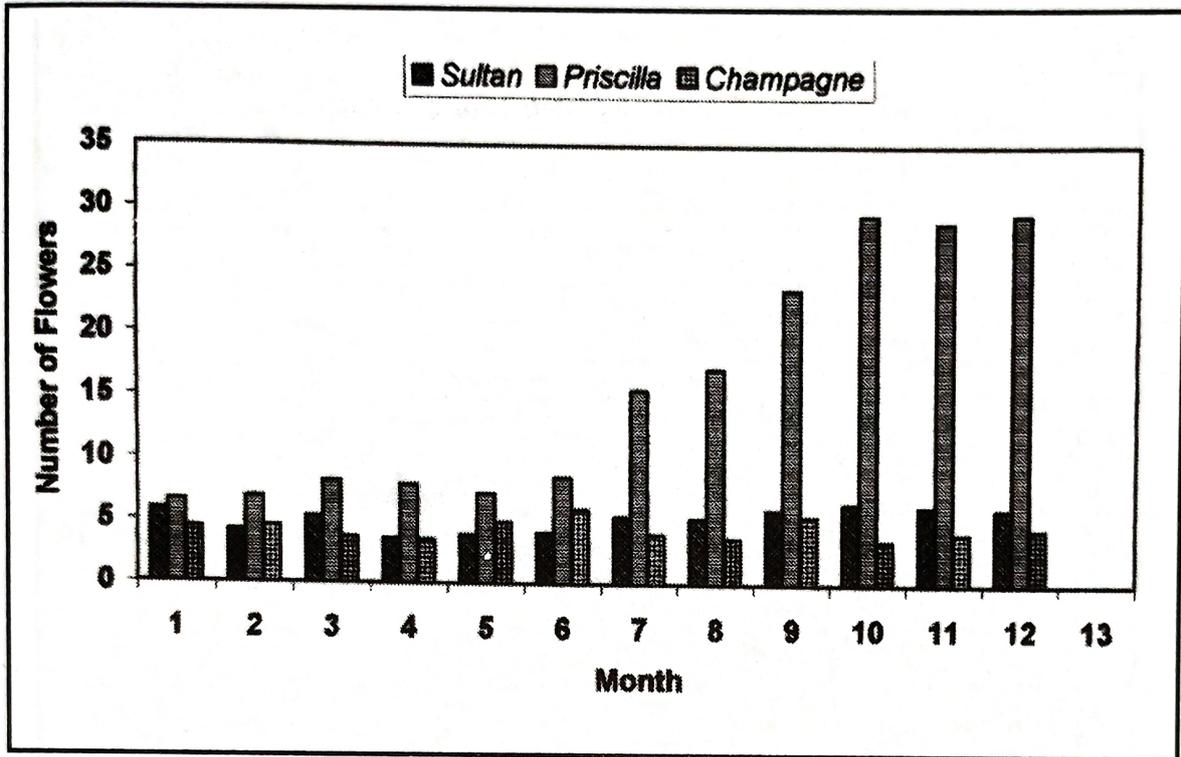


Fig. 8 Mean number of flowers of three Holland anthurium varieties.

