

SOUVENIR

VASANTA FLORICULTURE TRADE FAIR - 2054

1998



FLORICULTURE ASSOCIATION NEPAL (FAN)
Kathmandu
2054

Vasanta Floriculture Trade Fair 2054

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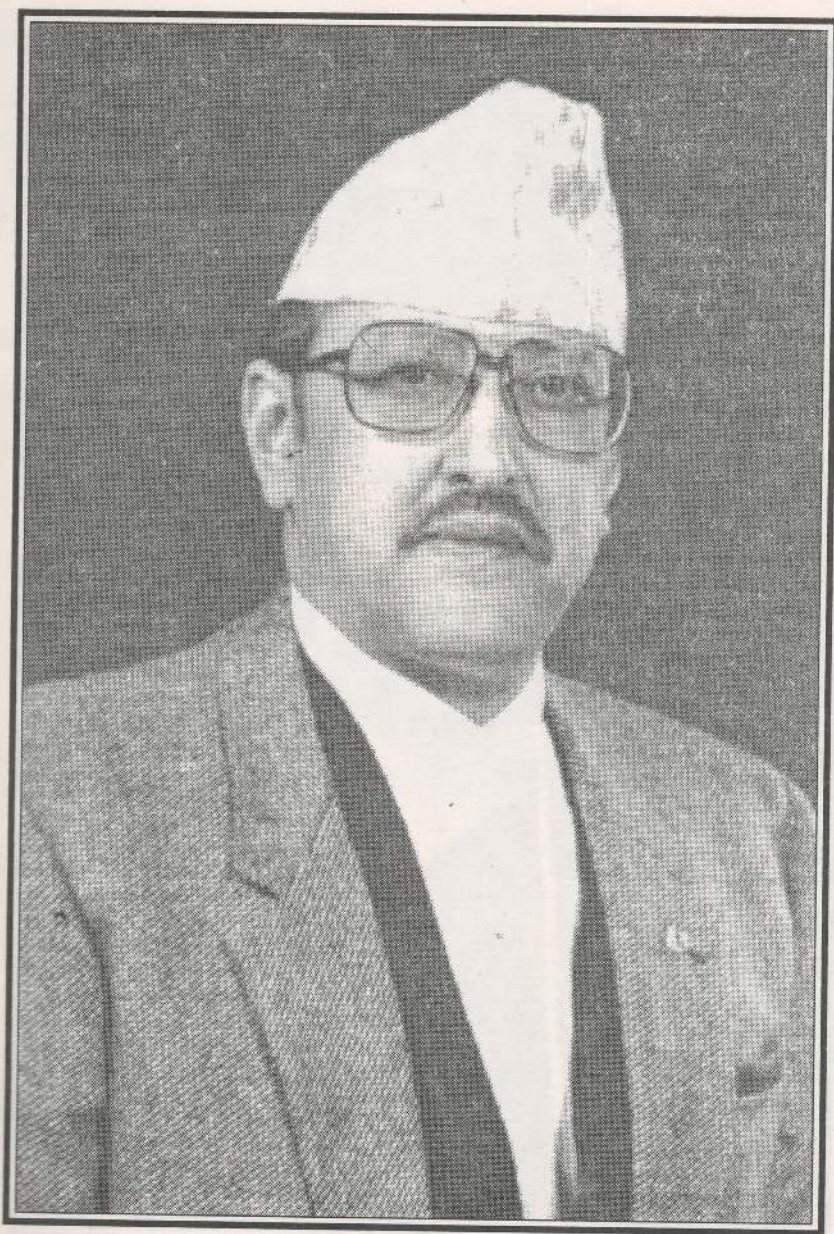
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**His Majesty King
Birendra Bir Bikram Shah Dev**



**Her Majesty Queen
Aishwarya Rajya Laxmi Devi Shah**



कृषि उद्यम केन्द्र

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शुभकामना

नेपालको विभिन्न भागका पुष्प व्यवसायीहरू समेटेर स्थापित Floriculture Association Nepal (FAN) ले २०५४ चैत्र २८ देखि चार दिनको वसन्त पुष्पव्यापारमेला आयोजना गर्न लागेकोमा नेपाल उद्योग वाणिज्य महासङ्घ/कृषि उद्यम केन्द्रको तर्फबाट शुभकामना व्यक्त गर्न चाहन्छौं ।

लगातार विगत वर्षहरूमा पनि कृषि उद्यम केन्द्रको प्राविधिक/आर्थिक सहयोगमा सङ्घले पुष्पव्यापार मेलाहरू आयोजना गरी पुष्प व्यवसायमा धेरै उद्यमीहरूलाई आकर्षण गर्न सकेको र पुष्पव्यापारमा निरन्तर वृद्धि हुँदै गइरहेको हामीले देख्दै आएका छौं । यस पटक आयोजना गर्न लागेका वसन्त पुष्पव्यापारमेलाले अधिराज्यभर अझ बढी प्रभावकारी रूपमा पुष्पव्यवसाय अगाडि बढाउन मद्दत मिल्ने छ भन्ने कुरामा हामी विश्वस्त छौं ।

पुष्प व्यवसायीहरू व्यापारीक दृष्टिकोणले फाइदा प्राप्त गर्न सक्ने केही प्रमुख किसिमका फूलहरूको उत्पादनमा गुणात्मक सुधार गरी ती फूलहरूको व्यावसायिक खेतीमा विस्तार गर्दै हाल भइरहेको आयातलाई प्रतिस्थापन गर्ने र विदेशमा निर्यात गर्नेतर्फ अग्रसर हुने नै छ भन्ने आशा र विश्वास पनि लिएका छौं ।

वसन्त पुष्पव्यापारमेलाको उत्तरोत्तर सफलताको कामना गर्दछौं ।

२०५४/१२/२०

डा. देवभक्त शाक्य
प्रबन्ध निर्देशक

दुइ शब्द

कृषिप्रधान देश नेपालमा खेतीको विविधताको ज्यादै नै ठूलो सम्भावना छ । केवल परम्परागत खेतीमा मात्र लागेर प्रतिस्पर्धात्मक आजको समयमा चाहिँदो प्रगति गर्न नसकिने अवस्थाहरू दिनानुदिन टड्कारो हुँदै गइरहेको परिप्रेक्ष्यमा नेपालमा पनि यस दिशातर्फ दृष्टि दिनु आवश्यक भइसकेको महसुस हुन्छ । एकातिर परम्परागत कतिपय खेतीमा सिँचाइको पूरा प्रबन्ध हुनुपर्ने अर्कोतिर परिश्रम ज्यादा गर्नुपर्ने र परिश्रम गरेअनुसार प्रतिफल प्राप्त नहुने हुँदा पनि आर्थिकस्तर चाहिँदो रूपमा बढ्न सकेको देखिन्छ । फेरि जग्गा टुकडिने क्रम जारी छ । स-साना टुकडे जग्गामा अत्याधुनिक संयन्त्रहरूको उपयोगिता नरहने भएकोले पनि परम्परागत खेतीबाट जति फाइदा लिनुपर्थ्यो त्यो लिन सकेको पाइन्छ । यी कुराहरूलाई दृष्टिगत गर्दा खेतीको विविधतातर्फ सोच्नु पर्ने तथा त्यहीअनुसार उपयुक्त खेतीको चयन गरी त्यसलाई बढाउनेतर्फ पहल गर्नुपर्ने देखिन्छ ।

पुष्पखेतीको संसारभरमै वृद्धि भइरहेको छ । यसको बजार पनि दिनानुदिन विस्तार हुँदैछ । नेपालको जलवायु र माटोमा पुष्पखेतीको प्रबल सम्भावना रहेको कुरा अहिलेसम्मको अनुभव र भइरहेका खेतीबाट थाहा हुन्छ । पुष्पखेतीलाई केवल सोखमा मात्र सीमित नराखी यसलाई व्यवसाय र उद्योग बनाउनेतर्फ सोची आवश्यक पूर्वाधारहरूको तयारी नितान्त आवश्यक देखिएको छ । अरू देशमा बेमौसम सम्भित्ने फूलबिरुवाहरू यहाँ सजिसँग उत्पादन गर्न सकिन्छ । श्री ५ को सरकारले यसतर्फ जतिसक्दो चाँडो कार्यक्रमहरू बनाएर कार्यान्वयन गर्न सके राम्रो हुने देखिन्छ । यसतर्फ कृषकहरूलाई आकर्षित तुल्याउन सर-सुविधाहरू बढाइदिने तथा सहूलियत दरमा ऋण उपलब्ध गराई निर्यात गरिने फूलको परिमाणमा परिदान (Subsidy) समेतको व्यवस्था गरी यसलाई वृद्धि गर्नेतर्फ आवश्यक योजना बनाउन सके राष्ट्रको लागि विदेशी मुद्रा आर्जन गर्ने गतिलो स्रोत पुष्पखेती हुन सक्ने देखिन्छ ।

पश्चिमी मुलुकमा पुष्पखेती अत्यन्त विकसित रूपमा पुगिसकेको छ । त्यसको तुलनामा हाम्रो खेती प्रणाली निकै पिछ्छिएको छ । मौजुदा प्रणालीमा केही सुधार गरी असल बीउ-बिजन, बिरुवा तथा प्रविधिलाई भित्र्याएर यसलाई अधि बढाउनु उपयोगी हुने देखिएको छ ।

फ्लोरिकल्चर एशोशियशन स्थापनाकालदेखि नै यस दिशातर्फ केही लागिपरिरहेको छ र यसको लागि उपयुक्त वातावरण तयार पार्न समर्पित छ ।

फ्लोरिकल्चर एशोशियशनको स्थापनापश्चात् हुने गरेका पुष्पव्यापारमेला र प्रदर्शनीहरूले पुष्पखेतीतर्फ केही झुकाव ल्याएको भएता पनि अझ यसलाई कार्यदिशामा ल्याउन गर्नुपर्ने कुराहरू धेरै छ । श्री ५ बडामहारानी ऐश्वर्यराज्यलक्ष्मीदेवी शाह सरकारबाट नेपालमा पुष्प एवं यसको खेतीले व्यावसायिक रूप लिई राष्ट्रलाई हित होस् भन्ने चाहना राखिबक्सेर फ्लोरिकल्चर एशोशियशनको निमन्त्रणालाई स्वीकार गरीबक्सी प्रत्येक वर्ष पुष्पव्यापार-मेलाको समुद्घाटनमा सवारी भइबक्सेर ठूलो हौसला र प्रेरणा प्रदान गरिबक्सेको छ त्यसप्रति सबै आभारी छौं ।

अन्तमा वसन्त पुष्पव्यापारमेलाको अवसरमा प्रकाशित यस स्मारिकाको सम्पादनमा सहयोग गर्ने सहयोगीहरू, लेख उपलब्ध गराइदिई सहयोग गर्ने विद्वान्, लेखकहरू तथा विज्ञापन दिई सहयोग गर्नुहुने व्यक्ति, संस्था तथा व्यापारिक प्रतिष्ठानहरूप्रति आभार प्रकट गर्दछौं । उहाँहरू सबैको सहयोग प्राप्त नभएको भए यस रूपमा स्मारिका आउन सक्दैनथ्यो ।

डा. गोविन्द टण्डन
सभापति
वसन्त पुष्पव्यापारमेला २०५४



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सन्देश

फ्लोरिचलचर एशोशियशन नेपालले आफ्नो स्थापनाकालदेखि नै पुष्प व्यवसायमा लागेका व्यवसायीहरूको व्यावसायिक विकासका साथै गुणस्तरयुक्त व्यावसायिक उत्पादन गराई विदेशबाट आयात हुने फूलबिरुवामा कमी ल्याउन अग्रसर रहँदै आएको छ । नेपालमा नै उत्पादन भएका फूलबिरुवाहरूको बारेमा सर्वसाधारण जनमानस समक्ष जानकारी गराई त्यसप्रति वृद्धि हुँदै गइरहेको जनअभिरुचि अझ जागृत गराई पुष्प व्यवसायको प्रवर्द्धन गर्ने उद्देश्यले वसन्त तथा शरद दुवै मौसमको उपर्युक्ततालाई ध्यानमा राखी वर्षको २ पटक पुष्पव्यापारमेलाको आयोजना गर्न थालेकोले सम्पूर्ण फूलबिरुवा प्रेमीमहानुभाव तथा पुष्प व्यवसायीहरूलाई ठूलो अवसर प्राप्त हुँदै आएको छ ।

यस सन्दर्भमा आगामी २०५४ चैत्र २८-३१ सम्म भृकुटीमण्डप प्रदर्शनी हलमा आयोजना हुन लागेको वसन्त पुष्पव्यापारमेला २०५४ को उपलक्ष्यमा प्रकाशन हुने यस स्मारिकाले नेपालमा फूलबिरुवाको वर्तमान अवस्था एवं यसको विकासका लागि आवश्यक पर्ने विभिन्न सूचनामूलक र ज्ञानवर्धक सामाग्री समावेश गरिएको हुनाले सबै क्षेत्रमा यसले राम्रो योगदान पुर्‍याउने छ भन्ने ठानेको छ ।

विगतका वर्षहरू जस्तै यस वर्ष पनि फ्लोरिचलचर एशोशियशन नेपालद्वारा परिचालन गरिएका सम्पूर्ण क्रियाकलापहरूमा यहाँहरूबाट प्राप्त सहयोगको लागि हार्दिक कृतज्ञता व्यक्त गर्दछु साथै आगामी दिनहरूमा पनि यस्तै निरन्तर सहयोगको अपेक्षा राखेको छु ।

अन्तमा यस वसन्त पुष्पव्यापारमेला २०५४ लाई सफलताका साथ सम्पन्न गर्नमा सहयोग पुर्‍याउनु हुने सम्पूर्ण सदस्यहरू, आयोजक समिति, विभिन्न उपसमिति तथा कृषि उद्यम केन्द्र, ने.उ.वा. महासङ्घ लगायत अन्य सहयोगी क्षेत्रलाई धन्यवाद ज्ञापन गर्दै वि.सं. २०५५ को शुभउपलक्ष्यमा शुभकामना व्यक्त गर्दछु । धन्यवाद ।

(सुरेशभक्त श्रेष्ठ)

अध्यक्ष

२०५४/१२/२५

Editorial

Dear readers,

It is a great pleasure to present you our souvenir magazine published on the occasion of Vasanta Floriculture Trade Fair (Chitra 28-31, 2054) organized by FAN.

This souvenir magazine comprises articles on research and development activities to promote floriculture in Nepal. Articles on ornamental ferns, orchids, seasonal ornamentals etc. are included to fulfill the interest of laymen and novice. Thus, it is an attempt to provide information on different aspects of floriculture and we hope that it may be useful to general people as well as entrepreneurs.

We would like to express our deep gratitude to contributors who helped with their valuable articles to make this magazine possible. We would also like to thank FAN members and others for helping to make this publication successful. However, the views expressed by contributing writers not necessarily represent the view of FAN.

This year, we have added a few articles on tissue culture. Since tissue culture is an integral part of floriculture, we feel that it is necessary for our readers to get a glimpse and idea on tissue culture and its relevance. The tissue culture industry in Nepal has seen steady development in last few years. A few private laboratories are involved in this industry. We hope that not only will we be seeing leaps and bounds in floriculture industry due to rapid micropropagation, but also we hope that much needed research on indigenous plants and orchids will be carried out by the concerned agencies.

Hopefully, this will lay a foundation and open up avenues for export of indigenous and other potentially exportable plants.

As floriculture in Nepal is beginning to be recognized by government and other non-governmental agencies as an important industry with immense export potential, in near future, we hope the entrepreneurs would turn the dream into reality.

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पुष्प व्यवसाय एवं उद्यमलाई प्रगतिको पथमा डोच्याउन सक्रिय रहेको
फ्लोरिकल्चर एशोशियशन नेपालद्वारा आयोजित वसन्त व्यापार मेला
२०५४ को सफलताको कामना गर्दछौं ।

Flora Farms

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नेपालमा पुष्प व्यवसायलाई हरसम्भव विस्तार र विकास गर्न लागिपरेको
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२०५४ को सफलताको कामना गर्दछौं ।

Women In Floriculture

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फ्लोरिकल्चर नेपालद्वारा आयोजित
वसन्त पुष्प व्यापार मेला
२०५४ को सफलताको कामना गर्दछौं ।

Om Sai Nursery

Bansbari, Kathmandu, Tel: 372235

A Note on Nepalese Orchids

Jnan Hankay Rai

We have in Nepal about 350 species of orchids under 90 genera spread over different climatic and edaphic conditions. The common people call them 'Sunakhari' or 'Sungava'. This is a collective name for the entire family unlike the botanical names. A few species of horticultural and commercial interest has been chosen and their names given below against the region they come under.

Upper Temperate to Sub-Alpine

Cirrhopetalum wallichii, *Spathologottis ixiioides*, *Cymbidium grandiflorum*, *C. grandiflorum* var. *hookerianum*, *Habenaria susanne*, *Coelogyne corymbosa*, *Calanthe chloleuca*, *Pleione humilis*, *P. hookeriana*, *P. praecox*.

Temperate

Coelogyne criatata, *C. elata*, *C. ochracea*, *C. nitida*, *Dendrobium chrysanthum*, *D. densiflorum*, *D. devonianum*, *D. nobile*, *D. heterocarpum*, *Cymbidium giganteum*, *C. longifolium*, *C. eburneum*, *C. gammieanum*, *C. mastersii*, *C. lancifolium* (miniature), *C. cyperifolium*, *Arachnanthe cathcartii*, *A. clarkei*, *Arundina graminifolia*, *Eria coronaria*, *Phaius wallichii*, *Vanda cristata*.

Sub-Tropical - Tropical Region

Dendrobium formosum, *D. transparens*, *D. pierardi*, *D. primulinum*, *Aerides multiflorum*, *Cymbidium aloifolium*, *C. pendulum*, *C. munronianum*.

Commercial Importance

Orchids with their varied qualities stand second to none of their rivals of commercial and horticultural importance. It holds and will continue to hold its commanding place for cut flowers throughout the world. Its wonderful forms in bright sepals and petals, its fantastic shape and depth in shade of colour, its richness of charming arrangement, erect stems, and last but not the least, the heart beating effect presented by the blooms in a harmonious combination win the heart of growers, admirers, and lovers. Its eternal and pleasant creativity zealously bring peace and happiness to human beings, and shed their lives in the desert air to come up again.

Participation, and a Plea for its Promotion

In view of these plus points of orchids, the writer has rightly taken to its promotion by using methods and means of Science and Technology including hybridisation and tissue culture. Potential stock plants from the

above list have also been earmarked for their use in hybridisation with the highly prized orchids of the outside world. Some *Cymbidiums* and *Paphiopedilums* of class have been imported from outside to help promote the objective, and the writer feels it will not be too long before the outcome of result for Nepal.

It is to be noted with pride and pleasure that the government and for that matter the Department of Plant Resources with its Herbarium in Godawari has been doing its part for the general public by imparting technology in tissue culture for orchids as well as for the potential plants under agriculture and gardening. The co-operation and co-ordination of the Orchid Society of Nepal for the advancement of orchids are also very much there. A recent announcement of the government, inviting researchers and collectors for their co-operation in finding and preservation of rare plants including orchids reached us as a pleasant surprise. This is, the writer feels, as it should be. But unfortunately, much remains to be done in the domain of Science and Technology. Science, despite the loud voice of performance, has not been able to streamline its motivation. Consistency is wanting as it has not reached the common people.

A Note on Rarity of Orchids

Nature itself brings rarity in orchids. In the common parentage of

orchids some time by accident or due to intricacies or genetical make up in plants, a rare variety emerges and grows side by side with the normal parentages. The writer prefers to call it 'one in a million' or 'uncommon of the common'. The orchid lovers in course of their visit to the neighbouring forest must have seen a common orchid called *Coelogyne ochracea* in white flowers holding on to the branches of trees during March-April with a yellow lip. In the collection of the writer there emerged an exceptionally new variety in the progeny with entirely ivory white flower without the splash of yellow lip. The same is with *Coelogyne nitida* which grow side by side with the former. These two come under indigenous type.

