

**EXTENT OF ADOPTION OF ORCHID GROWING PRACTICES BY THE FARMERS
OF EAST SIKKIM**

S. Subba, A. Saha and D. S. Dhakre

Department of EES, Palli-Siksha Bhavana (Institute of Agriculture), Visva-Bharati, Sriniketan

Received: April 2016 Revised accepted: May 2016

ABSTRACT

The study was conducted to investigate the extent of adoption of recommended orchid growing practices by the farmers of East Sikkim. The sample size consisted of 100 respondents. The overall analysis indicated that majority of respondents had high level of adoption about recommended orchid growing practices. The adoption was particularly nil for the recommended practice of propagation of orchids through cuttings. The adoption was very less for the practices like propagation through seeds, off-shoots and aerial shoots. Majority of respondents partially adopted different varieties, propagation through pseudobulbs, control of weeds and time of manuring. Majority of respondents had fully adopted propagation of orchids in pots and container. The time of manure and fertilizer application, growing media and irrigation had partial adoption by the respondents.

Keywords: Adoption, Adoption index, Extent of adoption

INTRODUCTION

Orchids are accepted to be the world's most exotic and fascinating flowers, with their extraordinary variety of sizes, shapes, colors and markings. Because of their curious, long lasting, brilliantly colored flowers, they are sought after plants by hobbyist and nurseryman all over the world. India has a very large variety of orchids and hilly regions have one or other orchid flowering almost throughout the year. Sikkim is a smallest hilly State in the Eastern Himalayas of the Indian Union yet it surpasses other states of India in having maximum orchid diversity. In Sikkim orchids are grown mostly in each district as the growers are interested not only for economic value but also for gardening purposes. Farmers are well trained for growing orchids. Orchids grow well in climatic conditions like Tropical, Sub-Tropical, Sub-Temperate, Temperate, Dry-Alpine and Wet-Alpine.

Adoption in orchid is an important thing in cultivation of orchid. In Sikkim most of the farmers have adopted new technologies which give them a better result to standardize micro propagation techniques for product of quality planting material at commercial scale. Adoption makes a farmer to develop export worthy orchid lines through a systematic breeding programme. Adoption of tissue culture has made orchid growers more profitable and created an economic standard. Adoption is important because it standardize post harvest management practices, orchid cut flowers for domestic and international markets. Advancement has been made to collect, conserve, characterize and evaluate germplasm, and develop National repository of orchids through adaptation. Adoption for growing orchids has been considered as an important thing in the productivity of orchid flowers. Problems have been faced by the farmer in non availability of labor, marketing facilities, storage and transportation. Farmers usually adopt new technologies to increase the production. Keeping in view the vast potential and importance of growing orchids to the state's revenue in the broader sense and the impact of the practice on improving the social life of the farmer, this study was undertaken. The objective of the study is to analyse the extent of adoption of orchid growing practices by the farmers of East Sikkim

MATERIALS AND METHODS

East district in Sikkim state was selected for the study as it has the maximum area and production under orchid than all other districts of the state. Villages from Assam Lingzey block and Pakyong block was selected for this study. Proportionate random sampling procedure was employed in selecting

70 respondents from Assam Lingzey block and 30 respondents from Pakyong block. Thus the sample size consisted of 100 respondents. The extent of adoption of the orchid growing practices was measured by means of “adoption index”. The adoption of each practice was measured on a three point continuum. Three scores for full adoption, two scores for partial adoption and one score for non-adoption was assigned. The sum of scores of all the selected practices was taken as the adoption score for each respondent. The index was calculated using the formula adopted by Usharani (1998), and it is also calculated by simple ranking method.

$$\text{Adoption index} = \frac{\text{Adoption score obtained by the respondents}}{\text{Possible maximum score}} \times 100$$

The respondents were categorized into low, medium and high level of adoption by using percentage.

RESULTS AND DISCUSSION

Extent of adoption of orchid growers

Table No.1 reveals that use of pot and container (3.0) obtained 1st rank, followed by manuring (2.53), repotting (2.51). Control of weeds(2.44), growing media(2.34), varieties (2.32), use of poly house(2.24), tissue culture(2.19) were given 2nd, 3rd, 4th, 5th, 6th, 7th, 8th respectively.

Table1. Distribution of respondents according to their extent of adoption

n=100

Recommended Practices	Mean Score	Rank
1. Varieties	2.32	(vi)
2. Propagation through		
a. Seeds	1.34	(xiv)
b. Psuedobulbs	1.98	(xii)
c. Cuttings	0	(xvii)
d. Off-shoots	1.14	(xvi)
e. Aerial shoots	1.25	(xv)
f. Tissue culture	2.19	(viii)
3. Use of pot and containers	3.0	(i)
4. Use of poly house	2.24	(vii)
5. Manuring	2.53	(ii)
6. Time of manure and fertilizer application	1.91	(xiii)
7. Disease and pest control	2.03	(xi)
8. Control of weeds	2.44	(iv)
9. Growing media	2.34	(v)
10. Repotting	2.51	(iii)
11. Irrigation	2.5	(x)
12. Harvesting	2.13	(ix)

Extent of adoption

Overall adoption: The distribution of respondents according to their overall extent of adoption of recommended orchid growing practices is given in Table 2.