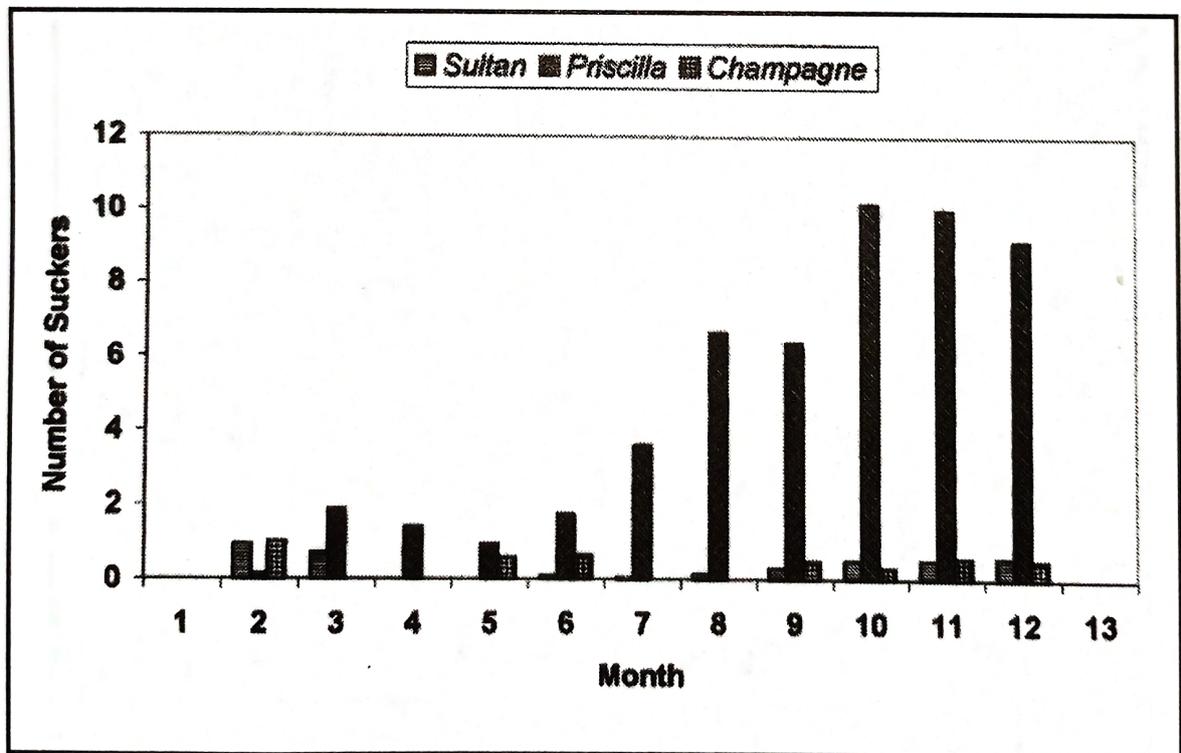


Fig. 9 Mean number of suckers produced by three Holland anthurium varieties.



Fig. 10 Sultan plants bearing flower.



Fig. 11 Champagne plants bearing flowers.



Fig. 12 Priscilla plants without flowers.