But species of *Paphiopedilum insigne* of Assam-Myanmar introduced to Nepal and grown by the writer also produced the following rare varieties. We take up that to the nature.

The rare varieties under the progeny are:

1. *Paphiopedilum insigne* cultivar *sanderae*
2. *Paphiopedilum insigne* cultivar *Harefield Hall*
3. *Paphiopedilum insigne* cultivar *Sanderianum*

In the progeny of *Paphiopedilum villosum* another variety offered by nature is:

1. *Paph. villosum* cultivar *Boxalli*.

Common Diseases of Garden Roses

V. Manandhar

Roses are widely cultivated flowers. The rose cut flowers are most popularly used in flower arrangements and hence have greatest demand in flower market. According to business plan for rose cut flowers published by Floriculture Association of Nepal, 1996, the demand in Kathmandu valley is about 3000 rose sticks per day. But the local production fulfils 50% of the demand for 7 - 8 months only and the rest are met through import. From these data, there seems to be ample scope of rose farming. Because of the sufficient scope, the interest of flower growers towards the rose cultivation is increasing rapidly. But despite of their hard work, the farming is not being fully successful due to the various diseases subjected to this crop. For getting healthy crop, every rose grower should know about the common diseases attacking roses and their controlling measures.

In course of investigation on fungal diseases of ornamental plants of Kathmandu valley, four fungal diseases of rose have been found. These diseases and their controlling measures, are described below.

1. Black Spot

The black spot appears as small to large circular, black lesions on the

leaves. The spots at first appear as purple - red coloured spots, later darkened to black with fringed margins. These spots later coalesce to produce large irregular black lesions and the marginal tissue of the lesions turn yellow. In case of severe infection, entire leaf becomes yellow and fall off.

The causal agent of this disease is *Diplocarpon rosae*. This fungus produces spores throughout the growing season and cause the repeated infection. The spores and the mycelium overwinters in the infected plant debris which infect the newly appearing leaves in the spring time.

Control: Lime sulphur spray before starting the growth in spring or at the first appearance of the black spots is effective. In case of severe infection, various fungicides such as Captan, Zineb, Ferban etc. should be sprayed weekly throughout the season. Infected parts should never be left in the ground as these are the main infecting causes. Disease resistant varieties of roses should be used as far as possible.

2. Botrytis Blight

The *Botrytis* blight is probably the most common and widely distributed fungal diseases of rose. This disease appear as blossom blight. The

fungus produces a noticeable grey mold layer over the flower bud. The infected bud turns brown and fail to bloom. The outer petals also turn brown to tan - coloured. Bloom blight later leads to fruit and stem rots. Greyish cankers grow down the stems from the infected buds and shoots start die back.

The fungus responsible for this disease is *Botrytis* sp. In cool humid weather, the fungus produces large number of spores which cause further infections. The mycelium grows very fast and invades the floral part. After severe infection, the whole inflorescence is covered with the mold layer and rotting of the infected part begins. In the winter season, the fungus survives in the soil and the decaying plant materials. When the growing season or the spring comes, the fungus infect the healthy plant.

Control: All the infected parts should be removed and burnt. Infected parts should never be left in the field for decaying, because these decaying debris carry the fungal mycelium,. Lime sulphur or fungicides like Maneb, Captan, Zineb etc. should be sprayed as soon as the disease appears and spraying should be continued weekly.

3. Powdery Mildew

The disease is very common on roses and flower production is reduced due to severe infection of leaves, growing tips and flower buds.

The disease appears at first as slightly raised blister like areas that soon become greyish white powdery layer. As the leaves expand, they become curled and distorted. On the older leaves, larger white patches of fungus growth appear. Young shoots and buds are also infected and covered by the fungus growth. The infected buds either fail to bloom or open properly after severe infection, the whole plant become discoloured, dwarfed and eventually, the plant dies.

The casual organism for this fungus is *Sphaerotheca pannosa*. The white mycelium grows on the leaf surface forming a whitish grey powdery coating. Large numbers of spores, clinging together in chains, are produced, the fungus overwinters in the infected plant debris and in spring, it infects the healthy plant.

Control: Same controlling measures as in case of Black spot should be done. For fungicide spray, Captan is more suitable for this fungus.

4. Verticillium wilt

This disease may be confused with wilting due to the fungal infection or simply due to lack of water. In the case of lack of water, the plant survives after watering, but in case of infection, the plant does not survive.

The fungus causing this disease is *Verticillium* sp. It is soil borne disease

and the pathogen enters the host through roots by direct penetration through root surface or from the damaged parts. The organism grows rapidly inside the plant and damage the whole vascular system causing cell death. The infected plant gradually or suddenly wilts. Leaves become yellow, wither, drop off and the whole plant later dies. The fungus survives in the infected debris and infect the root of other healthy plants.

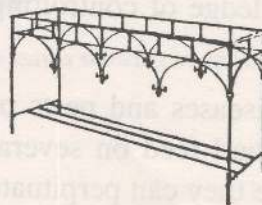
Control: The whole infected plant should be burnt. Disease free plants should be used for plantation. As it is a soil borne disease, plantation should be done in clean well drained soil. Root wounding should be avoided as far as possible. Once this disease appears, replantation should not be done without soil treatment.

नेपालमा पुष्प व्यवसायलाई हरसम्भव विस्तार र विकास गर्न लागिपरेको
फ्लोरिकल्चर एशोशियशन नेपालद्वारा आयोजित
वसन्त पुष्प व्यापारमेला २०५४ को सफलताको कामना गर्दछौं ।

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Control of Pests and Diseases on Rose

Ram Badal Shah

From the time immemorial the rose has occupied the highest place among flowers and is honoured as the queen among them. This is not only because of its fragrance, beauty, decorative value or as it gives pleasure and delight but due to these reasons it also keeps the highest commercial position among flowers. Now a days roses are among the most important cash crop of the world. In Nepal also interest is increasing in rose growing as a cash crop.

Like any other crops roses also face many hazards. Insect pests and diseases are very important ones. Even after good nutritional supply plants get damaged and sick due to the attack of insect pests and diseases, which cause serious economic loss to the growers. Therefore a knowledge of controlling them is essential.

The most diseases and pests of roses also attack and feed on several other plants where they can perpetuate year after year. This makes rather difficult to ensure complete safety of the rose. However the present knowledge of pests and disease control makes it possible to grow and produce good roses. For this, one must know that insect pests and organisms of diseases are completely different and so are there control measures.

Insects have six legs, two pairs of wing (except few, fly, wasp, lice, silver fish etc.), and one pair of antennae. They move and from place to place. They have eyes and mouth on their head. Thus they feed by eating, chewing, biling and sucking. In addition to these insects there are some other organism like mites (with eight legs) and nematodes (leg-less worm) which damage the roses. Depending on their feeding habit effective chemicals are needed for their effective control.

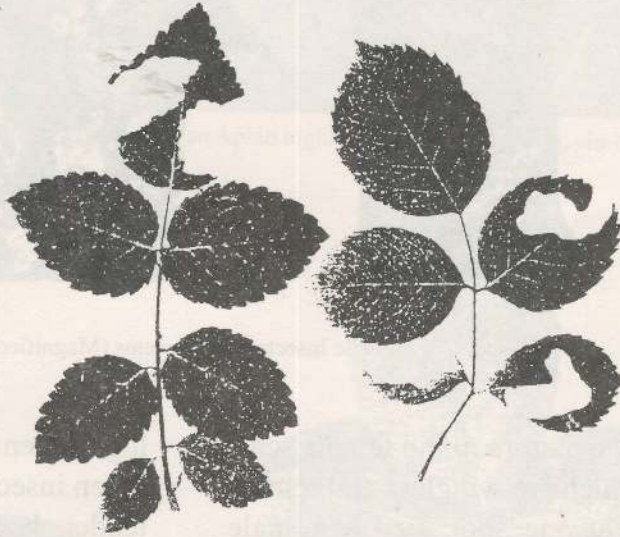
Diseases are caused by various organisms like fungi, bacteria and virus which can not be seen without powerful microscope, we can only see the symptoms on sick plants. Separate chemicals may be necessary to control various diseases. The symptoms of diseases are seen as abnormal appearance, colour, spots of various colours and shape on leaves and stems, powdery look, burning of leaves etc.

Insect Pests

The main pests seriously damage the rose in our country are Chafer beetles, Red scales, Aphids, Jassids (leaf hoppers), other pests damaging roses (sometimes seriously) are Thrips, Mealy Bugs, Mites, Leaf-cutting bees, Digger wasps. In some places Nematodes (microscopic organism) also become a problem.

Chafer Beetles

More attack of rose Chafers are observed during spring and monsoon season. They also feed on many other plants like grape guava etc. They lay eggs in soil where they grow into fleshy-white grub which damages roots. The adults feed on leaves and flowers petals. They defoliate the plants and make the bud and flower useless. They mainly eat at night time and hide among petals during days. (Control measures given in the chart).



Left, a Chafer Beetle (actual size, 11 mm.); right, rose leaves showing irregular cuts and punctures.

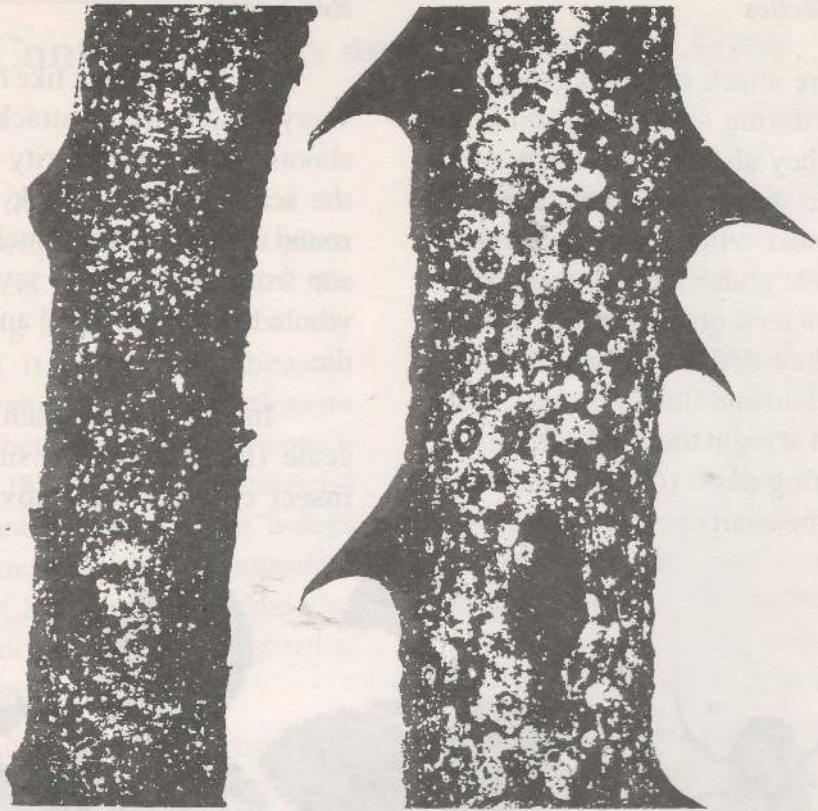


Left, blotching of leaves by Mites; right, a Mite very highly magnified (actual size, microscopic)

Red Scales

Red scales look like redish brown waxy scales. They attack the tender shoots. With the maturity of the shoot the scales form a thick incrustation round the shoots. They suck most of the sap from the plant. In severe cases the whole branch gets dried and ultimately die.

In spring from each of the male scale (longish one) a small winged insect emerges and moves about to



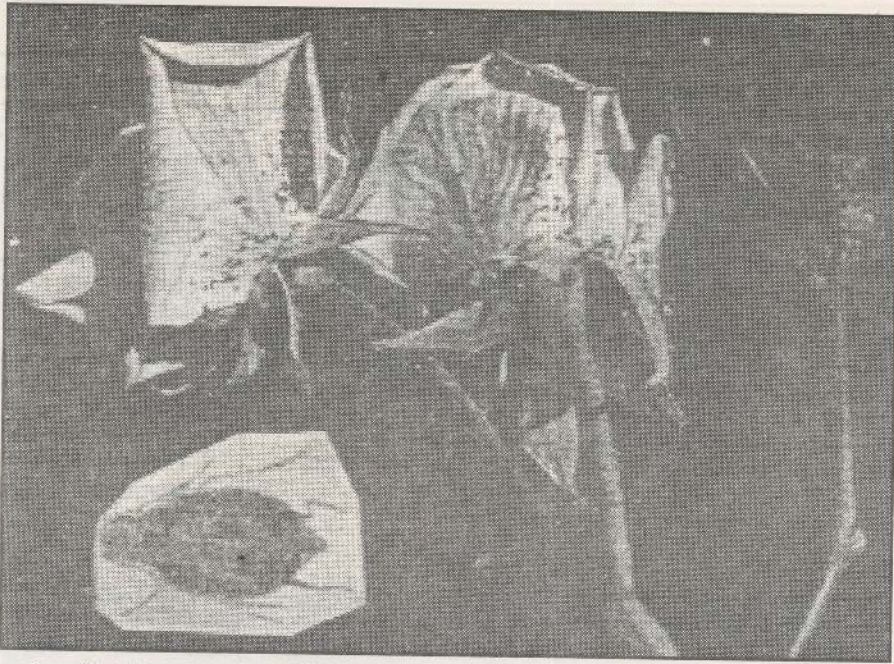
Scale Insects on rose stems (Magnified)

fertilize the mature round female scale insects which are wingless and remain attached at one spot. Fertile female produces a number of young crawlers which move or blown by wind to new shoots. Fresh cycle of starts in autumn. This insect attacks 86 species of plants like apple, banana, citrus, coconut, mango etc. (Control measures given in the chart).

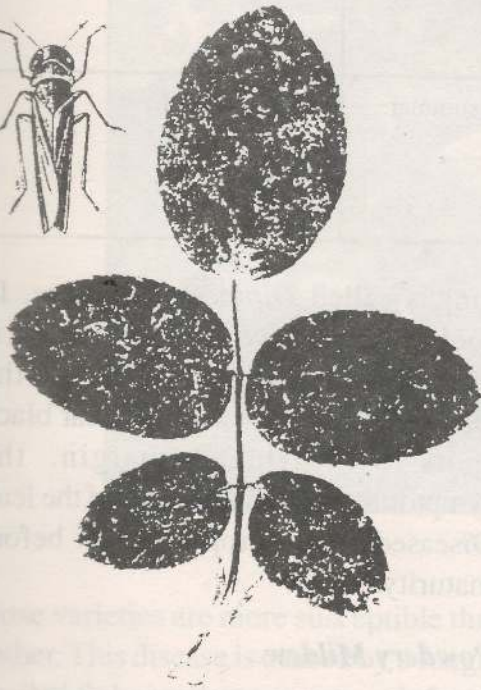
Aphids

They are also called plant-lice
Aphids are minute but more prominent,

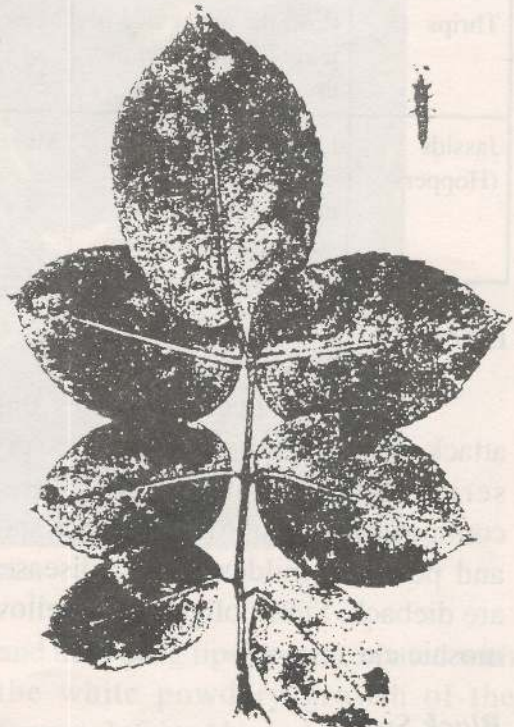
high-green to deep-green and blackish-green insects. They occur in cluster on tender shoots, buds and flowers. They also attack numerous other plant species. Aphids suck the plant sap so much that the growth is reduced to minimum, leaves get badly curled and twisted. Ultimately the attacked part dies. The attacked buds eat distorted and makes the flower useless. They are active throughout the year except in too hot or too cool weather. (Control measures given in the chart).



Colonies of Aphids on petals and buds; *inset*, an Aphid highly enlarged (actual size, pin-head)



Yellowish-white patches on leaves, caused by Jassids; *top*, a Jassid highly enlarged (actual size, pin-head)



Rasped and distorted leaves with black spots owing to injury caused by Thrips; *top*, a Thrip highly enlarged (actual size, pin-head)

Chart: Main Pests and their Control

Pests	Most Active Period	Nature of Damage	Major Control Methods
Chafer Beetles	More attack during spring and monsoon season.	Adults feed on leaves at night irregular cuts and punctures in leave.	Dizainon (Basudin) 20% EC 5CC or 1-5 teaspoonfull per lit. of water, 2-3 sprays at 15 days intervals.
Red Scales	More active in spring autumn.	Attack the tender shoots and stems, infected portions get covered with white layer of redish brown waxy scales.	Malathion 50% EC, 2CC or Fenitrothion 50% EC, 2CC or Metasystox 2CC per lit. of water, 2 sprays at 15 days intervals. Timate granules 10-25 gms/plant soil application after rain and in the end of winter.
Aphid	Bud and flower get diosigured and wither up.	More active in spring.	Malathion, Feritrothion or Diazinon sprays and Thimate G. soil application as given for Red Scale.
Thrips	Rasp the under side of leaves which later dry up.	More active in summer.	Same as Aphid.
Jassids (Hoppers)	Leaves lose natural colour give sickly appearance and subsequently dry up.	More active in summer.	Same as Aphid.

Diseases

There are several diseases that attack roses but some of them are very serious in our country. The most common diseases of roses are black spot and powdery mildew. Other diseases are dieback. Stern blight, rust, yellow mosaic etc.

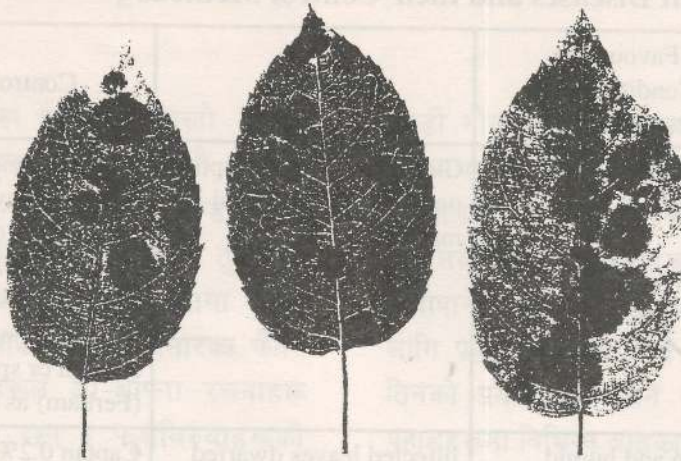
Black Spot

This is a very common disease all over the country. It is caused by a

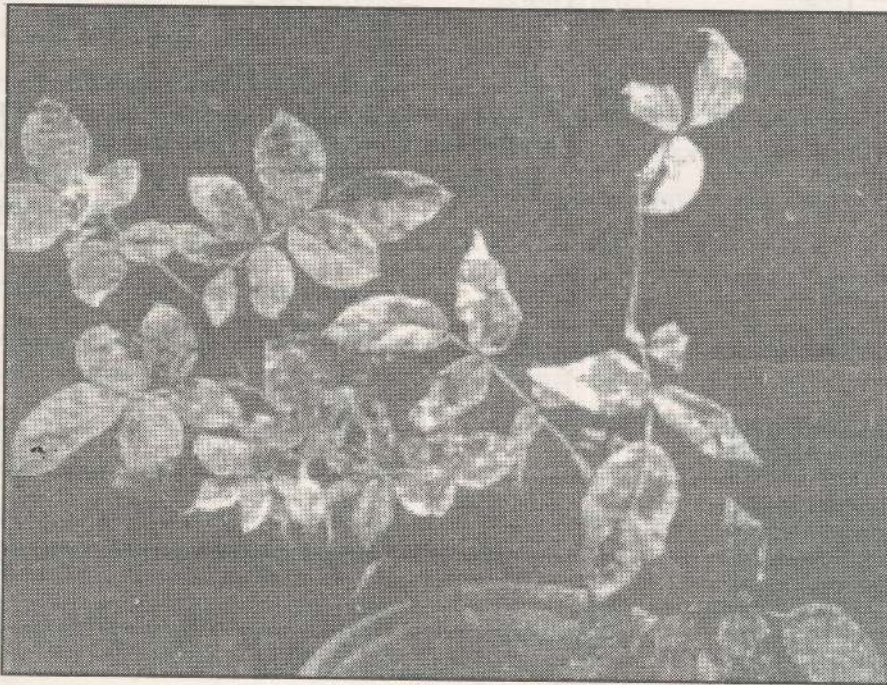
fungus called *Diplocarpon rosae*. In cool and humid weather the disease is more sever. The symptoms of the disease is seen on leaves as clear black spots with fringed margin. the symptoms occur on both side of the leaf. Diseased leaves drop off even before maturity.

