Floriculture Trade Fair - 2003

SOUVENIR

Floriculture Association Nepal (FAN)

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FLORICULTURE TRADE FAIR 2003

SOUVENIR

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शुभकामना

नेपालको कृषि उद्यमलाई व्यवसायिकरण गर्ने क्रममा वि.सं. २०४८ सालदेखि नेपाल उद्योग वाणिज्य महासंघले कृषि उद्यम केन्द्र मार्फत विभिन्न संचालन गर्दै आएको र केन्द्र मार्फत प्रवर्द्धन गरिएको फ्लोरीकल्चर एशोसिएन नेपालले आफ्नो स्थापनाकाल देखिनै विभिन्न जातका फूलहरुको उत्पादन, विकास र बिक्री वितरणको प्रवर्द्धनमा खेल्दै आएको भूमिका अत्यन्त प्रशंसनीय छ।

यस क्रममा फ्लोरीकल्चर एशोसिएसन नेपालले नेपालको पुष्प व्यवसाय र यससँग सम्बन्धित उद्योगको विकासका लागि विभिन्न स्वदेशी व्यवसायीलाई सहभागी गराई नै चैत्र २५ देखी २८ गतेसम्म भृकुटीमण्डप प्रदर्शनीहलमा पुष्प व्यापार मेला आयोजना गर्न लागेकोमा मलाई अत्यन्त खुशी लागेको छ। यस्ता मेला पुष्प व्यवसायको विकास तथा यस व्यवसायमा लाग्न उत्सुक व्यक्तिहरुका लागि प्रेरणाको स्रोत हुने कुरामा दुईमत छैन।

नेपालको भौगोलिक विविधता एवं जलवायु पुष्प व्यवसायको लागि निकै उपयुक्त मानिएको तथा पुष्प व्यवसायले उद्योगको रुप लिई सकेको आजको अवस्थामा आन्तरिक बजारमा फूलको माग पूर्ति गर्नुको साथै अन्तर्राष्ट्रिय बजारको माग र चाहना अनुरुप फूलहरु उत्पादन गरी निर्यात गर्नु पर्ने आजको खाँचो हो। यसलाई परिपूर्ति गर्न यस्ता मेलाले मार्ग निर्देशन पनि गर्ने अपेक्षा मैले गरेको छु।

अन्त्यमा, उक्त मेलाका अवसरमा एशोसिएसनले विभिन्न पुष्प व्यवसाय सम्बन्धी उपयोगी सामग्रीहरु सहित प्रकाशित गर्न लागेको पुष्प विशेषांक (Souvenir) पुष्प व्यवसायी र यस क्षेत्रमा रुची राख्नेहरुका लागि अत्यन्त उपयोगी हुने विश्वास व्यक्त गर्दै उक्त प्रकाशनको साथै पुष्प व्यापार मेलाको पूर्ण सफलता र एशोसिएसन तथा एशोसिएसनका सम्पूर्ण सदस्यहरुको उत्तरोत्तर प्रगतिको लागि हार्दिक शुभ-कामना व्यक्त गर्दछु।

(विनोद बहादुर श्रेष्ठ)
कार्यवाहक अध्यक्ष

Agro Enterprise Center

Federation of Nepalese Chambers of Commerce and Industry

कृषि उद्यम केन्द्र

नेपाल उद्योग वाणिज्य महासंघ

शुभकामना

नेपालमा पुष्प व्यवसाय र उद्योग विकास तथा प्रवर्द्धन कार्यमा फ्लोरिकल्चर एशोसिएसन नेपालबाट बिगत १२ वर्ष भित्र खेलेको भूमिका नेपाल उद्योग वाणिज्य महासंघ/कृषि उद्यम केन्द्रको तर्फबाट सराहाना गर्दछु।

विगत वर्षहरुमा निरन्तर पुष्प प्रदर्शनी, पुष्प व्यापार मेला, अन्तर्राष्ट्रिय व्यापार मेलाहरुको आयोजनाका साथै गत असोज २०५९ मा AGROEXPO 2002 मा समेत सह-आयोजकको रुपमा काठमाडौंमा बृहत पुष्प मेला आयोजना गरी ल्फोरिकल्चर एशोसिएसन नेपालले जनमानसमा पुष्पको महत्व र चाहानामा अभिबृद्धि गराउन एकतर्फ अति सफल भएका पाएका छौं भने अर्को तर्फ पुष्प व्यवसायी/उद्यमीहरुमा विशेषता/विविधता हासिल गर्न र व्यवसाय/उद्योगलाई देशव्यापि रुपमा विकास र विस्तार गर्नमा निकै सहयोग पुऱ्याएको हामीले पाएका छौं।