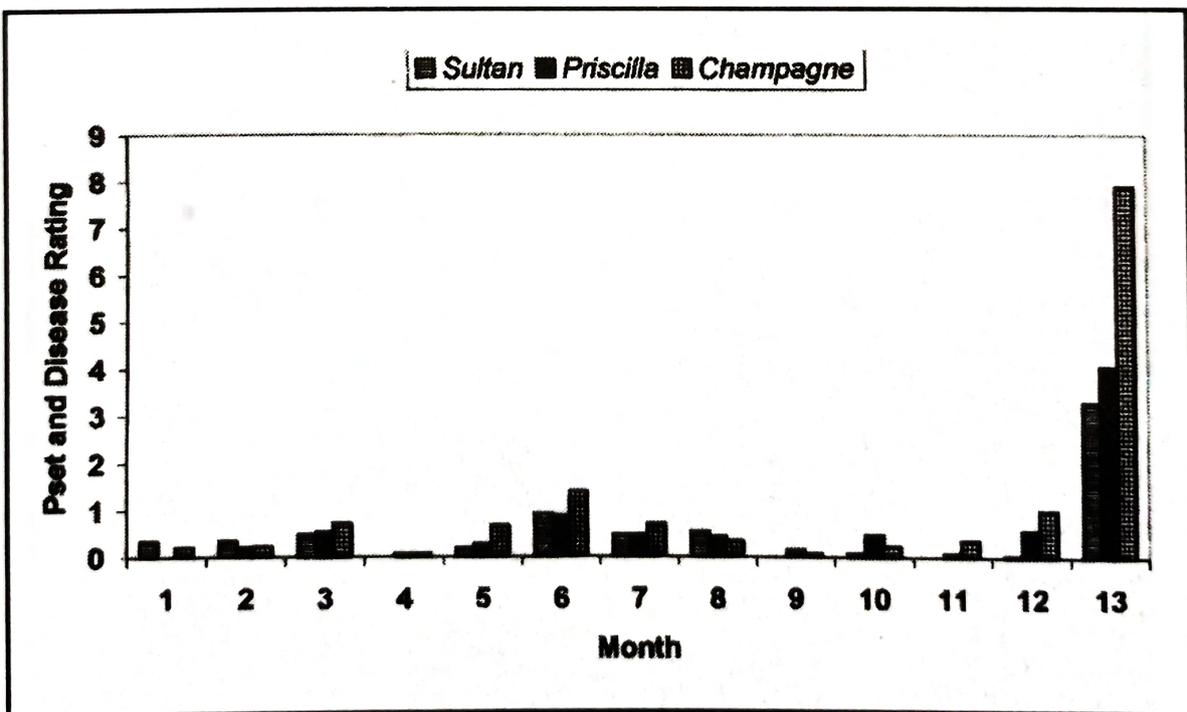


Fig. 13 Pest and disease rating of three Holland anthurium variety.



Fig. 14 Damage caused by cutworms.



Fig. 15 Damage caused by thrips.

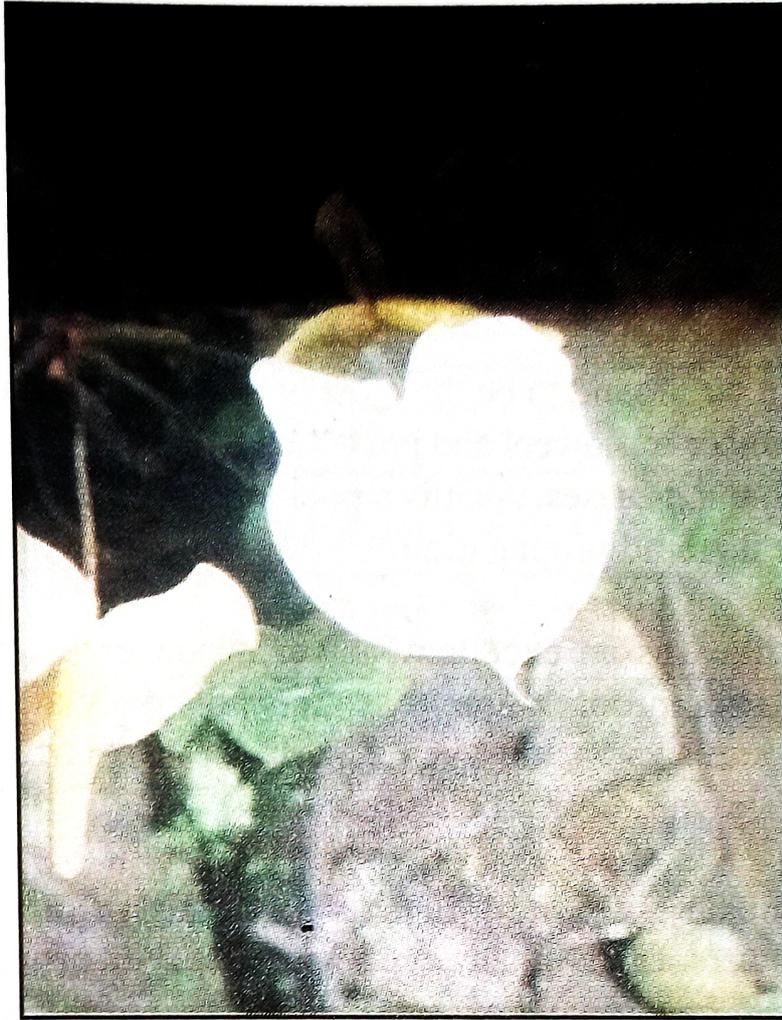


Fig. 16 Damage caused by leaf bug.