Powdery Mildew

Though it is observed very occasionally, but is serious in warm and humid weather with cool night. Some



Black Spot



Powdery Mildew

rose varieties are more susceptible than other. This disease is caused by a fungus called *Sphaerotheca pannosa*. Infected younger leaves get curled exposing the lower surface where raised blister-like areas are found. Later the leaf surface

and the young tips become coated with the white powdery growth of the fungus. Infected buds do not open, the petals get discoloured, dwarfed and finally die. (Control measures given in the chart).

Chart: Important Diseases and their Control Methods

Diseases	Favourable Conditions for diseases occurrence	Symptoms	Control Measures
Black Spot (<i>Diplocarpon rosae</i>)	Cool and humid weather.	Clear circular black spots on leaves with fringed margins.	Collected and burn the fallen leaves. Spray Captan 0.2% particularly on the under side of leaves at 7-15 days intervals as soon as the disease appear. 3-4 sprays are enough or spray Hexaferb (Ferbam) as above.
Powdery Mildew (<i>Spharotheca pannosa</i> var. <i>rosae</i>)	Warm and humid weather with cool night.	Infected leaves dwarfed and curred, white to grey powdery surface of leaves, buds get distorted and may not open.	Captan 0.2% or Karathan 0.1% or Benlet 0.1% or Bavistin 0.1%. 2-3 spray at 10 days intervals.
Die back (<i>Diplodia rosaram</i>)	Warm humid weather.	Blackening and death of the twigs front tips and cut ends downwards.	Equal parts of copper carbonate and red lead w/w and enough linseed oil to make thick paste (Rose Paint) an apply at cut ends, spray as given under Black Spot.



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सौन्दर्य अभिवृद्धिमा फूलबिरुवा एवं बगैँचाको महत्त्व

डा. गोविन्द टण्डन

फूलबिरुवाहरू ईश्वरको त्यस्तो अनुपम सृष्टी हो जसको तुलना संसारको कुनै वस्तुसँग गर्न सकिँदैन । घाम-पानी, असिना, ठण्डी नभनी आफ्नो समयमा फूलेर अरूलाई आनन्द तुल्याउने विशेषता फूलबिरुवामा छ । फूलबिरुवामा भएको सौन्दर्य र आकर्षणबाट लोभिएर संसारका कैयन कवि, साहित्यकारहरूले आ-आफ्ना रचनाहरू रची अमर बनेका छन् । फूलबिरुवाहरूको सम्बन्धमा कैयन कृतिहरू लेखिसके अझै कति लेखिने हुन् । जहाँ फूलबिरुवा हुन्छन् त्यहाँको वातावरण नै महकिएको हुन्छ । फूलबिरुवाहरूको महत्त्व दिनानुदिन बढ्दो छ । फूलबिरुवाहरू संस्कृति र सभ्यताको प्रतीक बन्न पुगेका छन् । फूलबिरुवामा अन्तर्निहित सौन्दर्य, आकर्षण र सुवासको वयान गर्ने शब्दै छैन भने हुन्छ ।

फूलबिरुवाहरू भएको घर होस् वा कार्यालय वा कारखाना त्यसको गमक नै भिन्नै हुन्छ । त्यसको तारीफ सबैले गर्छन् । फूलबिरुवा वा बगैँचाको रूप-रङ्गले त्यस घरमा बस्ने व्यक्ति वा कर्मचारीहरूको रुचि, स्वभाव र व्यवहारको पहिचान सजिलैसँग गर्न सकिन्छ । जुन घरमा फूलबिरुवाहरू छन् त्यस घरका सदस्यहरू मेहनती छन्, परिश्रमी छन्, सौन्दर्य चाहन्छन्, सर-सफाई र स्वच्छतामा ध्यान राख्छन् भन्ने बुझिन्छ भने फूलबिरुवाहरू नभएको घरका सदस्यहरू त्यसको विपरीत हुन्छन् भन्दा फरक पर्दैन । यसैले घर वा भवनको वरपरको वातावरण हेर्नासाथ त्यहाँ बस्नेहरूलाई सजिलै पहिचान गर्न सकिन्छ ।

नेपालमा विभिन्न किसिमका फूलबिरुवाहरू छन् । यहाँको हावापानीमा विविधता भएको हुनाले

ठण्डी मौसममा हुने बिरुवा पनि पाइन्छन्, गर्मी मौसममा हुने बिरुवाहरू पनि पाइन्छन् । प्रकृतिले नेपाललाई यस्तो बनाइदिएको छ कि यहाँ संसारमा हुने सबै जातका बिरुवाहरू उत्पादन गर्न सक्ने हावापानी र वातावरण छ । यहाँको भूबनोट कसैको लागि प्रकृतिको श्राप होला तर उचित किसिमले तिनको प्रयोग गर्न जाने यहाँका डाँडा-काँडा, पहाडहरूमा विभिन्न जातका फूलबिरुवा रोप्न पाए जनसामान्यको जीवनस्तर माथि उठाउन निकै भरथेग हुन्थ्यो ।

केही समययता नेपालको शहरी क्षेत्रहरूमा फूलबिरुवाको चाख बढ्न थालेको देखिएको छ । कुनै बेला “फूलबिरुवा पनि किन्ने हो र माग्नुपर्छ” या “चोरे फलिफाप हुन्छ” भन्ने संस्कारले जरो गाडेको थियो । आजकल त्यसमा केही परिवर्तन आएको छ । खासगरी २०३० यता काठमाडौँ-खाल्डोमा नयाँ-नयाँ घरहरू निर्माणको एक किसिमले भेलै आयो र त्यसमा पनि ‘मुण्डाशैली’ का विदेशी नक्कलका घरहरू बन्न थालेकाले त्यस्ता घरहरूको बगैँचामा केही न केही फूलबिरुवा लगाउने प्रचलन बढ्नाले फूलबिरुवाले व्यावसायिक रूप लिन थाल्यो । विस्तार-विस्तार नर्सरीहरू खुल्न थाले । त्यसभन्दा अगाडि सौखिनहरूले आफ्ना लागि विभिन्न किसिमका फूलबिरुवाहरू भिन्न-भिन्न स्रोतबाट जम्मा गरेर रहर पुऱ्याउने भएता पनि तिनको बिक्री-वितरण हुँदैनथ्यो भने हुन्छ । त्यस्ता स्रोतहरूमा सत्ताशीन राणा परिवारका सदस्य वा नातागोताहरू र तिनीहरूसँगको पहुँच र जानपहिचान नै प्रमुख थियो । किनभने जङ्गबहादुर राणाको बेलायत भ्रमणपश्चात् फूलबिरुवा र बगैँचाप्रति नपत्याउँदो किसिमले चाह बढ्दै गयो ।

राणा प्रधानमन्त्री चन्द्रशमशेरको पालामा त यो उत्कर्षमा पुग्यो । उनले बनाएको सिंहदरबार आकर्षक बगैँचाको लागि लामो समयसम्म प्रसिद्ध रह्यो । चन्द्रशमशेरका छोराहरूको दरबारहरू पनि बगैँचाको लागि निकै चर्चित थिए । विभिन्न मुलुकहरूबाट आयात गरिएका फूल एवं बिरुवाहरू उनीहरूको दरबारमा हुन्थ्यो । मल्लकालमा दरबारको एक भाग 'भण्डारखाल' को नामले प्रसिद्ध थिए । भण्डारखाल रूख, बिरुवा र बगैँचाको लागि सुपरिचित थिए ।

नेपालमा बनजङ्गलहरूमा अनेक जातका फूलबिरुवाहरू छन् । हेर्दा जङ्गली फूलबिरुवा देखिए पनि तिनलाई उपयुक्त किसिमले स्याहार-सुसार गरी बगैँचामा लगाए शोभा बढाउन कम मदत गर्दैनन् । आजकल बगैँचामा लगाउन उपयुक्त तुल्याइएका कतिपय फूलबिरुवाहरूको पुख्र्रौली बनजङ्गलकै रैथाने फूलबिरुवाहरू हुन् । ठिम्सर (Hybrid) जातको फूलबिरुवा तयार पार्ने प्रविधिको त अझ जङ्गली बिरुवाहरूको महत्त्वलाई उजागर तुल्याएको छ । त्यस्तै गरी ग्राफिटिड एवं वडिड प्रविधिको लागि पनि जङ्गली जातका बिरुवाहरू बरदान सिद्ध भएका छन् ।

फूलबिरुवा खेती नेपालको लागि एक उपयुक्त खेती हुन सक्छ । अहिलेसम्म यसतर्फ त्यत्ति ध्यान दिएको पाइन्न । हाम्रो पूर्वी नेपालको सरहदपारि रहेको कालिम्पोङ, दार्जीलिङ फूलबिरुवा-खेतीको लागि विदेशमा समेत ख्याति प्राप्त छ । त्यहाँ झण्डै डेढ सय वर्षदेखि फूलबिरुवाको खेती हुँदै आएको छ । फूलबिरुवाकै कारण दार्जीलिङ, कालिम्पोङ पर्यटकहरूको लागि प्रमुख आकर्षणको स्थल बन्न पुगेको छ । सँगैको हाम्रो आफ्नो क्षेत्रमा केही गर्न सकेको देखिँदैन । फूलबिरुवा खेतीलाई व्यापक रूपमा लगाउन सरकारी स्तरबाट नीति-नियमहरू बनी तदनुकूलको व्यवस्था गरी स्थानीय

बजार र निर्यातको लागि समेत परिपाटी मिलाउन सके जीवनस्तर उकास्ने काममा धेरै मदत पुग्दथ्यो । अनुकूलको हावापानी, पानीको उपलब्धता र सस्तो मजदुरी तीनै कुराहरू फूलबिरुवा खेतीको लागि सकारात्मक पक्षहरू हुन् । सरकारले सहूलियत र सुविधा उपलब्ध गराइदिएर भए पनि फूलबिरुवा खेतीको लागि मार्गप्रशस्त गरिदिनु उपयुक्त हुन्छ ।

फूलबिरुवाको प्रति दिनानुदिन चाख नेपाली समाजमा खास गरी शहरी क्षेत्रमा बढ्दै गएको भएता पनि यसको व्यापकताको लागि अझै निकै परिश्रम गर्नुपर्ने अवस्था छ । अहिलेसम्म ताजा फूल होस् वा बिरुवा अधिकांश भारतबाटै आयात हुने गरेको छ । यसमा क्रमशः परिवर्तन गर्दै लगी नेपालमा नै आवश्यक पर्ने फूलबिरुवाहरूको उपलब्धता हुने व्यवस्था जतिसक्दो चाँडो गर्न सकियो भने नेपालबाट प्रत्येक वर्ष जसरी करोडौँ रुपैयाँ बाहिर गइरहेको छ त्यो हुने थिएन ।

फूलबिरुवाप्रति अभिरुचि बढाउन एकातिर यसको प्रचलनमा बानी पार्ने गरी विविध उपायहरू अवलम्बन गर्नु जरुरी छ भने अर्कोतिर सरकारी कार्यालय, भवनहरूमा भएको खाली जग्गाहरूमा सिसो उमारेर उराट्लाग्दो तुल्याउनुभन्दा भएका बगैँचेहरूलाई काम दिई फूलबिरुवाहरू लगाउन सके कार्यालयहरूलाई आकर्षक तुल्याउन मदत मिल्नुका साथै फूलबिरुवाप्रति चाख बढाउन पनि सघाउ पुर्‍याउने देखिन्छ । जति कार्यालयहरू स्वच्छ, सफा र आकर्षक हुन्छ त्यत्ति नै कर्मचारीहरू एवं बाहिरबाट कार्यालयमा आउने व्यक्तिविशेषमा अनुशासन र अदवको अपेक्षा गर्न सकिन्छ । एक-दुइ सरकारी कार्यालयहरू छोडेर अधिकांश सरकारी कार्यालयहरूको वरपर बरु बाभो जग्गामा ढड्डी घाँस उमिरहेको हुन्छ त्यसमा फूलबिरुवाहरू रोपी आकर्षक तुल्याउ भन्ने भावना रहेको पाइँदैन । स्रोत नभएको, जनशक्ति नभएको ठाउँको त अर्कै

कुरा हो भएको ठाउँमा पनि कुनै व्यवस्था छैन । अन्तराष्ट्रिय निकायका नेपालमा रहेका कार्यालयहरू फूलबिरुवाहरूले गर्दा हराभरा र सुन्दर देखिन्छ बाहिरबाटै । बाहिरी वातावरण स्वच्छ र सफासुगन्धर हुनाले कार्यालयमा अनुशासन, शिष्टाचार सबैको प्राण भएर रहेको देखिन्छ ।

यस्तै अवस्था हाम्रा कलेज र विश्वविद्यालय-हरूको छ । बरू व्यक्तिविशेषले सञ्चालन गरेका विद्यालयहरू आकर्षक र सुन्दर छन् । उच्च शिक्षा आर्जन गर्ने विद्याका केन्द्रहरूको अवस्था बडो नाजुक छन् । भर्खरै स्थापित कलेज र विश्वविद्यालयलाई छोडेर अधिकांशको भौतिक रूप दयनीय देखिन्छ । यसतर्फ न विश्वविद्यालय प्रशासनको न कलेज प्रशासनको नै ध्यान पुगेको पाइन्छ । राम्रोभन्दा राम्रो फूलबारी, बगैँचा बनाउन सकिने जग्गाहरू यसै खेर गइरहेको देखिन्छ । भएको स्रोतहरूलाई मात्र केही उपयोग गरेर केही गरूँ भन्ने भावना राख्ने हो भने कार्यालय, विद्यालय, कलेज, विश्वविद्यालयका खेर गइरहेका जग्गाहरूको उपयोग हुन गई सौन्दर्य अभिवृद्धिमा सहयोग पुग्ने थियो ।

शहरी क्षेत्रहरूका मूलसडकको दायाँ-बायाँ र बीचका जग्गा (ट्रफिक आइल्याण्ड) दुरुपयोग भएर शहरको वातावरण नै बिग्री रहेको जो कोहीले अनुभव गरिरहेका छन् । यसमा राजधानी काठमाडौँकै कुरा लिऊँ जति सुकै “स्वच्छ हराभरा स्वस्थ काठमाडौँ” भन्ने नारा लिए पनि यसतर्फ कुनै पहल हुन सकेन । सडकको छेउछाउका यस्ता जग्गाहरूलाई उपयोग गरी सुन्दर फूल-बिरुवाहरू भएको आकर्षक स्थलहरू बनाउन प्रायोजनको खाचो नपर्ला जस्तो लाग्छ । तर यस्तो भइरहेको छैन । त्रिभुवन अन्तराष्ट्रिय विमानस्थल-देखि काठमाडौँशहर आउने सबै मूलसडकहरूको अवस्था हेरिनसक्नु छ, त्यस्तै चक्रपथको दायाँ-

बायाँका खाली ठाउँहरूको अवस्था छ । काठमाडौँलाई यदि हराभरा र सुन्दर तुल्याउने हो भने यस्ता खाली जग्गाहरूको उपयोग फूलबारी, ल्याण्डस्केपिङ एवं आकर्षक बगैँचाको रूपमा गर्नुपर्ने हुन्छ । हामीमा एउटा धारणाले जरो गाडेर बसेको छ “यस्ता खुला ठाउँमा पनि फूलबिरुवा रोपेर हुन्छ चोरिइ हाल्छ नि !” । यो केही हदसम्म सार्थक होला तर कुनै कामै नगरीकन यस्तो टीकाटिप्पणी गर्नुभन्दा गरेर हेर्दै गएपछि त्यसको उपायहरू अधिल्लिर आइहाल्छन् भन्ने सम्झ्ने नै केही काम हुन सक्ला । अन्यथा केही सार्थक कामै नहुने हुन्छ ।

यदि नेपाललाई सुन्दर र आकर्षक बनाउने हो भने यस्ता अनेकौँ कार्यक्रमहरू तर्जुमा गरी कार्यान्वयन गर्नु आवश्यक छ जसबाट शहर, बस्ती र गाउँहरू मनमोहक देखिँयुन । शहरी क्षेत्रहरूमा नगरपालिका, उपनगरपालिका एवं महानगर-पालिकाहरूले आफ्नो वार्षिक बजेटको कमसेकम बीस-पच्चीस प्रतिशत शहरलाई फूलबिरुवा, बगैँचा र ल्याण्डस्केपिङको माध्यमबाट सुन्दर तुल्याउन नियमित कार्यक्रम सञ्चालन गर्ने व्यवस्था नितान्त आवश्यक भइरहेको महसुस हुन्छ । यसरी शुरूवात भएमा फूलबिरुवाप्रतिको आकर्षणमा अरू अभिवृद्धि हुन गई आन्तरिक बजारको विस्तार हुन गई फूलबिरुवाको खेतीलाई मानिसहरूको रुचि बढ्नेछ र यसले व्यक्ति, समाज र राष्ट्र तीनैलाई आर्थिक उन्नतिमा लग्नेछ यसमा शङ्का छैन । खाद्यान्न बालीभन्दा फूलबिरुवा खेतीले निश्चित रूपमा ज्यादा आर्जन गराउँछ । केवल यति हो कि आन्तरिक बजार पहिले विस्तार हुनुपर्छ त्यसपछि बाह्य बजार स्वतः बढ्दै जान्छ । वर्तमान मौजुदा अवस्था न आन्तरिक बजारले धान्न सक्ने किसिमको छ न बाह्य बजारको लागि त्यस अनुकूलको स्तर एवं परिमाणमा नै केही काम हुन सकेको छ ।

हिजो आज बगैँचा बनाउने तथा ल्याण्डस्केपिङ गर्ने काममा केही बढोत्तरी हुँदै गएको देखिएको छ । यस्तोमा समुचित योजनाको आवश्यकता पर्दछ । केवल फूलबिरुवाले मात्र पनि बगैँचा राम्रो बन्ने होइन न रूखबिरुवा, दूबो वा चौरहरूले मात्रै पनि बगैँचा बन्ने हो । यसमा सबैको सन्तुलन आवश्यक हुन्छ । भोलि गएर घर-भवनलाई असर पार्ने गरेर पनि रूखबिरुवाको चयन गर्नु हुँदैन । एक त बगैँचालाई सकेसम्म प्राकृतिक र सरल बनाउनुपर्छ । अर्को भविष्यमा गएर दुःख नदिने, घर नढाक्ने, बगैँचा नछोप्ने किसिमका बिरुवाहरूको छनौट जरुरी हुन्छ ।

सडक छेउछाउमा देवदारका रूखहरू लगाइनु युक्तिसङ्गत हुँदैन न सल्ला र जङ्गली बिरुवाहरू नै तर आजकल यसले फेसनको रूप लिँदैछ । केही समय राम्रो जस्तो देखिए पनि भविष्यको लागि त्यसले धेरै दुःख दिन सक्छ । हुँदाखाँदाको रूखबिरुवालाई काट्नु पर्ने हुन्छ । यसैले पहिले नै विचार पुऱ्याउनु आवश्यक छ । हालै बानेश्वर वीरेन्द्र अन्तराष्ट्रिय सभागृहको पश्चिममा काठमाडौँ