पुष्प व्यवसायी/उद्योगलाई अझ प्रभावकारी रुपले विकास तथा विस्तार गर्न र नेपालबाट निकासी गर्न सक्षम बनाउने कार्यमा नीतिगत सहयोगहरुको अति जरुरी महशुस गरेका छौं। यस पटकको "पुष्प व्यापार मेला २००३" को आयोजनाले नीति निर्माता र विकास कार्यमा समर्पित सबै पक्षको ध्यानाकर्षण हुनाको साथै व्यवसायी/उद्यमीहरुलाई सहयोग र सफलता मिल्न सक्नेछ भन्ने अथाह विश्वास लिएका छौं।

अन्तमा, उक्त मेलाको अवसरमा एशोसिएसनले प्रकाशन गर्न लागेको स्मारिका अत्यन्त उपयोगी र रोचक हुने विश्वास व्यक्त गर्दै मेलाको सफलता र एशोसिएसनको उत्तरोत्तर प्रगतिको लागि शुभकामना व्यक्त गर्दछु।

२०५९/१२/२१

कृष्ण प्रसाद ताम्राकार

अध्यक्ष

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Floriculture Association Nepal expressing a very happy, prosperous, succesful & peaceful New Year 2060 strive to work

- Generating awareness of importance of floriculture product
- Making FAN self sustainable
- Obtaining land and fund for FAN
- Helping upgrade production management and marketing skills
- Economic prosperity through export of floriculture products

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Editorial

We take great pleasure to present you our souvenir of Floriculture Trade Fair 2003.

Floriculture Industry in Nepal is still in its infancy period to compete with the world market.

We would first like to thank Agro Enterprises Centre for its continous support to us and also to Export Promotion Board/Ministry of Commerce/HMG for supporting FAN in various programs including export promotion. We would also like to thank all the advertisers to help this souvenir realize.

There were times when floriculture projects mushroomed which were set by people with little knowledge of floriculture trade and culture. Several of them were lured into it by golden goose stories expecting quick and high returns.

Those who have survived have learnt from past mistakes and are striving towards better quality and competitive prices.

This industry is recognized as a sunrise industry observing the trend of growing International trade which exceeded 31 billion U.S. dollars in cutflower section alone. There are many other sectors such as ornamental plants, tissue culture, dry flowers, bulbs which has been making an improtant presence in the world market.

With our country joining the WTO we have to identify our strengths and weaknesses in floriculture trade and be alert to diversify suited to the needs of the floriculture market of the world .

It is upto the government to help floriculture units to compete with those from Zimbabwe, Zambia, Israel, Kenya, India, Shrilanka and Malaysia as these countries have a clear edge over Nepal by the way of exemption of export and import duties as well as freight. Clear policies for agro industries with view of the floriculture industry should be formulated.

Awareness of our potentialities is a must and strategies have to be developed to compete in the world market in the same way as sportsmen compete in Olympics, FIFA, or the World Cricket game after thorough preparation of serveral years in advance; as this industry will one day lead Nepal towards economic prosperity.

Contents

Best Plants for a superb garden

Neera Pradhan
Department of Plant Resources
Thapathali, Kathmandu

Nature plays an important role in the development of plants, flourishing them for beautification of the country. For gardeners and plant lovers, making the right selection of plants is the single most important ingredient for success in gardening. So it is necessary to identify the kind of plants we want to grow and understand the condition in which it will grow, successfully. Obviously we should have a clear idea of different conditions in which plant grows. Before planning a beautiful garden, we must have sound knowledge of what a plant requires in terms of light, water, temperature, soil type and nutrients. Among these requirements, soil is essential to all plants. It holds air and moisture such that the plants' roots are not deprived of oxygen, and also balances the current nutrient and the appropriate level of lime and acidity. So, soil is one of the major elements in the success of any garden, apart from its design and construcrion .

Here is a list of some plants suitable for acid soil, chalk soil and clay soil.

Plants for Acid soil

The following plants can be grown in acid soil.

Tree	Shrub	Prennial, Ground cover and Climbers
Abies Koreana	Berberis (in variety)	Acotinum sp.
Acer rubrum	Cotinus sp.	Alchemilla molllis
Crataegus sp.	Ligustrum ovalifolium	Artemisia absinthuim
Larix deciduas	Osmanthus (in variety)	Berginia cordifolia
Magnolia grandiflora	Sarcococca {in variety}	Buddleja {in variety}
Sorbus {in variety}	Vibernum {in variety}	Campanula {in variety}
		Centhranthus rubber
		Galium odoratum
		Geranium (in variety)
		Iris germanica
		Jasmine officinale
		Lamium maculatum
		Ligularia (in variety)
		Primula(in variety)
		Tradescantia (in variety)
		Vernica prostrata
		Vinca minor
		Viola (in variety)

Plants for Chalk soils

Chalky soil occurs naturally in limestone areas and lime loving plants are more numerous than acid loving plants. This soil can be improved by adding leaf mould, farmyard manure and compost to increase the nutrient content and water retaining capacity.