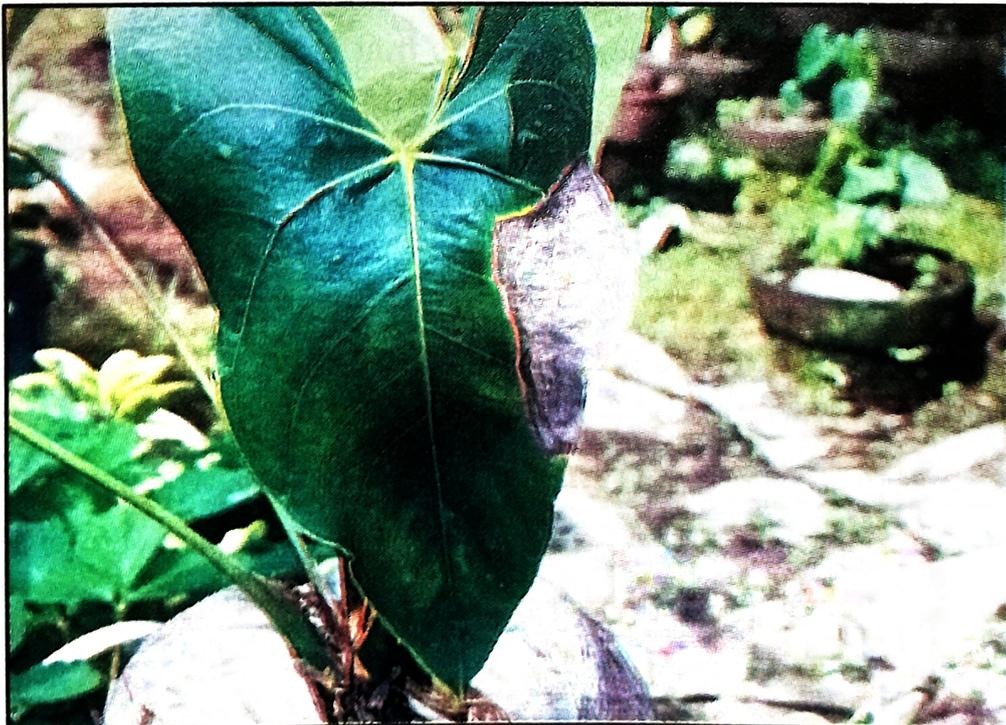


Fig. 17 Bacterial blight of anthurium

Summary, Conclusions and Recommendations

Three Holland anthurium varieties, namely, Sultan, Priscilla, and Champagne were planted at the College of Agriculture, Mindanao State University, Marawi City from December, 2000 to November, 2001 to test their adaptability in the province of Lanao del Sur.

Sultan was found to be the most promising variety. It produced the highest number of flowers and possessed a high degree of resistance to insect pests and diseases. As it is a poor sucker producer, top cutting is advised for its rapid propagation.

Priscilla was an excellent sucker producer but poor flower producer. Extreme proliferation of suckers adversely affected flower production, hence suckers must be regularly separated from the mother plants to encourage flower production.

Champagne was next in rank to Sultan in producing high number of flowers. Like Sultan, it has poor ability to produce suckers. As it is prone to bacterial wilt infestation, the use of this variety must be considered with care.

Selection of superior varieties that can adapt to the climatic conditions of Lanao del Sur cannot be done in one year alone with limited number of varieties. It usually requires several years of testing before a valid result can be obtained, hence the findings of this study are still unsubstantial.

It is therefore recommended that the study be extended for two years and more varieties be screened to come up with reliable results.

Appendix Table 1. Monthly data on plant height (cms), number of leaves, flowers, suckers and pest and disease rating of three Holland anthurium varieties. MSU, Marawi City. December 2000 to November 2001.