महानगरपालिकाको सहयोगमा सडकछेउमा फूलबिरुवासहितको ल्याण्डस्केपिङको काम भएको छ । तर त्यहाँ पनि त्यही गल्ती हुन गएको छ । देवदारका झण्डै पच्चीसवटा वृक्षहरू पाँच-पाँच फीटको दूरीमा लगाइएका छन् । जबकि यो वृक्ष ठूलो भएपछि झण्डै ३०-३५ फीट अग्लो हुन्छ र यसले झण्डै २५-३० फीटको व्यास क्षेत्रलाई ओगट्छ । बिरुवाको प्रकृति र स्वभावअनुसार नै त्यसलाई उपयुक्त ठाउँमा लगाउनु पर्ने कुराको हेक्का नराखिए त्यसले कालान्तरमा सम्पूर्ण क्षेत्रलाई नै असर पार्ने हुन्छ । केशरमहल अगाडिको बगैँचामा रोपिएका विशाल वृक्षहरू यसैका उदाहरणहरू हुन् ।

सङ्क्षिप्तमा फूलबिरुवा तथा बगैँचाहरूको विस्तार गर्दै लगी हरियालीको संरक्षण, संवर्द्धनमा शहरी क्षेत्रहरूले प्रमुख भूमिका निर्वाह गर्न सक्छन् । साथै नेपालको परिप्रेक्ष्यमा यसलाई अझ बढी उपयोगी हुने गरी योजना बनाइनु आजको सन्दर्भमा ज्यादै जरुरी भइसकेको अनुभव हुन्छ ।

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नेपालमा पुष्पव्यवसाय

भुवनेश्वर शर्मा

नेपालमा पुष्प व्यवसाय अहिले एक आकर्षक 'पुष्प उद्योग' को रूपमा स्थापित हुनपुगेको छ । फूलबिरुवाप्रति मानिसको अभिरुचि दिनप्रति दिन बढ्दो छ । यही जनचासो र बढ्दो अभिरुचिको फलस्वरूप काठमाडौँ र काठमाडौँ बाहिरका शहरहरूमा एक सयभन्दा बढी निजी फूलबिरुवा उत्पादक नर्सरीहरू स्थापना भएका छन् । जसको ४० प्रतिशत नर्सरीहरू काठमाडौँमा रहेका छन् ।

अव्यवस्थित शहरीकरण, बढ्दो जनसङ्ख्या र औद्योगिकीकरणको कारणले शहरबाट हास भइरहेको हरियालीको अभावलाई परिपूर्ति गर्न आफ्नो, बगैँचा, घरको छत र घरभित्रसमेत फूलबिरुवाहरू रोप्ने क्रम द्रुततर बढिरहेको छ ।

सन् नब्बेको दशकमा नर्सरी व्यवसायीहरूले नेपालको पुष्प उद्योगलाई व्यवस्थित गरी उद्योगको रूपमा स्थापित गर्ने उद्देश्यले "नेपाल पुष्प व्यवसायी सङ्घ" नामक सस्था खडा गरेपछिका वर्षहरूमा नेपालको पुष्प उद्योगमा उल्लेखनीय प्रगति भयो र उनीहरू नर्सरी व्यवसायलाई प्रतिष्ठित उद्योगको रूपमा स्थापित गर्न सफल भए ।

केही वर्षअगाडि नगण्य अपवादलाई छोडेर ठूला होटेल, विदेशी नियोग र राजदूतावासहरूमा काम गर्ने मालीहरूले अपनाएको यो व्यवसायमा अहिले ठूला लगानीकर्ताहरूको समेत आकर्षण बढेको छ ।

देवीदेवताका मन्दिरहरूमा र विशेष अवसर तथा समारोहमा मात्र प्रयोग हुने फूल यस्तो प्रतिष्ठित उद्योगको रूपमा स्थापित हुनु व्यवसायी तथा सर्वसाधारणको लागि खुशीको विषय हो । शहर

बजारमा दैनिक सजावटका फूल किन्ने र घर, कोठा, बैठक, टेबल आदि सजाउने चलन सामान्य भएको छ ।

अस्पतालमा आफ्ना बिरामीलाई भेट्दा होस् वा बिमानस्थलमा आफन्तहरूको आगमन र विदाइमा, फूलका गुच्छा र बुकेहरू उपहार दिएर भेट्ने चलन अहिले लोकप्रिय भएको छ । जन्म-मृत्यु फूल बराबर महत्त्वको सुन्दर वस्तु हो ।

बिरामीलाई पोषणयुक्त खानेकुरा र फलफूल लिएर भेट्न जाने आफन्तहरूले ती चीजहरू उपहार दिन छाडेका छन् । हालका वर्षहरूमा फूलका बुकेहरूले बिरामी आफन्तका शीघ्र स्वास्थ्यलाभको कामना गर्ने नयाँ परम्पराको शुरुवात भएको छ । बिरामीलाई ताजा फूल उपहार दिँदा र उनीहरूको सामुन्ने फूल राखिदिँदा उनीहरूको स्वास्थ्यमा मनोवैज्ञानिक असर पर्न गई बिरामीहरू शीघ्र स्वास्थ्यलाभ प्राप्त गर्दछन् ।

फ्लोरिकल्चर एशोशियशन नेपालले यस वर्ष आउँदा चैत्र २८ गतेदेखि ३१ गतेसम्म भृकुटीमण्डप प्रदर्शनीहलमा चौथो पुष्प व्यापार मेलाको आयोजना गर्न गइरहेको छ । यस संस्थाले विगत पाँच वर्षदेखि प्रत्येक वर्ष पुष्प प्रदर्शनी तथा व्यापारमेलाको आयोजना गर्दै आइरहेको छ । पुष्प प्रदर्शनी हिसाबले हुन गइरहेको यो पुष्प मेला छैटौँ र व्यापार मेलाको हिसाबले चौथो हो ।

यस पटकको व्यापार मेलामा आन्तरिक उत्पादनलाई प्राथमिकता दिने, अधिकांश नर्सरीहरूको सहभागिता जुटाउने, व्यवसायमा आधारित विभिन्न सूचना सङ्कलन गरी, उद्योगलाई

थप व्यवस्थित गर्ने र निकासीका सम्भावनाहरूको अध्ययन गर्ने आदि कार्यक्रमहरू राखेको छ ।

६ वर्ष पहिले नेपाल राजकीय प्रज्ञा-प्रतिष्ठानमा पुष्प प्रदर्शनी हुँदा नर्सरी व्यवसायीहरूको कम सहभागिता र सर्वसाधारणको न्यून चासो रहेको थियो । सहभागिता जुटाउनको लागि नर्सरीहरूमा पटक-पटक जाँदासमेत उनीहरूलाई प्रदर्शनीको महत्त्वको बारेमा विश्वास दिलाउन कठिन भएको थियो । यसलाई दृष्टिगत गरेरै निःशुल्क ढुवानीको व्यवस्था गर्दा समेत कम नर्सरीहरू सहभागी भएका थिए ।

त्यसपछिका वर्षहरूमा नर्सरी व्यवसायमा व्यापक सुधारोन्मुख परिवर्तनहरू भए । यस उद्योगलाई प्रवर्द्धन गर्ने उद्देश्यले सङ्घले प्रत्येक वर्ष व्यापार मेलाको आयोजना गर्दै आयो र राजधानीबाहिर छरिएर रहेका नर्सरीहरूलाई समेत एकत्रित गरी व्यापार मेलाहरूमा सहभागी बनायो ।

सन् १९९५ मा गरिएको प्रथम पुष्प व्यापार मेलामा ७ लाख रुपैयाँको प्रत्यक्ष बिक्री र २ लाख रुपैयाँको अर्डर सङ्कलन गरिएको थियो भने करिब १० हजार दर्शकहरूले मेलाको अवलोकन गरेका थिए । त्यसै गरी सन् १९९६ मा गरिएको द्वितीय व्यापार मेलामा १० लाख ५० हजारको प्रत्यक्ष बिक्री र ९ लाख ५० हजार रुपैयाँको अर्डर सङ्कलन गरिएको थियो । १५ हजार दर्शकले मेलाको अवलोकन गरेका थिए ।

सन् १९९७ मा आयोजना गरिएको तृतीय व्यापार मेलामा ८ लाखको प्रत्यक्ष बिक्री र १ लाखको अर्डर सङ्कलन गरिएको थियो भने १० हजार दर्शकहरूले प्रदर्शनी अवलोकन गरे । ३५ नर्सरीहरूले व्यापार मेलामा भाग लिए ।

उक्त मेलामा विगतमा जस्तो उत्साहजनक

व्यापार हुन सकेन । चैत्र-वैशाखमा गर्नु पर्ने प्रदर्शनी आषाढमा गर्नु पर्दा सर्वसाधारण तथा ग्राहकहरूको कम सहभागिता हुनुका साथै यो समयमा फूलहरू पनि कम फुल्ने हुँदा उत्साहजनक बिक्री हुन सकेन भन्ने पुष्प व्यवसायीहरूको राय थियो ।

सर्वसाधारणको फूलबिरुवाप्रतिको बढ्दो अभिरुचि र व्यवसायीहरूको उत्साह हुँदाहुँदै पनि नेपाल आन्तरिक उत्पादनमा आत्मनिर्भर हुन सकेको छैन । आन्तरिक मागको करिब ६० प्रतिशत पुष्पजन्य उत्पादनहरू भारतबाट आयात गरी परिपूर्ति गरिन्छ । अधिकांश आयात हुने फूलबिरुवाहरूमा गुलाब, वेगमवेली, हिविस्कस, एराकोरिया, एरिकापाम, डाइफनवेचिया, साइकस पाम, चाइनापाम र अन्य सजावटी बिरुवाहरू पर्दछन् । त्यसै गरी गुलाब, ग्लाडियोलस, एन्थरियम र सुनगाभा जातका फूलका कट-फ्लावरको मागको आपूर्ति पनि आयातबाट नै गरिन्छ । यसको पनि आयात अंश ६० प्रतिशत नै रहेको छ ।

नेपाल फूलउत्पादनमा आत्मनिर्भर हुन नसकेको कुरालाई ध्यानमा राखेर केही पुष्प उद्यमीहरूले कृषि उद्यम केन्द्र र फ्लोरिकल्चर एशोशियशन नेपालको आर्थिक तथा प्राविधिक सहयोगमा यातायातको राम्रो सुविधा भएका पूर्वी तराईका केही ठाउँहरूका साथै काठमाडौँ र धादिङमा पनि फूलबिरुवाहरू उत्पादन शुरू गरेका छन् । धादिङ, चितवन, हेटौँडा, वीरगञ्ज, जनकपुर, भद्रपुर आदि ठाउँहरूमा उत्पादन शुरू भएको छ । विशेष गरी कटफ्लावरहरूमा ग्लाडियोलस र गुलाब उत्पादन गर्ने लक्ष रहेको छ ।

नेपालमा उपयुक्त हावापानी र माटो पाइने हुँदा फूलको मागलाई विचार गरेर संसारका सबै

ठाउँमा उत्पादन हुने फूलबिरुवा उत्पादन गर्न सकिन्छ । यसो गर्न सकेमा नेपाल फूल उत्पादनमा आत्मनिर्भर भई आयात व्यापारलाई रोक्न सकिन्छ ।

वि.सं. २०५१ सालमा गरिएको एक सर्वेक्षण मुताबिक काठमाडौं उपत्यकामा वार्षिक २ करोड फूलबिरुवाको बजार छ । तर यो रकम अहिले निकै माथि पुगेको छ । राजधानीबाहेक बाहिरका ठाउँहरूमा पनि बढ्दो पर्यटकीय क्रियाकलापले गर्दा फूलबिरुवाको बजारको विस्तार भइरहेको छ भने सर्वसाधारणमा समेत यसको प्रभाव परेको छ । पोखरा, चितवन, विराटनगर, धरान, वीरगञ्ज, हेटौँडा, जनकपुर, भैरहवा, बुटवल जस्ता ठाउँहरूमा फूलबिरुवाप्रतिको आकर्षण बढिरहेको छ ।

नेपालमा फूलबिरुवाको आन्तरिक बजार विस्तार भइरहेको छ । यस व्यवसायलाई उद्योगको रूपमा प्रवर्द्धन र थप विस्तारको लागि बजार व्यवस्था अनुरूप, उत्पादकहरू, होलसेलरहरू र रिटेलरहरूको व्यवस्थित बजार स्थापना गरी यो उद्योगलाई अगाडि बढाउनु अपरिहार्य भइसकेको छ ।

आन्तरिक मागको आपूर्तिमा आत्मनिर्भर भएपछि मात्र हामी निर्यात व्यापारको बारेमा सोच्न सक्दछौं । यसको लागि उद्योगमा विद्यमान समस्याहरूको पहिचान गरेर तिनको निराकरणको उपाय खोजिनु पर्दछ । देशको ठोस उत्पादन आधारको विकास एवं विस्तार गरिनु पर्दछ । निकासीको लागि आवश्यक पूर्वाधारहरूको सिर्जना एवं विकास गर्नु आवश्यक हुन्छ ।

पुष्प उद्योगमा नयाँ प्रविधि, पूँजी प्रवाह, प्रतिस्पर्धात्मक स्थितिको सामना, व्यवस्थापकीय कुशलता, दक्ष जनशक्तिको उत्पादन, गुणस्तर, शीतघर इत्यादिको व्यवस्थाको लागि संयुक्त

लगानीतर्फ उपयुक्त विदेशी लगानीकर्तालाई संलग्न गराउन सकेमा नेपाल निर्यात व्यापारमा सफल हुन सक्दछ । यसको लागि सरकार, लगानीकर्ता, व्यवसायीहरूको समन्वय हुनु जरुरी छ ।

भौगोलिक विविधताले गर्दा नेपालमा विभिन्न प्रकारको हावापानीमा हुने फूलबिरुवा उत्पादन गर्न सकिन्छ । यही कारणले गर्दा नै नेपालले वर्षेभरि फूलबिरुवा उत्पादन गरी आन्तरिक तथा वाह्य बजारमा पठाउन सक्दछ । अन्य विकसित देशहरूको तुलनामा विकाशोन्मुख देशमा श्रमशक्ति सस्तो हुने हुँदा उत्पादन मूल्य कम हुन गई नेपाली उत्पादनले अन्तराष्ट्रिय फूलको बजारमा प्रतिस्पर्धा गर्न सक्दछ ।

विश्वमा फूलको पैठारी गर्ने प्रमुख राष्ट्रहरू जापान, जर्मनी, संयुक्त अधिराज्य र हङकङमा समेत नेपालको सीधा हवाई सम्पर्कबाट पनि नेपालको निर्यात सम्भावना प्रबल रहेको छ ।

वर्तमान अन्तराष्ट्रिय बजारमा फूलको व्यापारले महत्त्वपूर्ण स्थान ओगटेको छ । फूल आर्थिक दृष्टिकोणले निकै सम्भाव्य, आकर्षक र कतिपय कृषिजन्य तथा व्यापारिक वस्तुको तुलनामा बढी लाभप्रद वस्तुको रूपमा देखापरेको छ । विश्व पुष्पबजारमा नेदरल्याण्ड सबैभन्दा ठूलो निर्यातकर्ता र जर्मनी सबैभन्दा ठूलो आयात गर्ने राष्ट्रहरू हुन् । विश्व निर्यातको करिब ७० प्रतिशत भाग नेदरल्याण्डले ओगटेको छ । अग्रपङ्क्तिका अन्य फूल निर्यातक देशहरूमा केन्या, कोलम्बिया, इटाली, इजरायल, स्पेन, फ्रान्स, यू.एस.ए. र थाइलैण्ड पर्दछन् ।

पुष्प उद्योगको प्रवर्द्धन र निर्यातोन्मुख पार्नेतर्फ श्री ५ को सरकारको सम्बन्धित निकायबाट केही उल्लेखनीय प्रयासहरू भएको देखिँदैन । राष्ट्रिय योजनाहरूमा पनि “पुष्प उद्योग” लाई

समेट्न सकिएको छैन । नवौँ पञ्चवर्षिय योजनामा पनि यस उद्योगलाई प्रवर्द्धन गर्ने ठोस नीति तथा कार्यक्रमहरू उल्लेख नहुनु व्यावसायमा सम्बद्ध उद्यमीहरूको लागि दुखको कुरा हो ।

प्रशस्त बजारको सम्भावनाहरू हुँदाहुँदै पनि यस व्यवसायमा अनेकन कठिनाइ र समस्याहरू छन् । दक्ष जनशक्ति, गुणस्तरीय बीउ-बिरुवाको अभाव, व्यवस्थापकीय महत्त्वप्रति अनभिज्ञता, शीतघरको अभाव, व्यवस्थित बजारको अभाव र चिस्यानयुक्त यातायात साधनको कमी आदि यो उद्योगका प्रमुख समस्या हुन् ।

शीतघरको अभावले गर्दा मागभन्दा उत्पादन बढी हुने र केही दिन भण्डार गर्नुपर्ने अवस्थामा फूलहरू खेर फाल्नु पर्ने स्थितिको सिर्जना भई उत्पादक तथा व्यवसायीहरूले घाटा बेहोर्नु पर्ने हुन्छ ।

यी विविध कठिनाइ र बाधा अड्चनका बीचमा पनि नेपालको पुष्प व्यवसाय प्रतिष्ठित उद्योगको रूपमा स्थापित भएको छ र यसका विविध पक्षमा द्रुतगतिले सुधारहरू भइरहेका छन् । फूलको बजार दिनप्रति दिन बढ्दो छ भने अनभिज्ञ मानिसहरू पनि यस व्यवसायप्रति आकर्षित भइरहेका छन् ।

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Micropropagation of Chrysanthemum in Development of Floriculture

Asha Karki

In floriculture science, Chrysanthemum is considered as one of the important plants because of its look and commercial value. It can be used both as pot plants and cut flower. The developed countries such as North America and Europe are the major producers of Chrysanthemum. The spray variety of Chrysanthemum is most popular in Germany and in the Netherlands.

Similarly, Chrysanthemum pot plants and cut flowers are equally popular in Nepal. As per the information published by Floriculture Association of Nepal (FAN) the total demand of Chrysanthemum cut flowers amounts to 3 hundred thousand sticks per annum. Out of the total demand only 50% are met through local production and remaining is met through import from India.

For the production of platelets in mass scale, tissue culture technique is considered superior in comparison to traditional method. The micropropagation of plants was initiated with ornamental species viz. Cymbidium (Morel 1960). The technique developed by morel is used for disease free plants. Steward and

Dermen in 1970 were the first scientists to report the regeneration of Chrysanthemum from shoot tip culture. Prasad et al. (1983) produced a large number of plantlets of Chrysanthemum morifolium "Otome Zakura" by shoot tip culture on Murashige and Skoog media with growth hormones.

Two types of explant for shoot tip and petal culture is used for plant regeneration.

The following procedure is used to achieve the above objective:

1. Shoot Tip Culture

Shoot tip are taken from the mother plant and washed thoroughly in running tap water for 30 mins. followed by a surface wash with a few drops of teepol and finally rinsed with distilled water. Aseptically, the washed shoot tips are surface sterilized with 0.1% mercuric chloride for 5 minutes and finally washed 4-5 times with sterilized distilled water. After surface sterilization, shoot tips are kept in Murashige & Skoog medium containing 6-Benzylaminopurine and Naphthelenacetic Acid. The media

is solidified with 0.7% Agar and pH is adjusted to 5.8.

2. Petal Culture

Mature petals are detached from flowering plants grown in the pots or field and surface sterilization technique is same as in shoot tip culture. The petals explant is kept in Murashige and Skoog medium containing 6-Benzylaminopurine and Naphthelenacetic Acid. The media is solidified with 0.7% Agar and pH adjusted to 5.8.

For the response of the regeneration of explant, cultures are maintained under continuations illumination 2000 lux at 23+20°C. After

4-6 weeks the regeneration response of the explant observed.