Tree	Shrub	Prennial, Ground cover and Climbers
Abies Koreana	Aronia arbutifolia	Alchemilla mollis
Acer (in variety)	Berberis (in variety)	Anemone sp.
Betula (in variety)	Buddleja (in variety)	Aster sp.
Ficus carica	Chaenomelles japonica	Astilble sp.
Larix deciduas	Cornus (in variety)	Berginia sp.
Mallus (in variety)	Cotinus coggygria	Campanula carpatica
Pyrus (in variety)	Euonymus fortunei	Dianthus (in variety)
Sorbus (in variety)	Ligustrum ovalifolium	Digitalis sp. (in variety)
Mahonia sp.	Geranium (in variety)	
Myrtus communis	Helianthemum (in variety)	
Salvia officinalis	Iris (in variety)	
Thuja occidentalis	Lamium maculatum	
Vibernum (in variety)	Nepeta sp.	
	Pentemon (in variety)	
	Phlox paniculata	
	Primula auricula	
	Veronica prostrata	
	Vinca (in variety)	

Plants for Clay soil

Although part of the garden landscape in many areas, clay soil can be difficult to deal with because of waterlogging in winter and baked hard in summer. Plants suffer either from too much water or from drought. Here is a selection of plants that are attractive and tough enough to cope with these far from ideal conditions.

Tree	Shrub	Prennial, Ground cover and Climbers
Acer (in variety)	Artemisia sp.	Alchemilla mollis
Betula sps	Berberis sp.	Anemone sp.
Catalpa sp.	Chaenomeles sp.	Aquilegia sp.
Malus sp.	Cornus sp.	Aster sp.
Pyrus sp.	Lavendula sp.	Aucuba japonica

	Ligustrum ovalifolium	Berginia sp.
	Mahonia sps.	Buddleja sp.
	Roses	Campanula carpatica
	Salvia officinalis	Dianthus sp.
	Syringa sps.	Dicentra sp.
		Digitalis sp.
		Echinops bennaticus
		Geranium sp.
		Hemerocallis sp.
		Inula magnifera
		Iris laevigata
		Lamium maculatum
		Ligularia sp.
		Primula floridae
		Pulmonaria sacchrata
		Tradescantia sp.
		Trollius europaeus
		Veronica prostrata
		Vinca minor

The beauty of any garden can greatly be enhanced by carefully selecting, and planting plants, in suitable places. Plants (shrub, annuals and biennials) attract wildlife of many kinds from birds, bees and butterfly and adding balance to the environment thus helping in bio-diversity conservation. So it is better to carefully think about the plant before gardening, which will save considerable effort, money, also helping in beautification of surrounding.

Bulbous Plants for Gardening

Mrs. Rose Shrestha
Garden Officer
Royal Botanical Garden

Bulbous plants, to attractive flowers especially in spring and winter and easy cultivation, have a great popularity in the world of flowers since pre historic time. In the public parks and garden they provide spectacular and crowd pleasing spring displayers. In cut flower market also fifty percent of cut flower include bulbous plants. Not only in spring but they can give colors in the garden throughout the year. By choosing the right bulbs, choosing the right place to plant them and taking certain easy steps, perennialized and naturalized flower bulbs can perform well in many situation – borders of mixed perennials, rock and heather gardens, water garden, natural gardens and in in-lawn application. Diversification of these plants make them well flourished in hills as well as in plains.

Bulbous plants include those plants, which produce fleshy storage organs that may be modified underground stem or roots and area enriched with nutrients and moistures. The main purpose of this storage is to tide the plant over its period of natural dormancy when the soil is dry and cold, for multiplication of the plants. So most of the bulbs are perennial, except cardio crinum which die after flowering. They under go 3 phases within a year. Viz. vegetable growth, Flowering and dormancy one after the other. Vegetable growth proceeds flowering Gladiolus where as it succeeds after flowering in Amaryllis and Haemanthus.

Types of Bulbous Plant

These plants can be divided into following types on the basis of different storage organs they have:

True Bulb

Plants having pear shaped or oval bulb that represent a complete plant are grouped into this type. E.g. Tulip, Lilies, Narcissus, etc. It has embryonic flower surrounded by undeveloped shoots and body is covered by series of fleshy scales. There scales are modified leaves held together by basal plant at the bottom. Scales contain the nutrients, which sustain the plant during dormant period and first stage of growth. In some cases they are closely packed as in Hyacinths and in some case they are loose as in Lily. Most of the bulb has papery skin called tunic, which protects the tissue within. But lily does not have, so it can be damaged with wrong handling.