Variety	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Total	Mean
Plant height (cms)														
Sultan	26.85	26.1	27.91	27.12	21.72	20.5	25.29	24.96	26.39	27.31	26.15	25.29	305.59	25.466
Priscilla	32.18	32.45	32.75	34.87	23.8	20.53	26.12	25.64	28.17	28.84	29.55	27.94	342.84	28.57
Champagne	29.15	27.78	31.33	34.07	22.36	19.04	29.92	23.03	26.45	24.32	23.55	23.47	314.47	26.206
Number of leaves														
Sultan	5.85	4.2	5.3	3.6	3.9	4.09	5.42	5.29	6	6.5	6.29	6.07	62.52	5.21
Priscilla	6.53	6.93	8.2	7.93	7.2	8.53	15.53	17.29	23.57	29.54	28.92	29.57	189.74	15.812
Champagne	4.46	4.56	3.7	3.5	4.93	6	4	3.67	5.47	3.54	4.07	4.43	52.33	4.3608
Number of flowers														
Sultan	0.08	0.08	0.38	0.62	0.15	0.27	0.6	1.07	1	1.43	1.5	1.64	8.82	0.735
Priscilla	0.06	0.53	0.13	0.06	0.06	0	0	0	0	0	0	0	0.84	0.07
Champagne	0.66	0	0.92	0.5	0.09	0.25	0.26	0.27	0.33	0.69	0.92	0.5	5.39	0.4492
Number of suckers														
Sultan	0	0.93	0.69	0	0	0.09	0.06	0.14	0.29	0.5	0.5	0.57	3.77	0.3142
Priscilla	0	0.13	1.86	1.4	0.93	1.73	3.6	6.64	6.36	10.15	10	9.14	51.94	4.3283
Champagne	0	1	0	0	.57	0.64	0	0	0.47	0.31	0.57	0.5	4.06	0.3383
Pest & Disease Rating														
Sultan	0.33	0.33	0.46	0	0.18	0.91	0.46	0.53	0	0.07	0	0.03	3.3	0.275
Priscilla	0	0.2	0.53	0.06	0.26	0.86	0.46	0.43	0.14	0.46	0.08	0.57	4.05	0.3375
Champagne	0.2	0.21	0.71	0.07	0.66	1.38	0.69	2.33	0.07	0.23	0.36	1	7.91	0.6592

Appendix Table 2. Analysis of Variance of mean plant height (cms), number of leaves, flowers, suckers and pest and disease ratings of three Holland anthurium varieties. MSU, Marawi City. December 2000-November 2001.

a. ANOVA on plant height

Source of Variation	DF	SS	MS	Fc	Ftab	
					5%	1%
<i>Treatment</i>	2	44.8	22.4	1.792	3.22	5.16
<i>Error</i>	42	525.33	12.5			
<i>Total</i>	44	570.13				

b. ANOVA on the number of leaves produced

Source of Variation	DF	SS	MS	Fc	Ftab	
					5%	1%
<i>Treatment</i>	2	1057.54	1517.085	141.08**	3.22	5.16
<i>Error</i>	42	451.63	10.75			
<i>Total</i>	44	1509.17				

c. ANOVA on the number of flowers produced

Source of Variation	DF	SS	MS	Fc	Ftab	
					5%	1%
<i>Treatment</i>	2	4.13	2.065	24.4**	3.22	5.16
<i>Error</i>	42	3.55	0.085			
<i>Total</i>	44	7.68				

d. ANOVA on the number of suckers produced

Source of Variation	DF	SS	MS	Fc	Ftab	
					5%	1%
<i>Treatment</i>	2	166.95	83.48	234.68**	3.22	5.16
<i>Error</i>	42	14.44	0.36			
<i>Total</i>	44	181.89				

e. ANOVA on the degree of pest and diseases rating affecting each variety

Source of Variation	DF	SS	MS	Fc	Ftab	
					5%	1%
Treatment	2	8.82	4.41	41.9**	3.22	5.16
Error	42	4.24	0.1			
Total	44	13.06				

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