The flasks with microshoots are brought to the green house and kept for one week for acclimatization. Then the microshoots are transplanted in non-sterile sand and covered with polythene hood. The initiation of roots are observed after 8-10 days. After 15 days of rooting the rooted plants are transferred to polybag for field establishment. The following 15 different varieties of tissue culture Chrysanthemum were displayed in the exhibition organized by the Department of Plant Resources.

1. Cream gaint
2. Temptation



Display of Tissue Cultured Chrysanthemum flower in the Exhibition.

3. Sonar bangla
4. Rupasi bangla
5. Yellow spider
6. Golden giant
7. Pink turnour
8. Valentine
9. Royal purple
10. Gol-gai
11. Bravo
12. Achievement
13. Green sleeves
14. Diamond jublee
15. Yellow night

The plants produced through tissue culture also have an advantage of erect stem during flowering and the leaves remain with the main stem. There exists an immense export market of Chrysanthemum if a good quality of flowers could be produced. To achieve this goal bio-technological techniques of producing high quality tissue culture plants using the cheap and efficient protocol developed in Nepal can be used.

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Role of Biotechnology in Floriculture

Nirmal Joshee
Brajesh Vaidya

It has been long known about the fact that floriculture industry in general do need to rely on biotechnology one way or another. Whether it may be a commercial production or research, biotechnology plays a crucial role in many ways. In the world today, because the products are becoming more and more global, floriculture industry has become heavily reliant on supplies from different countries. Some aspects and concepts in floriculture that includes biotechnology in farmer level where high technology and skilled manpower are not much required, are the ones that could yield a better result in Nepalese context.

The Integrated Intensive Farming System (IIFS) methodology involves agricultural intensification, diversification and value addition. To be ecologically sustainable, such intensification should be based on techniques that are knowledge-intensive rather than capital intensive, and which replace to the extent possible, market purchased chemical inputs with farm-grown biological inputs. It has been defined as utilization and conservation of land, water, and forest resources at farm household and community level for continuously improved livelihood and overall human development. It is important to mention

here that there should be perfect lending of indigenous technical knowledge (ITK) and newer technologies. We intend to discuss one of these biotechnologies, plant tissue culture and micropropagation, in detail and its possible role in the development of floriculture.

Micropropagation

Objective and Scope

Micropropagation represents the optimum efficiency in terms of vegetative plant propagation and allows large number of propagates to be produced in a relatively short period of time under controlled conditions, throughout the year, in a relatively small space. Micropropagation industry is in fact, one of the recognized global profit making option. It is estimated that there is a world market of 15 billion US dollars per year for the tissue culture products. International demand for tissue culture plants during 1990-91 had gone up to 250 million plants.

The widespread use of micropropagation has many advantages namely-

1. When classical methods of *in vivo* vegetative propagation prove inadequate, *in vitro* cloning is an

- important tool in speeding up propagation.
2. Adult plant material that often cannot be cloned *in vivo*, can sometime be rejuvenated *in vitro* and then subsequently cloned. It has special significance in forestry sector.
 3. Growth of *in vitro* propagated plants is often stronger than in those cloned *in vivo*. This is mainly due to rejuvenation and/or the fact that they are disease free. Disease free does not mean incorporation of resistance to disease.
 4. When the existing methods of cloning are too slow or too complicated to be profitable, *in vitro* cloning can be applied to produce large number of plants more quickly and at a competitive price.
 5. By *in vitro* cloning expensive methods such as grafting or budding on a rootstock can be rendered obsolete.
 6. *In vitro* cloning enables the uncovering of chimeras and the isolation and cloning of spontaneous or induced mutants. Mutation induction and regeneration of adventitious buds *in vitro* makes it possible to obtain solid mutants.
 7. In contrast to *in vivo* propagation, *in vitro* cloning of herbaceous plants can be continued all year round and so become independent of the seasons.
 8. *In vitro* cloning enables the production of disease free plants and thereby facilitates phytosanitary transport from country to country.
 9. In forestry, quality seed production and availability is difficult. Proven elite plants can be cloned to establish orchards for high quality seeds.

Different Phases in Micropropagation

Phase 0: This covers correct pretreatment of the starting material i.e. keeping the plant in disease free state etc.

Phase 1: It deals with sterile isolation of a meristem, shoot tip, explant etc. In this phase, there is only one important requirement; to accomplish non-contaminated growth and development.

Phase 2: The primary goal in this phase is to achieve propagation without losing the genetic stability.

Phase 3: This involves the preparation of the shoots and plants obtained in phase 2 for transfer into soil. It involves shoot elongation and subsequently root formation must be induced, either *in vitro* or later *in vivo*.

Phase 4: This covers the transfer from test tube to soil and the establishment of plantlets (hardening).

The process of acclimatization or hardening is the most critical phase of plant tissue culture. The process of hardening is usually done in greenhouse and hardening tunnels.

Among the new biotechnologies, tissue culture and related techniques have done quite well during the past few years. In Nepal it is now being carried out at many government, non-governmental organizations and private laboratories. Main products (crops) for different climatic zones that are already in the market are:

1. Fruits- banana, strawberry, shoot tip grafted sweet orange
2. Cash crops- ginger, cardamom, sugarcane
3. Vegetables- potato
4. Flowers- orchids (*Cymbidium*, *Dendrobium*, *Oncidium*, *Paphiopedilum*, *Renanthera*, *Vanda* spp. etc.) carnation, chrysanthemum, gerbera, African violet etc.
5. Forestry- *Ficus*, bamboo, *Artocarpus lakoocha*, *Eucalyptus* spp.

Indigenous technologies and locally available substitutes may bring down prices comfortably low for the farmers.

Future Directions

Following areas should be the priority areas as far as tissue culture is concerned.

1. Research and application of biotechnological tools for producing high quality, genetically superior planting material for biomass production, specially for wastelands.
2. conservation of elite germplasm through low temperature or cryopreservation.
3. Identification of medicinal plants with proven record e.g. *Taxus* and study active chemical compounds, germplasm conservation, and micropropagation.
4. Development, validation and scale up of protocols for plant regeneration through plant tissue culture for economically important plants.
5. Biotechnology programs to benefit the target population for employment generation, upgrading their skills and improved standards of living in rural areas through large scale demonstration.
6. Human resource development programs to be expanded to cover the inaccessible, remote regions of the country, facilitating training at all levels.

There are biotechnologies that can be practiced parallel to micropropagation supporting it. Two of such examples are given under.

Bio-fertilizer

These are natural fertilizers that are microbial inoculants of bacteria, algae or fungi individually or in combination, which augment the availability of nutrients for plants. *Rhizobium* is the best known example. It fixes atmospheric nitrogen symbiotically with legumes. Other bio-fertilizers are *Azotobacter*, *Azospirillum*, blue-green algae (BGA) and *Azolla*. Another good example is an actinomycetous bacteria *Frankia* which fixes atmospheric nitrogen in a symbiotic relationship with the roots of non-leguminous plants eg. *Alnus*, *Casurina*, *Myrica* etc.

Vermiculture

Vermiculture biotechnology allows harnessing earthworms as versatile natural bioreactors. Earthworms can be used for waste water treatment and solid waste management known as vermicomposting. Earthworms help nature in her overall soil building and plant growth processes by particle breakdown. It is desirable to have 0.2 to 1.0 million earthworms per hectare to keep up the fertility in soil regularly supplied with organic matters. They are also a rich sources of protein vermitin

and hence are being used in feed for poultry and piggery.

Limitations for Implementing Biotechnology Programs in Nepal

1. There are no guiding policies to set priorities for biotechnology research in the framework of national needs. Decision makers should create a policy environment which allows biotechnology to thrive in national R & D institutions and in commercial and industrial sectors.
2. There is no effective policy and legislation to protect Nepal's sovereign right to its genetic resources, and to ensure any flow back of benefits to the Nepalese people.
3. There is no biotechnology department as such in this country.
4. Research institutions are not technically equipped.
5. Lack of understanding and inclusion of Intellectual Property Rights (IPR), Farmer's Rights (FR), and Breeder's Rights (BR) in rules and regulations (law).

Constraints in General

- Without the incentive of strong market potential, firms are

unwilling to take the risk of production and marketing.

- Certain biotechnologies are expensive for the farmers and research and financial mechanisms are to be worked out.

Conclusions and Recommendation

The development of biotechnology should proceed with caution and critical thinking to ensure that the results are indeed responsive to end users, income generating, ecologically sound and beneficial to our society. A particular biotechnology in isolation will not be able to change the scene. We need to use various technologies in integrated fashion

involving various sections of society. To propel all these efforts in right direction political will and support of financial institutions would be absolutely necessary.

The basic paradigm of the biotechnology at village level should therefore include consideration of:

- Ecological sustainability,
- Participatory research and development,
- Economic efficiency with equity,
- Employment and income generation, including women's and
- Attraction and retention of educated youths in the village.

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Prospect of Cut Flower Production in Nepal

Gopi Upreti*

Introduction

Floriculture can be a promising enterprise in Nepal especially in hilly and inner plain areas. Potential for floriculture development dealing with cut-flowers, cut foliage, bulbs, tubers, corms, seeds, live plants, foliage and perfumes seem great. Flowers are high value crops which give higher income per unit of the growing area than other horticultural crops. Despite a wide range of agro-climatic conditions and many micro-climatic pocket areas suitable for many diverse flowers and ornamental plants, a systematic and serious attempts has not been made either by growers or the entrepreneurs to develop floriculture to its true potential. A number of factors can be attributed to this but lack of market, capital and the specialized production techniques are certainly the major factors. But with the inception of Floriculture Association of Nepal (FAN), the situation has been gradually changing. More and more people have turned to the production of the flowers, a number of flori-shops have come into existence in Kathmandu, and there has been an increased awareness among the urbanites about flowers and ornamental plants. The credit goes to the FAN

especially its yearly flower exhibition activities in promoting flori-business.

Cut-Flower Production Potential

A survey conducted in the recent past indicated that there exists a considerable domestic market for flori-products in Nepal. Actually, the flori-products (flowers, foliage, and live plants) produced in Nepal can meet only the 40 % of the domestic demands and 60 % demands are being met by the supplies from India. The supplies from India mostly consists of specialized products such as cut-flowers, foliage, and potted plants. Mostly these products are supplied to the five star hotels which require regular year round supply. The Nepalese Nurseries also supply limited number of cut-flowers and cut-foliages but only on a seasonal basis. The retail flori-shops complain that they have to depend on the supply from India especially for the cut-flowers of Rose, Carnation, Gladiolus, Tuberose and Orchids. The year round *regular supply* and the *quality* are the prime consideration of cut-flowers.

Cut flowers are the most dominating feature in modern flori-business. The production, processing and marketing of cut-flowers especially

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in developed industrialized countries such as Japan, Holland, Britain, Israel, and USA have become very specialized operation and requires relatively high level of professional expertise and management. Flori-business has become one of the most lucrative one and commands substantial capital transaction in the international market. Owing to the natural landscape and the diverse agroclimatic features, Nepal possesses an untapped potential for floriculture enterprise. A brief discussion on the production potential of some important cut-flowers in view of their environmental requirement will illustrate this fact:

Rose

Rose belongs to the family Rosaceae. Hybrid Teas and the Floribundas are the most popular modern roses. Rose is world's most favorite and unchallenged queen of flower. There is probably no flower more popular and better known than the rose. Roses grow and flourish in the widest range of conditions of soil and climates. To grow roses is not hard, but to grow the best roses requires a great deal of skill and knowledge.

Propagation

Increasing rose plants by different methods of propagation is an important and interesting aspect in its cultivation. These plants can be propagated by seeds, cuttings, layers, budding,

grafting and tissue culture. The most popular commercial method of propagation of roses are budding and grafting.

Climate and Soil

Roses can be grown successfully in variable climatic zones. However, moderate temperature, bright sunshine and high light intensity are good for flower production. It is suggested that sunshine for six hours is ideal for better growth and flowering. The weather conditions that prevail in Terai and inner Terai regions of Nepal during winter appears to be optimum and roses flower best during winter in Terai and inner Terai regions of Nepal whereas in the hilly regions of Nepal, best rose flowers are produced during summer. It is suggested that the quality rose blooms are obtained during December to April, with approximately 5 to 6 blooms per plant each in 60 cm. and above, and 45 to 59 cm. category stem length.

Temperature

The growing temperature markedly influences the growth and flowering of rose plants. Seasonal variation in temperature has a pronounced effect on flowering, flower quality and longevity of field grown roses. A minimum temperature of 7.9°C and maximum of 22.6°C with 6 sunshine hours during winter season has been found to delay flower bud opening, improve flower quality and

longevity in rose cultivar while 12.7 °C and, 27.8°C minimum and maximum temperature respectively in spring season with 6 sunshine hours has been found to induce early flower bud opening and reduce the longevity of intact flowers considerably without affecting the quality of flowers as compared to winter seasons. The rise in temperature during summer and rainy seasons adversely affects flower quality and longevity while inducing earliest flower bud opening.

Soil

Rose plants grow well in good fertile soil. They can, however, be grown in all types of soil with proper drainage facilities. Well drained medium loamy soil having adequate organic matter is ideal. The best soil reaction for roses should be in the pH range of 6.0 to 6.5. They will do reasonably well at a pH of 7.0 and slightly higher, but some nutritional problems may be encountered from time to time. A pH less than 6 is usually too low. A soil which has been in cultivation and has a depth of at least 45 cm. is good for rose growing. The subsoil must have the capacity to retain sufficient moisture, but at the same time permit good drainage. Adverse soil conditions, however, affect growth and flowering to a great extent. Budded plants have lesser tolerance to adverse conditions than unbudded rootstocks. Roses fall into the sensitive category of

plants with respect to salinity and sodicity tolerance.

Site

When a rose garden is being planned, the site is of utmost importance. The early morning sun should beam over the area for at least six hours a day. Rose bushes not receiving the morning sun perform poorly. In hot weather, however, partial shade during the afternoon when the sun is hot, is beneficial. It is better not to plant roses by the side of shade casting objects. The area should not be too close to trees or shrubbery which have a massive root system. An area protected from hot and cold blasts or wind is ideal. Roses cannot stand water-logging even for a short duration. The soil should be well drained or easily drained by using tiles and ditches.

Orchids

Orchids are the most loveliest among all the flowering plant in the world. The exquisite beauty of flowers, brilliance of colors, remarkable range of sizes, manifold shapes, variation in the form, attractive habits and wide distribution in the earth have aroused highest admiration for these charming plants throughout the world. These extraordinary plants belong to the very large and diverse family Orchidiaceae. The orchids with their 35,000 species and over 800 genera constitute probably the largest family among the flowering

plants, and exhibit an almost inequitable number of hybrids and varieties. They are the only major cut flower crop commercially grown as a pot plant in most parts of the world. In some of the tropical areas of the world, however, Arachnid, Aranda and Vanda are grown in ground beds cut flowers.

Climate and Growing Media

Orchids grow in a wide variety of climate and environmental conditions and cannot be expected to conform to any one set of rules in cultivation. But the basic requirements of most of the orchids are rather similar.

Temperature

The optimum temperature varies between 15.5 to 26.5°C for most of the cultivated orchids. For growing purposes, they are usually divided into three temperature groups: *warm*, *intermediate* and *cool orchids*. Warm orchids like Vanda, Rhynchostylis, Phalaenopsis and Dendrobium require moderate to high humidity. Temperature around 15.5 and 26.5°C at night and day, respectively, are suitable for the growth of these orchids. Cattleya, Laelia, Brassavola and allied genera, and Oncidium, Epidendrum, Miltonia, few species of Odontoglossum mottled leaf Stanhopea, and few others are represented in intermediate orchids. For these orchids the ideal minimum temperature is 13°C at night and 18°C

and above during daytime. Cool orchids include a number of beautiful genera like Cymbidium, plain leaf Paphiopedilum which do well between 10 to 13°C.

Cymbidiums prefer cold temperature and do not flower in warm areas. Night temperature between 10 to 13°C is congenial for initiation of flowering. In case of Vanda day temperature of 21°C or above and night temperature between 15.5 to 21°C are favorable. Tropical species of Eria generally require higher winter temperature (18 to 20°C); and high altitude species can withstand 13°C. The species of Microstylis, which possess pseudo bulbs are usually deciduous and while in cultivation require a winter night temperature of 15.5°C and moderate rest period.

Light

Orchids require less light intensity compared to common garden plants as they are cultivated in shade or greenhouses. As per the available literature, some of the popular orchids used in the cut-flower industry, like Arachnis and its hybrids, Cattleya, Dendrobium, Oncidium, and Vanda, require 2400 to 3600 foot candles of light intensity. Phalaenopsis shows satisfactory growth and flowering at 1500 foot-candle light intensity, while optimum requirement of light of Paphiopedilum varies between 1800 to 2400 foot-candles. Paphopedilums do

best in low light intensity, During winter, they require about 800 to 1200 foot candles and in spring through summer about 700 to 800 foot candles. *Paphiopedilums* flower at a low light intensity of 750 foot.

Humidity

High relative humidity is generally preferred by most of the orchids. They thrive well when the atmospheric moisture is not less than 30% at night and more than 80% during the day time. Generally monopodial types, e.g. *Vanda*, *Phalaenopsis* etc. require high humidity (70-75%) than sympodial types e.g. *Cattleya*, *Laelia* or those with leathery leaves (40-55%). High relative humidity reduces loss of moisture from the growing media and minimizes the frequency of watering. Relative humidity between 75 and 80% during the day. With increase in temperature, the humidity in the greenhouse should be increased.

Container and Potting Media

The orchids found in nature grow wild on trees, rocks, meadows or mashes and are generally divided into three groups, *Terrestrials*, *epiphytes* and *saprophytes*. According to the diversified habit of growth, the vegetative structure of the orchids is modified. Terrestrial orchids are generally planted in ordinary clay or plastic pots. Epiphytic orchids are best

grown in specially designed orchid pots with holes at the bottom and slits or perforations on the sides. Monopodial epiphytes like *Aerdes*, *phalaenopsis*, *Vanda* etc., are particularly suited to basket culture because of the large aerial roots produced from these plants and straight growing habit. Wooden or galvanized wire baskets are normally used. Many orchids are conveniently grown on wooden logs.

The material used as media for orchids are entirely different from that used for other plants. Hence, finding out a suitable potting media for a vast range of orchids is a fascinating subject of study. Different types of materials are used as potting media for epiphytic and terrestrial orchids. Epiphytic orchids can be grown in any one or in combinations of different material like chopped *Osmunda* fibber, over burnt brick pieces, chunks of hardwood charcoal, coconut husk, fir bark, red wood fibber, coarse peat moss, perlite, palco wool, Hawaiian tree fern (*Hapu*), coke, solite, broken pieces of oil palm nuts, gravel, red lava rock, Styrofoam consisting of strips of various sizes (orchid chips), styromull (plastic foam material etc. While terrestrial orchids grow in mixtures of several material like sphagnum moss, tree fern fibber, fir bark, pine bark, dried and undecomposed oak leaves, beach leaves, perlite, charcoal, shell grit, milled peanut hulls, loamy soil, leaf mould, river sand, etc.

Different potting media are, however, largely chosen depending upon the locally available materials. In general the media should consist of materials of uniform texture through which water will drain out readily, keep the media moist but will never become too wet or soggy. An ideal medium should preferably be inert, resistant to organic decomposition, as well as porous to ensure adequate aeration for root respiration; less costly and easily available.

Chrysanthemum

Chrysanthemum is a popular flower of great commercial importance as well as of aesthetic value throughout the world. The chrysanthemum is also grown as a florists' crop to meet the cut flower trade and also as an ornamental plant in beds and in pots in urban localities. The agro-techniques recommended for growing chrysanthemum therefore should encompass these two features.

Climate and Soil

Chrysanthemum can be grown in a wide range of climate and soil conditions. Light and temperature plays an important role in the production of high quality flowers.

Light

It is a well known fact that the flowering of Chrysanthemum is very much influenced by the quantum and

quality of light. Most of the cultivars require shorter days for flower bud initiation and development. Under long days they tend to remain vegetative. Incandescent light of roughly equal red and far red-wave length is reported to influence inter-nodal elongation and hence length of the stem. Cultivars vary in their day length requirements and a knowledge of the exact requirement of the cultivars will help the grower to manipulate the flowering by providing optimum photoperiodic requirements.