It is observed from Table No. 2, that 44 percent of respondents had high level of overall adoption of recommended practices followed by medium (40%) and low (16%) levels of adoption.

Practice wise adoption: The practice wise data collected for extent of adoption of recommended orchid growing practices and are presented in Table No. 3. From the analysis, it could be seen that half of the respondents fully adopted the practices namely recommended varieties, and propagation through tissue culture and pseudobulbs and all respondents adopted practice of using pots and container. Nearly one-third of the respondents fully adopted the use of polyhouse, manuring, growing media, repotting and irrigation. Very few respondents fully adopted the time of manure and fertilizer application, disease and pest control and control of weeds. Half of the respondents harvested at the recommended stage and month.

Table 2. Distribution of respondents according to their overall extent of adoption of recommended orchid growing practices

			n=100
Sl No.	Category	Percentage	
1.	Low	16	
2.	Medium	40	
3.	High	44	

The practice wise analysis revealed the following findings**Varieties**

Half of the respondents adopted the recommended varieties/species namely *Dendrobium densiflorum*, *Cymbidium macrorhizon*, *Vanda coerulea*, *Dendrobium nobile*, *Cymbidium pendulum*, *Dendrobium aggregatum*, *Cymbidium longifolium* etc.

Propagation

About 46% of respondents fully propagate orchids through tissue culture and 24% by pseudobulbs. Only 4% respondents propagate orchids through seeds because it is difficult to get orchid seeds and it is expensive.

Use of pot and container

Total number of respondents adopted growing orchids in pots and container because orchid is widely grown in pots and container.

Use of polyhouse

For growing orchids it is best to adopt polyhouse but only half of the respondents adopted this practice. Every grower cannot adopt polyhouse because there should be sufficient area and also income to adopt this practice.

Manuring

Little more than half of the respondents (54%) fully adopted the recommended dose of manures. Manure is water soluble and thus feeds the orchid every time it is watered. For best results, follow all temperature and light requirements for orchids fed with manure. Different species of orchids have different requirements, so we need to research a particular species.

Time of manure and fertilizer application

One-fifth of the respondents (27%) fully adopted the time of manuring and fertilizers application. Majority of them (37%) partially adopted and (36%) of them has not adopted this practice. Water the orchid regularly, keeping the soil moist but not soggy. The manure supplies ample nitrogen, but to encourage blossoms, fertilizers are applied regularly on a monthly or bimonthly basis, doses are dependent on the fertilizer and manufacturer's instructions. Manure is a naturally available and inexpensive fertilizer that provides all the food an orchid needs to grow and thrive. In fact, most orchids can be planted directly in this fertilizer without the use of other soils or humus.

Table 3. Distribution of respondents according to their practice wise extent of adoption

n=100				
SI No.	Recommended Practices	FA %	PA %	NA %
1.	Varieties	41	50	9
2.	Propagation through			
a.	Seeds	4	26	70
b.	Pseudobulbs	24	64	12
c.	Cuttings	-	-	100
d.	Off-shoots	-	14	86
e.	Aerial shoots	-	24	76
f.	Tissue culture	46	28	26
3.	Use of pot and container	100	-	-
4.	Use of polyhouse	52	20	28
5.	Manuring	54	44	2
6.	Time of manure and fertilizer application	27	37	36
7.	Disease and pest control	36	31	33
8.	Control of weeds	46	52	2
9.	Growing media	50	34	16
10.	Repotting	61	28	11
11.	Irrigation	51	49	-
12.	Harvesting	47	18	35

FA-full adoption, PA-partial adoption, NA-non adoption

Disease and pest control

36% respondents adopted practice of disease and pest control (31%) respondents partially adopted this practice and (33%) respondents have non-adoption. Spraying of Bordeaux mixture '6-6-50 or 4-4-50) will effectively control the leaf spot disease. Fungicide like Monoozeb @ 2.5 g/lit should be sprayed to control the disease. Affected plants with fungus should be treated with Zineb or Tersan. Pest should be controlled with a 20% emulsion of DMC diluted at the rate of 1 pint per 100 gal and also with the application of gesarol A (5 % DDT) @ 1 kg in 100 liters water with rhodiatox at 1:5000 organic phosphates, parathion and Malathion give good control of aphids.

Control of weeds

Nearly half of the respondents (52%) partially adopted control of weeds whereas (46%) of respondents fully adopted this practice. Weeds are a major problem of orchids. They compete for water and light, and their roots can make the orchid's potting mix break down more quickly than normal. Weeds such as ferns, *Oxalis*, can be controlled manually and also chemically. It is best to do this before the weed goes to seed, or the problem can multiply through an entire orchid collection.