Temperature

Similar to light requirements, Chrysanthemums are also influenced by temperature. The effect of night temperature is more pronounced than day temperature and a night temperature of 16-20°C is optimum for most of the cultivars. High temperature may cause floral distortion and low temperature may some time cause discoloration of the flower.

Soil

Chrysanthemum requires well drained sandy loam soil with a pH of 6.2 to 6.7. It is a shallow-rooted plant and is very sensitive to water logged conditions. If moisture is excessive it may favor disease infection and may impede root respiration. Optimum level of some of the essential nutrients for growing chrysanthemum have been reported to be Nitrogen 10 to 50 ppm, Phosphorous 5 to 10 ppm. Potassium 30 to 50 ppm, Calcium 100 to 150 ppm,

Boron 20 ppm, Copper 5 ppm, Manganese 3 to 4 ppm and Zinc 6 to 8 ppm.

Growing Chrysanthemums in Pots

Pot culture of Chrysanthemums is limited to a few big cities. The main training style are 'standard' with 1-3 bloomed per plant for the large flowered varieties and 'bush form' with hundreds of small flowered blooms on plants trained in mound shape. For training as 'standard', the large flowered varieties are planted with rooted stem cuttings late in July, allowed to grow vertically, pinched once (if more than one bloom is desired), de-shooted by removing auxiliary shoots as they arise, disbudded to leave a single terminal bud per stem, and staked with a single split bamboo stake inserted vertically near the base of the main stem. For training the small flowered varieties as 'bush', the plant is initiated from sucker early in January-February, and pinched several times to encourage branching and to reduce the height. To give the plant a desired shape selective pinching is done, without any de-shooting or disbudding.

Tuberose

Tuberose is one of the most important bulbous ornamentals of tropical and subtropical areas. They are commercially cultivated for cut and loose flower trade, and also for the extraction of its highly valued natural flower oil. The serene beauty of the flower spikes, bright snow white

flowers, sweetness of blooms, and delicacy of fragrance of this ornamental crop, transform the entire area into a nectarine and joyous one. Because of their lingering delightful fragrance and charm, they are adorned with romantic vernacular names in India like Gulcheri, Glushaboo (Hindi) Rajanigandha (Bengali); Sukandaraji, Nelasampengi (Telugu); Nilasampangi (Tamil), Sugandharaja, Nelasampingi or Sandharaga.

Climate and Soil

Tuberose can be grown with success under wide environmental conditions ranging from tropical to subtropical and temperate climate. If it is grown only for flower production, the climate must be warm and humid. Profuse flowering can be obtained throughout the whole year in a mild climate, free from extreme high and low temperature.

Temperature

Soil temperatures should be between 20 and 30°C for maximum bulb production. Flower spike formation, the mean minimum temperature is 13.4°C and for flower formation 18.3°C in Japan. Commercial cultivation of tuberose is mainly confined to warm, humid areas with average temperature range from 20 to 35°C. High atmospheric humidity and temperature around 30°C is optimum for Tuberose production.

Light

High light intensity is required for bulb and flower production. For bulb production, tuberose must be grown in full sun. Although this plant is insensitive to photoperiod, it has been reported that exposure to a day length of approximately 16 hours promoted the vegetative growth of plant enhanced the emergence of first flower spike by ten days.

Soil

Tuberose can be grown in any type of soil from light sandy loam to clay loam. A light, sandy and well drained soil makes lifting of bulbs easy. At least a 45 cm. deep, well drained, friable soil rich in organic matter and nutrients with plenty of moisture is preferable. Soil with high amount of clay or silt should be amended by incorporation organic matter and compost. Most of the nutrients become available to the plants in the pH range of 6.5 to 7.5 with good aeration.

Site

Tuberose is a sun loving plant. For good vegetative growth and maximum yield of flowers, a site should be chosen where plants will get plenty of sun throughout its growing period. The soil must have a good water holding capacity. A site protected from strong winds, hot and cold waves is preferable, so that there is no damage caused to the flower stalks. In shady

situations, the plants grow tall and lanky and the flowering is adversely affected.

Gladiolus

Gladiolus is one of the most important bulbous ornamental flower that is becoming one of the most important cutflower. It is commercially cultivated for cut flower trade. The remarkable beauty of the flower spikes, bright snow white, red, pink and orange color bloom have attracted a large number of flower lovers.

Climate and Soil

Gladiolus can be grown with success under wide environmental conditions ranging from sub-tropical to warm temperate. A warm and humid climate is considered to be good for this crop. Profuse flowering can be obtained throughout the whole year in a mild climate, free from extreme high and low temperature.

Temperature

Soil temperatures should be between 15 and 25°C for maximum bulb production. Flower spike formation, the optimum temperature is 15°C to 22 °C. Commercial cultivation of Gladiolus is mainly confined to warm, humid areas with average temperature range from 15 to 25°C.

Light

High light intensity is required for bulb and flower production. For bulb

production, *Gladiolus* must be grown in full sun. Exposure to a day length of approximately 14-16 hours promotes the vegetative growth of plant and enhances the emergence of flower spike.

Soil

Gladiolus can be grown in any type of soil from light sandy loam to clay loam. A loamy soil with at least a 45 cm. deep, well drained, friable rich in organic matter and nutrients with plenty of moisture is preferable. Soil with high amount of clay or silt should be amended by incorporation organic matter and compost.

Site

Gladiolus, unlike tuberose, is not very sun loving plant. For good vegetative growth and maximum yield of flowers, a site should be chosen where plants receive moderate sun throughout its growing period. The soil must have a good water holding capacity. A site protected from strong winds, hot and cold waves is preferable, so that there is no damage caused to the flower stalks.

Possible Location for Cut-flower Production in Nepal

Flowers can be produced successfully in the tropical, subtropical, warm temperate and cool temperate areas in Nepal. All most all flowers except those which require a high

degree of chilling requirement for the initiation of flower buds can be grown in the Terai and the inner Terai regions of Nepal during winter. For example, Rose, Chrysanthemum, Orchids, *Gladiolus*, can be grown in all most all the Terai and Inner terai regions during winter. However, the Terai and Inner terai areas of Western, Central and Eastern regions of Nepal are more suitable for successful production of these flowers during winter. These areas provide the optimum climatic and soil requirement for these crops during winter. From the point of view of the proximity to Kathmandu as a marketing center and also the ideal climatic conditions, Chitwan, Makawanpur, Navalparasi, Bhairawa, Bara, Parsa, Sarlahi and Dhading districts are ideally located in the tropical and sub-tropical regions of Nepal. Floriculture as an industry can be developed in these districts. Flowers such as Rose, Orchids, Chrysanthemum, Carnation, *Gladiolus*, and Tuberose can be grown for cut flower purpose during winter in these districts. The fresh flori-products from these districts can be supplied to Kathmandu within the same day of harvest.

Gladiolus, Tuberose and Carnation can be grown all year round in the Inner terai region such as Chitwan, Makawanpur, Dhading, Nuawkot, Kavre and a number of districts where day temperature during summer does not exceed 30 °C and the

night temperature remains below 22°C. Roses, Orchids, Chrysanthemum, Carnation, and Gladiolus can be grown in hills and mountain districts during summer. There are number of hill districts including Kathmandu valley that can ideally meet climatic and soil requirements of these crops during summer.

Given the unique physiography and the agroclimatic variability in Nepal, there exists a tremendous scope and possibility for expanding

floriculture enterprise. Climate that prevails in inner-terai, hills and the mountains during winter and summer makes it possible to grow and produce all most all kinds of flowers and ornamental plants. By taking advantage of the micro-climatic pocket areas and the seasonal variation in inner terai and the hills, Nepal can produce any kind of flowers and the ornamental plants and continuously supply these products either to a domestic market or abroad in the form of cut-flowers, foliage and potted plants.

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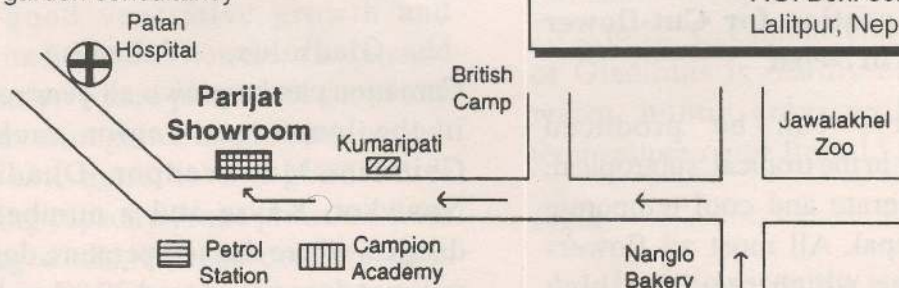
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Gerbera

R. Niroula

Gerbera is the most important plant in the field of floriculture with increasing commercial significance as cut flower. It is commonly known as Transvaal Daisy and belongs to the family *Compositae*. It is a dwarf perennial herb. Out of about forty five species, the best known and the only one to be horticulturally important is *Gerbera jamesonii* along with a number of its cultivars.

Gerbera is a beautiful cut flower for floral arrangement because of its numerous colours and shapes. It is hardy upright flower, free of leaves on the stalks which inturn the added merit of this plant. The flower has long vase life. Generally, flowers remain in vase for 10 to 15 days and can be extended upto 30 days with suitable treatment. In the cut flower crop Gerbera is the leading product.

The conventional method of vegetative propagation of Gerbera is quite inefficient. The major problems to traditional method are the low propagation ratio as only 5-6 plants on the average are produced per year from a single one year old plant.

In recent years, tissue culture as an alternative has been used in asexual propagation. In Europe, Gerbera is the

number one micropropagation product and is produced at 18 million units per year. Netherland is the most important producer of Gerbera. In 1988, 160 millions of flowers were sold (Pierik 1991). The three most common produced plants (micropropagation) in this country are Gerbera (17.1 million), Lily (16.3 million) and Nephrolepis (14.4 million) (Pierik 1991). Actually micropropagation of Gerbera has almost completely captured the cut flower market, and the same thing is happening for the pot plant business.

The plant tissue culture can establish plants with uniform and selected qualities, the technique may be used for mass propagation producing high quality cut flowers. The plants are most likely to be true to type. It can overcome the conventional method of propagation and phytosanitary problems and also reduce the cost of maintaining large areas of mother plants. The plants can be produced throughout the year in a small space.

In our country, micropropagation technique has been successfully developed through shoot proliferation in Gerbera. The *in vitro* cultures were initiated from apical shoot tips from the field grown plants. The preferable medium was Murashige and Skoog

(1962) with combination of auxin and cytokinin. The cultures were incubated at 25°C under 16 hours fluorescent light. The development of multiple shoot buds were found after 8 weeks of culture. After 4-5 sub-culture the regeneration was optimum, 30-40 shoots per flasks were found. Micropropagated shoots has been successfully rooted (70-80%) in non-sterile sand and the rooted plants survived easily in soil.

Establishment of Gerbera plantlets through shoot tip is rapid. The sand rooting technique also reduces the cost of production. Therefore the system is more efficient for commercial propagation. Thus a combination of

tissue culture with microstock plant and sand rooting of micro cutting might be desirable for commercial production of plantlets of Gerbera.

There is a rapid growth in the establishment of micropropagation laboratories in Nepal, which are engaged in the production of horticultural and ornamental plants. As a developing country, the labour cost is low in our country in comparison to other countries. So let us hope that in the near future there may be a large production of ornamentals including Gerbera of exportable qualities, which may help to boost the floriculture industry of the Nation.

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Floriculture in Nepal

(Present Status and Future Scope)

Kuber Jung Malla

Introduction

Floriculture as a trade has been emerging as a potential sector with high commercial value. It deals with floriculture products mainly ornamental plants and different kinds of cut flowers. Many kinds of plants have been used in the cultivation for commercial production of cut flowers. Roses, Chrysanthemums and Carnations are the main preferred varieties for cut flowers and they account for about 70 percent of total quantity of cut flowers in the world market. Orchids, Alstroemerias, Freesias, Lilies, Liatrises, Statice, Gladioli, Gypsophillas, Tulips, Tuberoses, Narcissus, Gerberas, Irises, Anthuriums, Nerine, Archillea, Proteas and Streletzias are other major crops grown for cut flowers.

World Trade of Floriculture

The global demand of floriculture products is ever increasing. The global consumption of flowers and plants touched a record of \$130 billion in 1990 and this is expected to be double by the year 2000 A.D. (Chengappa and Ravi). Germany is the biggest importer of cut flowers. Other major importers are the USA, France, Switzerland, the Netherlands, Italy, Australia, Sweden, Belgium, Japan and Gulf countries.

Among the exporters the Netherlands is the leading country, however part of its export is the re-export of the imported material. Other countries to export cut flowers are Colombia, Israel, Italy, Spain, Thailand, France, the USA, New Zealand, Ecuador etc. The Netherlands rules the floriculture market throughout the world, because of high quality and standard service. With about 11,000 growers, 2500 wholesalers, 10,000 retailers, and over 150 breeding and propagation companies and nine auction houses, the Netherlands controls the world export and auctioning of flowers. It occupies 65 percent of floral market of the world.

Although India entered into world floriculture market in 1971-72 and exported flowers worth Rs. 5.13 lakhs (I.C.), Her export in 1993-94 was worth Rs. 20 crores (I.C.). India exports mainly pot plants, cut flowers and dry flowers. More than 80 percent of the export is contributed by dry flowers and dried parts of plants used for decorative purposes. Roses, carnations, chrysanthemum, golden rod, amaryllis, jasmine, and some orchids are the main items that are exported. The main foreign markets for India are the Gulf countries, Germany, France, England and Singapore. India also has large domestic market for floriculture

products. At present, India produces flowers worth Rs. 200 crore (I.C.) and about 34,000 hectares of land are being used for the cultivation of flowers including 24,000 hectares under traditional cultivation. India got into international floriculture market only after Indo-American Hybrid Seed Company started growing flowers on a commercial scale for export.

Status in Nepal

Climatic diversity of Nepal is ideal for the cultivation of different ornamental plants, because the topography of Nepal extends from 100 m. at Tarai to alpine area. The labor cost also is cheap in contrast to other countries. In spite of these favorable conditions, very little has been done in this field. The Royal Botanical Garden, Godawari is the first organization which helped to develop some interest on plants, as a result some 84 plant nurseries and enterprises (Directory of Floriculture Enterprises of Nepal, 1994) are in existence located in 34 districts at present, among which 40 are based in Kathmandu valley. Most of the ornamental plants and 50 percent of the cut flower market is occupied by Indian supply. The floriculture trade is totally confined to domestic market. The demand of cut flowers is increasing every year. Mr. Rajendra Rai, a nursery owner, did first commercial cultivation of Gladioli in Godawari. Gladioli are very popular cut flower in Nepal and are supplied from March to September,

but fortunately at present there are more growers to cultivate gladioli. In spite of seasonality the off season demand of gladioli cut flowers are met by India supply, although some part of the demand is met from Biratnagar and Bhadrapur. The Standard nursery is successfully growing carnation another cut flower for last two years and supplying cut flowers to the local market.

First tissue culture laboratory was established in 1976 at Godawari under the Department of Medicinal Plants with a view to propagate orchids, ornamental as well as medicinal plants. The credit of this pioneer work goes to Dr. S.B. Rajbhandari. The protocols have been already developed for the ornamental plants such as Gerbera, Chrysanthemum, Carnation, Rose, Lily and Orchids. At present three tissue culture factories are in existence in private sector and are trying to explore external market for their products.

After FAN (Floriculture Association of Nepal) came into existence in 1993, awareness has been developed in the field of floriculture. Some nurseries were facilitated by FAN for the cultivation of gladioli and roses. Feasibility study for the wholesale market of flowers was carried out. Trade fairs have been organized for the promotion of floriculture business. It has helped to develop interest in floriculture in the country and make the floriculture business sustainable.

Constraints

The history of floriculture trade in Nepal is not old. Many factors are responsible for this business, therefore it is not going in full swing. Some major constraints are mentioned below:

1. Advanced technical know-how on cultivation, harvesting, post harvesting handling including packaging are very limited.
2. Green house being expensive, the cultivations are entirely based on open fields. So the quality of the products are not upto the international standard and quantity as well as supply are not regular and fixed.
3. All F1 seeds are imported, which are very expensive. These are imported mostly from Japan, Holland, Germany, The US and India.
4. There are no organized channels for marketing.
5. There are no standard regulations for the export of flowers and floral products.
6. Floriculture market in Nepal is totally dominated by India due to lack of sufficient plant materials in the country. Mostly, plant propagules, desired varieties of ornamental plants are imported from India.
7. No intense care is taken for plant sanitary system for the marketed flowers due to shortage of plant products.

8. No strict regulation is in practice to check the haphazard flow of plant material and floral products from India to Nepal.
9. Growers have no specialized products, they are dealing with all kinds of products in order to sustain their business, because it is assumed as a risky industry, as the trade of floriculture product depends only upon the demand of Kathmandu valley.

Future Scope

With suitable soil and climate in various regions of the country, it is possible to grow cut flowers a year round in Nepal. The labor cost being low, Nepal can do more in the field of floriculture. But there are some more things to be taken in consideration to make the floriculture trade sustainable in Nepal. They are mentioned below:

1. It is quite important to know what to grow, how to grow and how to go into the market for floriculture products. Growers need advanced training courses on agro-technology. Govt. organizations, FAN and other NGOs should play leading role in this sector.
2. Possibility of a collaboration with foreign companies should be sought for, for producing F1 hybrid seeds. Buy-back programs may be more beneficial in such collaborative ventures, because Nepal can provide seeds in low price as the labor cost is very cheap.

3. Out first target should be to fulfill our domestic demand. After we become self-dependent in our domestic market, we can think about export, because quality and quantity are the most striking measures for export.
4. Before exporting our floriculture products abroad, which needs a very high quality standard, it would be better to try our standard market with India and try to understand international standards and norms. India also has a large market in floriculture. In India roses flower during January-February but in Nepal it is in summer season, so we can export cut roses during summer season to India. Same is the case with chrysanthemum, which give flowers during Dec.-Jan. in India whereas they produce flowers earlier in Nepal. This is one of the advantages for us to supply cut flowers to India.
5. At present there are very few growers in Nepal engaged in floriculture, so a suitable environment should be created to encourage the growers. Provision of bank loans at a lower interest rate and market guarantee may be some measures of encouragement to growers. An organized co-operative can play a positive role in this part.
6. Import and export regulations for floriculture products should be simplified in order to facilitate the floriculture trade abroad.
7. A standard phyto-sanitary system should be practiced while exporting and importing plant materials to and from India and abroad.
8. Our research and development programs relating floriculture should be based on the needs of such growers.
9. There are so many beautiful wild flowers in Nepal, so we should explore the market of wild flowers abroad.

The floriculture in Nepal is in growing stage and there are many possibilities to develop it and let us hope its betterment in the coming days.

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Orchidiola : An Alternative Gladiolus for Winter Season in Kathmandu Valley

Rose Sherestha

Gladiolus is an important cut flower crop. Because of its prolonged vase life, colour variation and resistance to long distance transportation hazards, it is becoming popular in Nepal. In Kathmandu there is record of demand of 2500 spikes per day and 750,000 spikes per annum (FAN Report). Gladiolus cultivation is becoming popular these days. However in winter season they could not supply adequate spikes required in the market since their mother bulbs were mostly from India and such bulbs, though they are good enough in Indian climate during winter months, are very poor in flowering in the climate of Kathmandu valley at that period. So for the supply of the spikes in these months they have to cultivate in tropical areas of Nepal i.e. far away from Kathmandu valley or they have to import directly from India. Both of these ways increases their cost. To solve this problem a new variety of Gladiolus, Orchidiola was introduced for trial cultivation and production of flowers in winter months in Royal Botanical Garden (RBG), Godawari. Luckily the programme was successful and flowers are produced during mid winter (December - January) (Photo - Illustration).

Orchidiola is of Israel origin, winter flowering variety of Gladiolus. It is just like common Gladiolus in appearance. It is of approximately 100-120 cm in height with 45-80 cm long spikes. There are 12-19 florets in each spikes. Flowers are of glaudiflorous type and meet every quality of cut flower category. Four different cultivars of four different flower colour are used. They are:

1. YARDEN - Purple floret
2. ADI - Red floret
3. RONIT - Yellow floret
4. KARNER - Pink floret

Among them red and purple varieties are very vigorous in their growth and flowering time are also earlier i.e. about 70-75 days after plantation; while pink and yellow varieties are less vigorous and their flowering time is also later i.e. after 90-95 days after plantation. Cormel production are also different in these varieties. But they are more enough for bulb increment. However, cormel production depends upon application of N.P.K. fertilizers (K.P. Singh, S. Umar & K. Seyata, 1993); corm size, depth of planting and spacing (A. Mukhopadhyaya & G.J. Banker, 1987).

Even medium sized cormels (1.25-2.0 cm diam.) can produce flower spikes though colour breaks in basal florets was slightly delayed. But economic

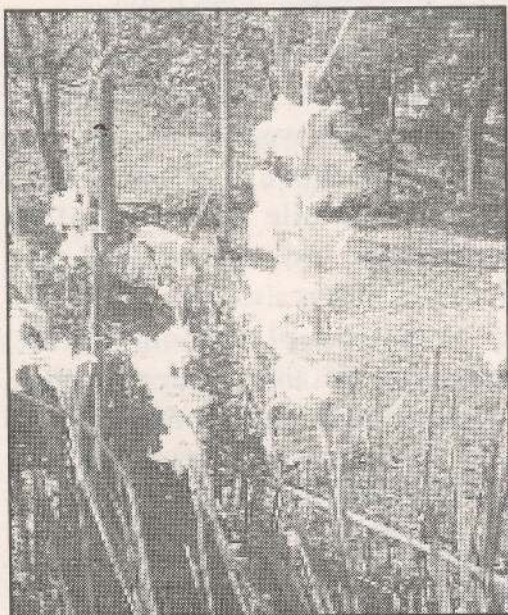
feasibility study is still to be done. Thus this Orchidiola can be a good alternative of common Gladiolus for winter month in Kathmandu valley.



YARDEN Variety



ADI Variety



RONIT Variety



KARNER Variety

***In Vitro* Propagation of Sandalwood** **(*Santalum album* L.)**

Neera Pradhan

There is an increasing need to select tree species and cultivate them to obtain essential oil, wood, fuelwood, fodder, biomass and other products. Many of the tree species provide more than one type of useful product used either directly by man as timber, fuelwood, building poles, gums, resins, oil or industrially processed as charcoal, pulpwood, plywood and others. One of the remarkable tree genus that has come into our garden is Sandalwood, which is highly prized for its wood and essential oil. The plant is acknowledged as one of the most precious perfumery items from antiquity to the modern time. Besides perfumery and carving idols, the plant is highly used in medicines too. The Sandalwood paste is applied to local inflammations and as cure for headaches, hemicrania and fever. It is also applied to skin diseases and for making good complexion. It is also used as a remedy for gonorrhoea, chronic cystitis and urinary infections.

Hindu, Muslims, Buddhists use Sandalwood powder as incense in their religious ceremonies and rituals. Rich people sometimes employ Sandalwood for cremating their dead.

Obviously the tree is highly valuable, so it is better to make

Sandalwood avenue or growing tree around the surroundings, which will make garden liveable.

The Sandalwood is exotic to Nepal. The plant is highly demanded in Nepal, India and abroad for its economic value. So the methods of propagation both conventional and *in vitro* should be fully exploited. The traditional method of plant propagation by using seeds have the disadvantage to the extent that the trees so raised may be genetically variable and always seeds need to be imported from India. In this view, tissue culture method is applied for mass propagation, in which plants produced are genetically uniform.

Procedure

Shoot tips of Sandalwood were collected from a five year old tree growing in Tropical House (Royal Botanical Garden, Godawary). The shoot tips were washed for one hour in running water followed by a surface wash with a drop of teepol. The shoot tips were washed thoroughly in distilled water. Aseptically the tips were sterilized with 0.1% Mercury Chloride (HgCl_2) solution for 5 minutes and again washed with sterilized water 4-5

times to make explant free from steriliant. The tips were excised and inoculated in the MS (Murashige and Skoog) medium supplemented with BAP (6-Benyl Aminopurine) 5.0 mg/l, NAA (Naphthyl Acetic Acid) 0.10 mg/l and 10% coconut water. The pH of the medium was adjusted to 5.5 to 5.8. The cultures were incubated in fluorescent light with a day length of 12-16 hours. The temperature of the incubation room was adjusted to 25-30° C.

Result

The culture shoot tips developed green small embryoides after 2 months of culture. These green embryoides developed into plantlets when subcultured in MS media supplemented with low concentration of BAP 1.0 mg/l and KN (Kinetin) 1.5 mg/l and 10% coconut water after 2-3 months. The plantlets were subcultured for mass propagation.

For rooting, plantlets were washed and dipped in 0.1% IAA (Indole Acetic Acid) for 5 minutes. The plantlets were rooted in non-sterile sand. However, rooting was observed in sand, but the percentage was not encouraging in comparison to other tissue cultured sand rooting plants. So *in vitro* rooting could be adapted for mass production, as the plant is root parasite.

Nevertheless, tissue culture method is very useful to produce the desired quality plants in large number and high yielding varieties can be produced, both for public and private sector. So far, the results achieved are still at the laboratory stage and they need to be scaled up for industrial use. Further more by *in vitro* methods disease resistant varieties can be produced and healthier trees can be released for the benefit of the growers.

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Open Space and Flowering Plants

Lajmina Joshi

Introduction

It is becoming increasingly difficult to maintain open space in the rapidly growing urban areas. This has led to encroachments and development of commercial buildings and installations with repercussions on healthy environment. Even in institutional premises, commercialization and shopping complex have impaired the environment. Although these attempts might help families and institutions financially for a short term, the approach is not sustainable for healthy development of our settlements. While the sanctity of the premises is at risk, development alone without adequate greenery and open space can not be contained for a long time. It is also becoming increasingly difficult to maintain public gardens because the cost of maintenance has become formidably high. On the other hand, despite the achievements in the field of floriculture Nepal has made, the production of flowers in relation to population increase is rapidly decreasing. This paper explores the potentials of the development and commercialization of flowering plants and gardening in all types of open space for their commercial viability with the purpose of maintaining physical environment on a sustainable basis.

Open Space

Open Space means a place where there is no encroachment and left over as it is. It may be a public or private space, courtyards, square etc. It has thus varied meanings. Open space may be green or just like a desert of concrete pavement depending on what purpose it is used for. From ancient times, we have the tradition of having private or public open green space for playing children, drying cereals, for relaxing and for meeting casually. Most of these activities were also strongly related with culture and religion. There was a strong tradition of planting and protecting trees including flowering trees either relating to religion or just to enliven the place.

Flowering Plants

The common flowering trees generally planted in Nepal are *Gravillea robusta* (Kaiyo Phool, Silk oak), *Callistemon lanceolatus* (Bottle brush, Kalki Phool), *Jacaranda mimosifolia* (Bule minosa), *Albizia lebbeck* (Silk tree, Siris), *Erythrina* sp. (Coral tree, Khukuri Phool), *Prunus persica* (Flowering peach, Aaroo Phool), *Mangolia grandiflora* (Bull bay, Rookh Kamal), *Michelia fuscata* (Kankan Champa), *Michelea champaca* (Sunacham), *Bauhinia variegata* (Orchid tree, Koiralo). Some of the common seasonal ornamental plants

generally planted in private and public open spaces are Calendula, Antirrhinum, Petunia, Celosia plumosa, Chrysanthemum, Carnation, Corkscomb, Coleus, Dahlia, Comphrena, Tagetes, Daisy, Delphinium, Dianthus, Digitalis, Aster, Impatiens, Rose etc. Those who have lack of open spaces can plant these seasonal ornamental plants in pots.

We should develop and encourage flowering plants in the following types of open spaces:

- Homesteads.
- Public parks and gardens.
- Reserved areas and town squares and chowks maintained by any public institution for community relaxation and pleasure.
- Gardens in the premises of commercial establishments maintained for beautification and public recreation.
- Private gardens and courtyards maintained by private individuals to provide a better home environment.
- Rooftop gardens, verandahs and window boxes, to enhance household environment and improve streetscape.
- Public water bodies and fountains, maintained for beautification and common use.
- Along road sides, parking areas and on river banks.

Open space, private or public, is important from every point of view, economically as well as physically. If the open space is properly used by planting flowers and trees it will generate resources through revenue collection by selling plants.

Homesteads

Gardening in homesteads has become infeasible as the size of plots is gradually decreasing. The land value is increasing astronomically. And there is a tendency to cover as much land as possible for construction of building for self-use as well as renting. Unless, the advantages of gardening could be realised and unless families could be financially enabled to plant flowers, the historical attachment of the people with flowers might diminish. Of course, terrace garden is a good innovation, but the indigenous architecture requires and favours pagoda style and slanting slopes. Even when the part of the roof could be flat, its construction as well as maintaining garden is not affordable to many. It is even more difficult and costly to maintain flower pots and vessels in verandahs. While awareness generation and revitalization of the traditional attachment may attract families to plant flowers, innovations are required to sustaining the flowering habits among the common people. At homesteads, families should be encouraged to plant flowers which require less effort and space and which are compatible with kitchen gardening.

The useful flowers which the family needs any way, or have to buy for religious festivals and functions, are as mentioned above. The promotion of floriculture largely depends upon the massive information dissemination programme and giving incentives and imparting technical know-how to families. This will help increase the consumption as well.

Institutional Premises

In case of institutional premises, for the purpose of financial returns alone, institutions should not be allowed to develop their premises without maintaining open space. A provision must be made that a certain portion of their total land should be developed as garden.

Public Open Space, Parks and Gardens

Publicly maintained open space and parks are not adequately managed. There is a dearth of knowledge in flower harvesting and generally flowers are stolen. The municipalities should take a leading role in maintaining public gardens. They should have gardeners in their payrolls and sell flowers to recoup the cost of gardening. They should work closely with relevant government agencies and other institution like FAN to develop and maintain gardens. Community should be mobilized and integrated with the municipal efforts and eventually small gardens should be transferred to the community for

development, management, consumption and trading. Inter-community competition of Floriculture show may help promote floral activities at the community level. This will be a great help in maintaining the open space in urban areas. With proper encouragement, local communities will plant and maintain flowers themselves. Except for entrance fee, which is not justified when the parks and open space are small, there is at present no mechanism to recoup the cost of maintaining gardens. Floriculture can be a very effective means of cost recovery.

Conclusion

Over the years, while there is a growing awareness on the importance of open space and city greening among different government levels and even at community and family level, ways and means of developing and maintaining different types of open spaces have not been effective mainly due to the problems of cost recovery. Floriculture offers one potential area of development which will make it easy for municipalities, private and public institutions, communities and families to maintain their open spaces and gardens as viable enterprises for creating healthy and green environment. The effective mobilization of NGOs like FAN and other agencies for the promotion of flowering plants in open space is required.

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Maintenance of Bonsai

S. D. Manandhar

Bonsai are artificially dwarfed trees or plants grown in small containers without losing its identity or natural characteristics as grown in the nature.

Whatever kind of plants bonsai are, and whether they are small or large should always be kept healthy. More healthy the plants are, it is more easy to train them. Growing bonsai is not that difficult if one knows how to maintain them.

Bonsai are not indoor plants but can be brought in for few days to enjoy or protect from extreme climates. Generally bonsai are grown on shelves in gardens, on roof tops and balconies in apartments. Wherever bonsai are grown one should keep in mind their requirement like plenty of sunshine, air, water and nutrition. At the same time one should not forget to protect from hot summer afternoon and freezing nights in winter.

Bonsai need adequate watering as they are grown in small containers with limited soil to spread its roots. Generally watering is done once a day in the morning. But it is not possible to say how often bonsai must be watered. That depends on weather conditions, soil used, location of plant and its size and stage of growth. Bonsai grows better when uniform amount of water is present in the soil. Water logging

condition must be avoided.

Washing foliage of bonsai with fine spray of water is equally important. This keeps foliage free from dust, keeps plant fresh. It is better to spray in the morning or evening than in afternoon. This also helps in controlling some insects too.

Feeding bonsai can not be neglected. Nutrients are generally given in two forms. One as decoction of organic manure meal as liquid manure and other in the form of solid or paste. In bonsai cultivation, organic manure like fish meal, oil cakes, bone meal compost etc. are more effective in comparison to chemical fertilisers. Time and amount of feeding depend upon stage of the plant and season. Generally bonsai are fed little in the spring and more in autumn. Young plants, flowering and fruit bearing bonsai require more nutrition than others. Remember that bonsai are not fed as other plants to have larger growths, flowers and fruits, but simply to keep them active and healthy.

Like other plants, bonsai are susceptible to disease and insect pests attack. Taking preventive measures is better than treatment. Sunshine, fresh air, proper nutrition and water are key factors for growing healthy plants. With these, one can minimise the disease and

insect pest. Washing foliage keeps away some of the insects like aphids, spiders and scales. Regular sprays of fungicides and insecticides are recommended if these problems are seen. In case of spraying the plant with insecticides and fungicides, remember that the soil should be moist, and weather should be mild.

Since bonsai are grown in small and shallow containers, plants become pot bound and soil becomes hard and non porous in due course of time. To maintain the plant health, occasional root pruning and repotting is necessary. Repotting doesn't mean completely changing of soil. While repotting generally one third of the old soil is replaced by new soil mixture.

The best time for safe repotting is the spring season or just before the sprouting the new buds in the plant. But it can be done in other time also provided that intensive care is given to the repotted plants.

Spring is also the season for pinching. As soon as new shoots appears, unwanted growth should be pinched off to maintain the shape and size of the bonsai. If pinching is done correctly and carefully, one might not need to prune in autumn.

No matter what plant materials are choosen for bonsai,if one keeps in mind how to take care and to maintain, it will definately help to get success in bonsai culture.

Repotting of Bonsai



1. Uprooting the plant.



2. Removing soil from the roots.



3. Pruning the roots.



4. Repotting.

बगैँचाको शोभा बढाउन रट आइरन फर्निचर

सविता ढुङ्गाना

रट आइरन फर्निचरको प्रयोग नेपालमा राणाकालमा दरबार बनाउँदादेखि भएको पाइन्छ । त्यति वेलाभै यसको प्रयोग भएको पाइएता पनि पछि आएर यसको प्रयोग झ्याल-ढोकामा बढी हुन थालेको पाइन्छ । अहिले रट आइरनका विभिन्न आकर्षक फर्निचर विशेष गरी बगैँचा तथा पार्कमा शोभायमान हुन थालेकोले रट आइरनप्रति ग्राहकहरू आकर्षित हुन थाले । कुनै पनि आधुनिक बगैँचामा रट आइरन फर्निचरको गाड्ने सेट आवश्यक अनुभव गरिन थाल्यो जसले बगैँचाको सुन्दरता र सजावटमा विशेष स्थान ओगट्न थाल्यो । आज आएर रट आइरनका गाड्ने सेट, गमला राख्ने स्टैण्ड र अरू फर्निचरको उपयोगिता दिनपरदिन बढ्दै नेपालमा यस उद्योगको विकास भयो ।

यस उद्योगको विकासकै क्रममा आकर्षण रट आइरन फर्निचर उद्योगको स्थापना २०५० वैशाख १० गते प्रयोगात्मक रूपमा भयो । यस उद्योगको उद्देश्य काठका सामानहरू जस्तै फलामबाट बनेका सामानहरूलाई उत्पादन गरी ग्राहकहरू समक्ष लोकप्रिय बनाई यसको बजारलाई वृद्धि गर्ने र केही हदसम्म भएता पनि काठको खपतलाई बचत गरी वातावरण संरक्षणलाई सघाउ पुऱ्याउने रहेको छ ।

शुरूमा यो सानो घरेलु उद्योगको रूपमा सञ्चालन भएको थियो । एक वर्षको अनुभवमा ग्राहकहरूको यस उद्योगप्रति सकारात्मक दृष्टिकोण पाइएको हुँदा यस उद्योगबाट उत्पादित वस्तुहरूको बिक्री वितरणको लागि एक बिक्री कक्षको आवश्यकता अनुभव भएपछि टेकुमा २०५१ साल फागुन २५ गते "आकर्षण" को नाममा एउटा

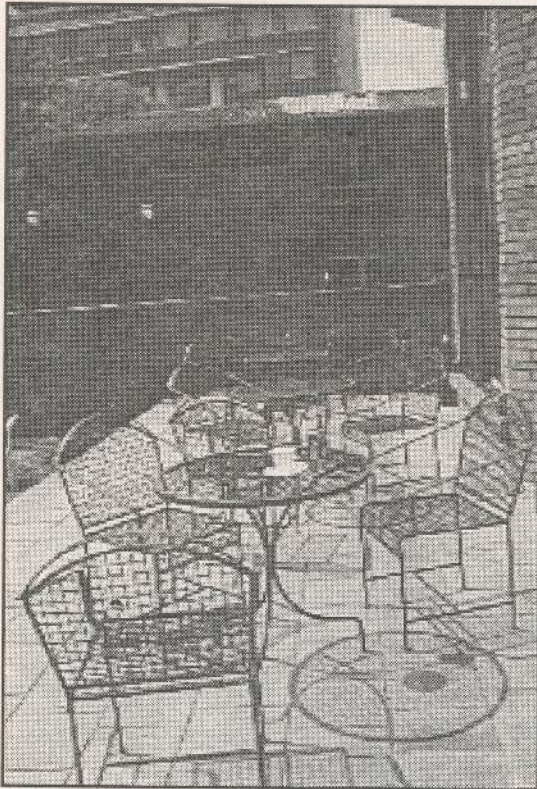
बिक्रीकक्ष खोलियो । बिक्रीकक्ष खोलिएपछि यस उद्योगबाट उत्पादित वस्तुहरूको बढ्दो मागलाई आपूर्ति गर्नका लागि स्वयम्भू छकडोलस्थित कारखानालाई थप कामदारहरू संलग्न गराई अरू व्यवस्थित गरियो । तीन वर्षको अन्तरालमा यस उद्योगबाट उत्पादित वस्तुहरूले काठमाडौँ र काठमाडौँ उपत्यका बाहिरसमेत बजार लिन सफल भयो ।

यस उद्योगबाट उत्पादित फर्निचरहरू विशेषतया बगैँचाका सेटहरू, किचेनका सेटहरू, बैठकका सेटहरू, उच्च र मध्यम दुवै वर्गका लागि लक्ष्य गरी उत्पादन गरियो । उच्च वर्गका



लागि बढी मूल्यमा आकर्षक डिजाइनका र मध्यम वर्गका लागि साधारण डिजाइनका कम मूल्यमा उत्पादन गरी बिक्री वितरण गरियो ।

यस उद्योगबाट उत्पादित फर्निचरहरू विशेष गरी तारे होटल र रेष्टुरेन्टहरूमा बढी मात्रामा वितरण हुन थालेको छ । तारे होटल र रेष्टुरेन्टमा यसले आफ्नो बजार लिन सफल भएको हुनाले यसको बजार काठमाडौँबाहिरसमेत फैलिन गएको



छ ।

आइरनबाट बनेका फर्निचरमा काठको फर्निचरमा जस्तो घमिरा, कीरा लाग्ने डर नहुने र यसलाई आगो र पानीले पनि असर नगर्ने हुँदा ग्राहकहरू बीच यसको लोकप्रियता बढ्दै गएको पाइएको हो । नयाँ-नयाँ डिजाइनका आकर्षक सामानहरू उत्पादन गर्न सकिएमा निश्चय पनि यस उद्योगले भविष्यमा आफ्नो विशेष स्थान बनाउन सक्ने कुरामा सन्देह छैन ।

आकर्षण रट आइरन फर्निचर उद्योगबाट घरमा प्रयोग हुने सामानहरू जस्तै फलामका आकर्षक दराज, बारबीक्यू (मासु सेक्ने चुलो) र बैठक कोठामा सजाइने कुर्सी, टेबल, क्याण्डल स्टैण्ड साथै बगैँचाको सजावटका लागि गार्डेन फर्निचर, झुला ल्याम्पपोष्ट इत्यादि यस उद्योगबाट उत्पादन हुने मुख्य वस्तुहरू हुन् ।