Growing media

Almost half of the respondents (50%) fully adopted the practice of growing media. Growers new to orchid growing soon realize that healthy orchids don't grow in regular potting soil, but the choices available in orchid potting media can be confusing. Many orchid cultivars can grow in a one-ingredient medium. Growing media like Brick Pieces, Cobblestone, Coconut Coir, Coconut Husk Chips Cork, Expanded Clay Aggregate, and Shredded Bark. Sphagnum Moss and Vermiculite combines well to create a light, moisture retentive orchid mix.

Repotting

Little more than half of respondents (61%) fully adopted this practice of repotting whereas (28%) of them partially adopted repotting. The ideal time to repotting an orchid is right after it finishes flowering, when it begins to produce new growth. However, it is not necessary to repot orchid every time rather it is done no more frequently than every 18 - 24 months. If the roots are rotting, if they seem soggy, and the potting material is no longer draining properly, there is need to repot the orchid.

Irrigation

Majority of them (51%) respondents fully adopted irrigation at critical stages namely establishment and flowering stages and the rest (49%) respondents partially adopted this practice. Partial adoption is found because the irrigation were not done regularly. Sometimes respondents did not give irrigation at critical stages because they are not giving much care of orchids. Types of irrigation system for orchids are mist and sprinkler systems, pipes and delivery systems and sprayers.

Harvesting

Nearly half of the respondents (47%) fully adopted harvesting at the time of harvesting. Hardy orchids that are grown as house plants are prized for their healthy six- to eight-week blooming period. Spikes can be harvested regularly for long-lasting cut flowers and if given good care, they will repeat their blooms every winter.

The association and contribution of independent variables on extent of adoption

The contribution of same set of independent variables was studied with the dependent variable, extend of adoption. To find out the relationship between the dependent variable, extend of adoption and 13 independent variables, simple correlation and multiple regression were worked out. The results are presented in Table 4.

Correlation

As seen from Table 4, education (X2), contact with extension staff (X8), mass media exposure (X9), source of information (X10), innovation proneness (X11), economic motivation (X12) and risk orientation (X13) had positive and significant association with extend of adoption at one percent level of probability. The variable annual income (X4) and operational land holding had positive and significant association with extend of adoption at five percent level of probability. Table 3, also revealed that age (X1), family size (X3), organic manure (X6) and social participation (X7) showed a non-significant association with extend of adoption.

Table 4. Correlation co-efficient of profile characteristics with extent of adoption

Sl. No	Characteristics	Correlation Co-efficient 'r' value
X1	Age	-0.006 (NS)
X2	Education	0.830**
X3	Family size	0.018
X4	Annual income	0.194*
X5	Operational land holding	0.190*
X6	Organic Manure	-0.014
X7	Social Participation	-0.019
X8	Contact with extension staff	0.311**
X9	Mass-media exposure	0.435**
X10	Sources of information	0.417**
X11	Innovation proneness	0.545**
X12	Economic motivation	0.379**
X13	Risk orientation	0.553**

**Significant at 0.01 level,*Significant at 0.05 level

Regression

The result of multiple regression analysis is given in Table 5. Results indicated that co-efficient of determination (R) was 0.745 in the extent of adoption through the explanation of 13 independent variables. The 'F' value showed that the analysis was significant at one percent level of probability. The variable education (X2) had shown a positive and significant contribution at five percent level of probability.

Table 5. Multiple regression co-efficient of profile characteristics with extent of adoption

Sl. No	Characteristics	Regression co-efficient	Standard error	't' value
X1	Age	-0.086	0.058	1.472
X2	Education	3.32**	0.293	11.33
X3	Family size	-0.085	0.211	0.403
X4	Annual income	0.031	0.023	1.33
X5	Operational land holding	-0.840	0.629	1.33
X6	Organic Manure	-0.006	0.7644	0.48
X7	Social Participation	-0.008	0.012	0.42
X8	Contact with extension staff	-0.427	0.234	1.82
X9	Mass-media exposure	0.445	0.262	1.70
X10	Sources information of	0.012	0.160	0.07
X11	Innovation proneness	0.76*	0.341	2.2
X12	Economic motivation	-0.296	0.183	1.62
X13	Risk orientation	0.399*	0.186	2.14

$R^2=0.745$; $F=30.538$ *Significant at 0.01level; **Significant at 0.05 level

CONCLUSION

Adoption of improved practice propagation through cuttings was particularly nil whereas improved practices like propagation through seeds, off-shoots and aerial shoots were adopted partially by the respondents. So the adoption constraints may be removed by supplying adequate inputs to the orchid growing farmers in time. Technical guidance may also give to them. While selecting the beneficiaries for various development programmes high farming experience and experience in growing orchids and extension agency contact, mass media exposure, economic motivation, scientific orientation, decision making behavior, credit orientation and low level of progressiveness may be considered by the extension functionaries,.

REFERENCE

Usharani, S. 1998. Status and potential for sunflower production in northern districts of Tamil Nadu. *Unpub.M.sc. (Ag.) Thesis*, Department of Agriculture Extension and Rural Sociology, TNAU, Coimbatore.