यस उद्योगबाट उत्पादित वस्तुहरूको प्रवर्द्धनका लागि यस उद्योगबाट बिक्री भएका वस्तुहरूको ग्यारेन्टी दिने, सामानहरू टुटफुट भएमा पुनः निर्माण गरिदिने, धेरै सामानहरू खरिद गरेमा ढुवानी निःशुल्क गरिदिने, बिक्री भइसकेको सामान मन नपरेमा फिर्ता गरिदिने तथा सामानहरूको जडान धरमै गएर गरिदिने हुँदा पनि ग्राहकहरूको यस उद्योगप्रति सकारात्मक दृष्टिकोण पाइएको छ ।

पुष्प व्यवसाय एवं उद्यमलाई प्रगतिको पथमा डोर्‍याउन सक्रिय रहेको
फ्लोरिकल्चर एशोशियशन नेपालद्वारा आयोजित वसन्त व्यापार मेला
२०५४ को सफलताको कामना गर्दछौं ।

Green Land Nursery

Kittini, Godawari, Lalitpur

फ्लोरिकल्चर एशोशियशन नेपालको कार्यप्रगति विवरण

जुलाई १५ देखि मार्च ३१, १९९८

१. वार्षिक साधारण सभा

प्रत्येक वर्षहरू सरह यस वर्ष पनि यस एशोशियशनको वार्षिक साधारण सभा होटल अर्किड त्रिपुरेश्वरमा सम्पन्न भयो । पदाधिकारीहरू एवं विभिन्न सदस्यहरू गरी जम्मा ३६ जनाको उपस्थितिमा सम्पन्न त्यस सभामा कृषि उद्यम केन्द्रबाट प्रबन्ध निर्देशक डा. श्रीदेवभक्त शाक्यको पनि उपस्थिति रहेको थियो ।

प्रबन्ध निर्देशक डा. श्रीदेवभक्त शाक्यज्यूले फ्लोरिकल्चर एशोशियशन नेपालले फूलबिरुवाको व्यवसायीकरणतर्फ अग्रसर रही व्यावसायिक उत्पादनका कार्यक्रमहरू परिचालन गर्दै लैजानुपर्ने आजको अवस्थामा त्यसै अनुरूपका कार्यक्रमलाई परिचालन गरेमा कृषि उद्यम केन्द्र सहयोग गर्न तयार रहेको तथा आगामी दिनहरूमा परिचालन गरिने कार्यक्रमहरूका लागि आवश्यक पर्ने सुभावहरू सहितको मन्तव्य दिई हौसला एवं प्रेरणा प्रदान गर्नुभएको थियो ।

फ्लोरिकल्चर एशोशियशनको विधान-बमोजिम आउँदो ३ वर्षका लागि नयाँ कार्यकारिणी समितिको छनौट तथा सन् २००० सम्ममा यस एशोशियशनले लक्ष्य गरेका मूलभूत कार्यक्रमहरूको कार्ययोजना (Plan of Action) पनि त्यस सभा-द्वारा पारित गरिएको छ ।

२. फार्मर टु फार्मर कार्यक्रम

विनरक इन्टरनेशनलको सहयोगमा मीसीसीपी युनिभर्सिटी अमेरिकाबाट नेपाल

आउनुभएका डा. हास्कीजले यस एशोशियशन-अन्तर्गतका विभिन्न सदस्य नर्सरीहरूमा भ्रमण गर्नुभयो । विनरक नेपालका डा. श्रीभीमेन्द्र कटुवाल तथा यस एशोशियशनको तर्फबाट उपाध्यक्ष श्रीअनुप राई र कार्यक्रम संयोजक श्रीगणेश दुङ्गानासहितको टोलीले उहाँलाई उपत्यकाका नर्सरीलगायत चितवन, विराटनगर तथा इहटरीका नर्सरीहरूको भ्रमण गराइएको थियो ।

भ्रमणबाट फूलबिरुवा व्यवसायमा आवश्यक पर्ने बजार व्यवस्थापन र रोगको निवारण सम्बन्धमा उहाँले सम्बन्धित नर्सरीहरूलाई जानकारी गराउनु भएको थियो । यस्तै निरीक्षण भ्रमणपछि डा. हास्कीजले तयार पार्नुभएको विस्तृत प्रतिवेदन यस एशोशियशनलाई उपलब्ध गराई फूलबिरुवाको विकास तथा सुधारका लागि अपनाउनु पर्ने नीति-बारे सहयोग पुर्याउनु भएको छ । नेपालमा फूलबिरुवाको थोक बजार (होलसेल मार्केट) खोली आवश्यक बजार सिर्जना गर्नु ज्यादै सान्दर्भिक रहेको कुरा उहाँको प्रतिवेदनमा उल्लेख गरिएको छ ।

३. निकासी प्रवर्द्धन कार्यक्रम

वाणिज्य मन्त्रालयको आर्थिक सहयोगमा निकासी प्रवर्द्धनसम्बन्धी कार्यक्रम सञ्चालनका लागि समय-समयमा वाणिज्य मन्त्रालय तथा यस एशोशियशनका कार्यकारिणी समितिको बैठक बसी केही आवश्यक कार्यक्रम सञ्चालन गर्ने सम्बन्धमा परियोजना तयार गरी पेश गर्ने कार्य भइसकेको छ । चाँडै नै उक्त कार्यक्रमहरू कार्यान्वयन गर्ने तर्फ काम भइरहेको छ ।

४. बृहत् गुलाफखेती

कृषि उद्यम केन्द्रको आर्थिक सहयोगमा नेपालमा गुलाफखेतीको परीक्षण उत्पादनपछि बृहत् गुलाफखेती गर्नेतर्फ यस एशोशियशनको समय-समयमा बैठक बसी परियोजना तयार गर्ने कार्य भइरहेको छ । अनुमानित ५० रोपनी जग्गामा खेती गरिने लक्ष्य राखेको यस योजनाका लागि सहभागीहरूको छनौट गर्ने कार्य भइरहेको छ ।

५. पुष्प थोकबजार

पुष्प थोकबजार स्थापना गरी नेपालका पुष्प व्यवसायीहरूलाई आवश्यक बजार सिर्जना गराई उनीहरूको व्यावसायिक विकास गराउन स्थानको छनौट गर्ने, कालीमाटी थोकबजार सञ्चालन प्रक्रिया बुझ्ने र आवश्यक परियोजना तयार गरी आवश्यक सुभाषको लागि कृषि उद्यम केन्द्रमा पेश गरी सकिएको छ ।

यसको अन्तिम तयारीका लागि उपत्यका बाहिरका नर्सरी सदस्यहरूको समेत सहभागी गराउने सम्बन्धमा बृहत् बैठक सम्पन्न भइसकेको छ । विगत वर्षहरूमा गरिएको बजार अध्ययन तथा विनूरक इन्टरनेशनलबाट आएका फूलबिरुवा विशेषज्ञ डा. हास्कीजले यस एशोशियशनलाई दिनुभएको प्रतिवेदनले पनि यसको स्थापनाको पुष्टि गरेको छ ।

६. व्यावसायिक बैठक

सदस्य नर्सरीहरूलाई टिस्यू कल्चर प्रविधि बारे जानकारी गराउने उद्देश्यले टिस्यू कल्चर उत्पादक र नर्सरीहरूबीच अन्तरक्रिया गराउने उद्देश्यले कृषि उद्यम केन्द्रबाट बोलाइएको बैठकमा त्यस प्रविधि बारेमा आवश्यक अन्तरक्रिया भएको छ । निकट भविष्यमा यससँग सम्बन्धित गोदावरी फूलको खेतीतर्फ आवश्यक कदम चालिने भएको छ ।

७. फोहरादरबार मेला

अमेरिकी स्वतन्त्रता दिवसको उपलक्ष्यमा फोहरादरबार काठमाडौँको आयोजनामा सम्पन्न मेलामा यस एशोशियशनका पाँच जना सदस्यहरूले नेपालमा उत्पादित तथा केही बाहिरबाट ल्याइएका फूलहरूको प्रदर्शनी तथा व्यापार गर्ने उद्देश्यले भाग लिएका छन् । नेपालस्थित विभिन्न विदेशी कुटनीतिक नियोगहरूको सहभागिता रहेको यस मेलामा सहभागीहरूले रु. १ लाख २५ हजारको व्यापार गरेका छन् । केही कूटनैतिक नियोगहरूमा वर्षभरि सजावट फूलको आपूर्ति गर्ने मौका पाउनाले यस व्यवसायको वृद्धि भएको छ ।

८. गोदावरी पुष्पप्रदर्शनी

शाही वनस्पति उद्यान गोदावरीको आयोजनामा सम्पन्न गोदावरी पुष्पप्रदर्शनी मेलामा यस एशोशियशनका चार जना सदस्यहरूले भाग लिएका थिए । विभिन्न प्रकारका गोदावरी फूलको बारेमा थाहा पाउने मौका यस प्रदर्शनीले दिएको छ । यस्तै श्री ५ को सरकारको फूलबिरुवासम्बन्धी निकायसँगको सम्बन्ध सुदृढ भएको छ । करिब २० हजारको व्यापार यस प्रदर्शनीमा हाम्रा सदस्यहरूले गरेका छन् ।

९. शरद पुष्पव्यापारमेला

ललितपुरको जाउलाखेलको खुला चौरमा यस वर्ष शरद पुष्पव्यापारमेलाको आयोजना गरियो । शरद पुष्पव्यापारमेला पहिलो पटक आयोजना गरिए पनि पूर्णरूपले सफल हुन गएकोले यसले आगामी वर्षहरूको लागि हौसला बढाएको छ । बन्द हलमा भन्दा खुला ठाउँमा पुष्प प्रदर्शनी उपयुक्त हुने अनुभव पनि यसले दिएको छ । झण्डै बीस नर्सरीहरूको सहभागिता शरद पुष्पव्यापार मेलामा रह्यो ।

Members' List

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28. Mr. Krishna Bhakta Budhathoki
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29. Miss. Sabanam Shrestha
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30. Mrs. Laxmi Pradhan
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31. Mr. Yogesh Pradhan
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32. Mr. Punya Prasad Timilshine
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33. Mr. Khem Raj Poudyal
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34. Jyoti Pradhan
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35. Mrs. Sabita Dhungana
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36. Mrs. Sarina Shah
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37. Mr. Ganesh Mandal
Shree Ganesh Nursery
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38. Mr. Surendra Singh Thapa
Sugam Nursery
4/129, Bishalnagar, Kathmandu
Tel: 414382 (R), 226008 (O)
39. Mr. Mahendra Raj Joshi
or, Ramesh Bajracharya
Nursery Enterprises
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40. Mr. Khushi Ram Gurung
Ganga Nursery
Sharadanagar-2, Rampur,
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Horticulture Department/IAAS
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41. Mrs. Jamuna Kayastha
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42. Mr. Kishor Pradhan
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Lalitpur
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43. Mr. Bharat Psd. Nepal
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44. Mr. Bhim Raj Adhikari
Shree Mahalaxmi Nursery
Itahari-8, Sunsari
Tel: 025-80252 (R)
45. Mr. Jnan Hankay Rai
Hankay Rai & Sons
P.O. Box 1750, Kathmandu
Tel: 523129 (R)
46. Ms. Sushma Regmi
Suravi Suman Nursery
Lagankhel (Dhashinkali),
Lalitpur
Tel: 521974 (R)
47. Mr. Sir Bahadur Thapa
Jhamsikhel, Lalitpur
Tel: 521211, Ext. 217
48. Mr. Gyan Maharjan
Jai Kishan Nursery
Battisputali (Dhobi Khola)
Tel: 250344 (B)
49. Mr. Hari Ram Shrestha
Ever Green Nursery
Godawari-1, Lalitpur
Tel: 290567
50. Ms. Binita Basnet
Clay & Craft
Kupondol, Lalitpur
Tel: 525606 (O), 430973 (R)
51. Mr. Shiva Pd. Pokharel
Ritu Nursery
New Baneshwor, Man Bhawan
Tel: 482901 (R)
52. Mr. Jagannath Thapa
J.N. Nursery
Godawari-3, Tukhel

53. Mr. Bharat Bikram Thapa
Ghar Agan Service (Pvt.) Ltd.
Chabahil-6, Kathmandu
Tel: 481583 (R), 243960 (B)
54. Mr. Govinda Dash Shrestha
Himalayan Nursery Int'l.
Saibu-5, Bhaishapati, Lalitpur
P.O. Box 324, Kathmandu
Tel: 525332 (R), 523110 (B)
55. Mr. Ram Badal Shah
Adarsha Nursery
Ramanand Chowk, Janakpur
Tel: 041-20757 (O)
56. Mr. Shyam Dhoj Karki
Kuleshwor, Kalimati
P.O. Box 5533, Kathmandu
Tel: 272768 (R)
57. B.S. Pal
Himalayan Floratech Pvt. Ltd.
P.O. Box 423, Jawalakhel
Tel: 527465 (O), Fax: 538236
58. Ms. Meera Maskey
Jyatha, Khabahal, Kathmandu
Tel: 214303 (O), 227046, 222730 (R)
59. Trilok Singh
Founder Member
Floriculture Association Nepal
60. Gopal K. Dewan
Founder Member
Floriculture Association Nepal
61. Sagar Guruwacharya
Founder Member
Floriculture Association Nepal
62. Sulochana Shah
Founder Member
Floriculture Association Nepal
Tel: 538273, 538473
63. Khadga Bikram Rai
Founder Member
Floriculture Association Nepal
64. Mrs. Yagya Ghale
65. Mr. Rajesh Shrestha
The Standard Enterprises
Bansbari, Kathmandu
Tel: 371267
66. Mr. Prasant Gazmair
Fragrance (Flowers & Plants)
Opp. Gemini Grocer,
Jawalakhel, Lalitpur
Tel: 524389 (R), 529706 (B)
67. Mr. Gopal Das Shrestha
Goken Art
Maharajgunj, Kathmandu
Tel: 427134 (R)
68. Mr. Krishna Bahadur Shrestha
Shree Krishna Gulaf Nursery
Godamchour, Ward No. 7,
Lalitpur
69. Mrs. Sumitra K.C. (Joshi)
Asmitra Nepal
P.O. Box 3717, Kathmandu
Tel: 224649 (R), 243584 (B)
70. Mr. Basu Dev Amatya
The Flower
P.O. Box 2935, Kathmandu
Tel: 522774 (R), 535837 (B)
71. Mr. Buddhi Ratna Sherchan
Shree Mahalaxmi Agriculture
Input Industries
P.O. Box 1174, Kathmandu
Tel: 476185 (R)

72. Dr. Hari Prasad Pokharel
Institute of Natural Health
P.O. Box 2789, Kathmandu
Tel: 479109 (R)
73. Dr. Govinda Tandon
Vasanta Nursery
Dhobi Khola, Battisputali,
Kathmandu
Tel: 470997 (R), 476343 (B)
74. Yadav Karmacharya
C/o Microplants Nepal Pvt. Ltd.
Harisiddhi-1, Lalitpur
P.O. Box 1602, Kathmandu
Tel: 373353 (R), 524558 (O)
75. Raghu Bista
Namaste Flowers
Kirtipur Municipality-12
Kathmandu, Nepal
Tel: 225802, 212635
76. Babu Raj Pradhan
Raj Kamal Nursery
Kakarvitta-8, Jhapa,
Tel: 023-29006 (PP)
77. Purna Lal Maharjan
Guras Nursery
Dholahiti, Sunakothi-9
Tel: 525253
78. Vijaya Laxmi Godar
Om Sai Nursery
Bansbari, Kathmandu
Tel: 372235
79. Kiran Ghimire
Tangal, Gairidhara
Tel: 415734
80. Sumad Rai
Green Land Nursery
Kittini, Godawari
81. Shreedhar Karki
Bagmati Nursery
Tinkune, Kothshwor
Tel: 484142
82. Pratibha Shakya
Bhotebahal, Kathmandu
Tel: 253921

"Flowers"

Certainly the most beautiful gift of the nature we can offer to you.

Life has many colours so does a Flower.

*So, why not make it a part of your life and let it blossom right into
the heart? Let us share every happy moment of life together.*

Remember us for:

- Cut flowers, gladiolus, roses, ziberas, lilioms, carnation, tube roses, incus and many more.
- Different varieties of carpet grasses for lawn.
- Extensive varieties of indoor and out-door plants.

CHAMELI

"The Flowers and the Plants"

Pulchowk, Lalitpur (Near St. Mary's School)

Phone: 521199

Contact Person: Kishore Pradhan

Participants Name List

S.N.	Name of Participants	Stall No.
1.	Womean in Floriculture	E 1, 2
2.	Bodhi Brikchya Nursery	E 3, 4, 5
3.	Fragrance Flowers	E 6, 7
4.	Evergreen Nursery	E 8
5.	Smarat Restaurant & Bar	E 9, 10
6.	Green Land	E 11
7.	Vasanta Nursery	E 12, 13, 14
8.	Adarsha Nursery	E 15
9.	The Jazzar Nursery	E 16, 17
10.	Ganga Nursery	E 18
11.	Amber Nursery	E 19, 20, 23, 24
12.	The Standard Nursery	E 21, 22, 25, 26
13.	STC	W 27, 28
14.	Hankey Rai & Sons	W 29, 30
15.	Parijat Nursery	W 32, 33
16.	Jai Kisan Nursery	W 34, 35, 36
17.	Bagmati Nursery	W 37, 38
18.	Flora Farm	W 39, 40
19.	Ritu Nursery	W 41, 42
20.	Tree Seeds & Flowers	W 43
21.	Chameli Nursery	W 44, 45, 48, 49
22.	J.N. Nursery	W 46, 47
23.	Akarshan Furniture	W 50
24.	Nursery Enterprises	W 51
25.	Gokem Art.	E 7.5
26.	Sun Flower Nursery	M 1
27.	Central Nursery	M 2
28.	Clay and Craft	M 3
29.	Department of Plant Resources/HMG	W 31

FAN ACKNOWLEDGES THE SUPPORT AND CONTRIBUTION OF THE FOLLOWING SPONSORS

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- 2. TOYOTA ORGANIZATION**
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- 4. NEBICO**
- 5. HALL MARK, BATTISPUTALI**
- 6. MR. MAHENDRA KRISHNA SHRESTHA**
- 7. PANCHAKANYA GROUP OF INDUSTRIES**



AGRO ENTERPRISES CENTRE

कृषि उद्यम केन्द्र

The Agro Enterprise Centre (AEC) established as an operating division of the **Federation of Nepalese Chambers of Commerce and Industry**, assists Nepalese entrepreneurs create agro-enterprise, improve their competitive market position, and increase their exports of high value agriculture products. The AEC provides services to clients on a cost sharing basis, routinely or on request. For agricultural prosperity through agro-enterprise development

Contact:

*The Agro Enterprise Centre, FNCCI Building, Sahid Sukra Milan Marga, Teku, Kathmandu
P.O. Box No. 7651, Tel: 232260, 242971, Fax: 977-1-227322 E-mail: agroaec@mos.com.np*

The AEC:

- Maintains a data bank with domestic and international market and price information, an inventory of agricultural processors, producer groups and associations, and relevant laws and regulations.
- Prepares and circulates periodically the AEC newsletter focusing on agro enterprise development.
- Offers business, marketing and technical skill training in, e.g. post-harvest operations, quality assurance and marketing of agriculture products.
- Advocates and educates, on behalf of private agro-entrepreneurs and commodity associations, on such concerns as changing the rules and regulations which affect the growth of private agro business, preventing unnecessary market regulations, etc.
- Identifies and encourages innovative venture proposals that serve multiple sector, small farmers and firms.
- Assists the formation of the agro based Commodity associations and their promotion.

On Request the AEC:

- Initiates research and directs environmental appraisals.
- Carries feasibility studies on specific commodities, markets and processes.
- Advises clients on their agro business plans.
- Undertakes contract research to improve product quality and competitiveness.
- Assists with high value agricultural products' export promotion.