Corn

Plants having rounded and flattered bulbs which are covered by a protective smooth and fibrous tunic, with a central growing point or two at the top and a basal plate from which root arise at the bottom. It looks like a true bulb but it doesn't have

series of scales. Its main nutrient body is a stem base. Its tunic is made up of dry leaf base from the previous season. It lasts just one year, when active growth is under way, food store is depleted and it starts to shrivel. At the same time one or more new corns develop on the top at the sides of old ones. These new corns form next year's planting material e.g. Gladiolus, Crocus Freesia Ixia, Acidanthera.

Gladiolus froms small cormlets around the edges. These tiny cormlets take 2-3 years to flower.

Tuber

Plants having swollen underground stem falls under this type. These are called tubers. A tuber does not have basal plate nor have protective fibrous. The growing points arise randomly around the tuber. e.g. Potatoes. The bud or eyes are scattered over the surface and so stems appear from the sides as well as top of the structure. There is no standard shape of tuber. e.g. Cyclamen, Gloriosa, Anemone, and Begonia.

Rhizome

This group of plants has rhizomes as storage organs, which difer from other by growing horizontally and spreading outwards either partly or completely below the soil surfaces. Main growing point is at the tip but other buds are formed along upper surfaces and along sides. Roots develop from buds under sides of rhizome. Cutting these long rhizomes into segments with root and at one bud in this case does propagation. E.g. Convallaria, Cannas, Achimenes, Zantedeschia, Agapanthus.

Tuberous root

Plants having swollen roots rather than swollen stem fall under this group. They are named as root tuber of tuber like root. These organs borne a cluster from crown, which is base of old, stem. These modified roots provide nutrients. These are propagated by cutting of individual storage root with a bud bearing section at the top. E.g. Dahlia, Clivia, Alstroemeria, Ranunculas.

Pseudobulbs

Some bulbcus plants have specialized storage organ called pseudobulb. It is a thickened stem base and grows above the soil and is green in nature. It may be oval, cylindrical, and globular or cane type. Both leaves and flowers arise from it. E.g. Orchids

Application

Mass Planting

Most of the bulbous plants can create wonderful visual effects in mass planting. Special effects are achieved by mass planting of a single variety. There are many Narcissi or Daffodils that lend themselves beautifully to mass planting. Not only when grown amongst shrubs, but when plant drifts along grassy medians, slope of traffic circles. They need initial planting and no need of annual lifting, drying off, and storing or subsequent replanting. If the bulbs are allowed to remain undisturbed and are fertilized in the fall or early spring regularly, these offsets soon become large enough to flower. Drifts of Daffodils, Crocuses, studding shallow bank or blue sea of muscari lapping round the trunk of

blossom decked flowering cherry they create great sweeps of color across the landscape, which can be quite breathtaking.

The successful establishment of these lovely plants is dependent upon the quality of the bulbs purchased. They should not be shriveled, brownish or dried out. Only purchase them if they have been properly stored in sand and when handled feel quite firm.

Naturalizing under and between trees and shrubs

Anemones, Colchicum, Crocus, Erythronium, various Narcissi, *Ornithjogalum Nutans, Scilla bifolia, Scillia campanulata* flourish well planted along the edge of rows of broad-leaved trees and directly under trees. The most suitable trees for bulbs and turbers are alder, ash birch, and cherry/Japanese cherry, oak and fruit trees. Low shrubs such as Cotoneaster varieties can be given a colorful face-lift with hardly Narcissus varieties in spring, lilies in summer of Colchicum in autumn. Similarly *Mahonia aquifolium* with yellow Narcissi. Prunus types with *Muscuri armeniacum. Magnolia stellata* with *Muscuri* alba. Magnolia *Soulangiana* with late-flowering pink double tulips makes a good combination. Rose can be combined with Narcissus varieties, botanical tulips, *Chionodoxa, Scilla siberica* and other special bulbous plants. Unitl the rose bushes are in bloom again, the earlier-flowring bulbs will provide a lively picture.

Bulbs in beds and borders

Bulbs are ideal for formal beds also. Narcissus, Galanthus, Crocus, Muscari, Chinodoxa and Scilla can be successfully grown in beds making very colorful display. Similarly sun loving bulbs like pink *Nerine, Crocosmia, Montbretia, Acidanthera, Amaryllis, Tigridia and Zephyranthes candida* can add color gloriously to the beds against wall of warm South and West aspect. Now a days where informal mixed border are a must for small gardens, one just needs planting skills in arranging plants. Daffodils make a good show with rose bushes while tulips are effective with wallflowers. Besides this informal planting of different varieties with different heights also can make beds and borders a very pleasing display, just we have to be careful about blooming behavior of the plants we choose. We can also use bulbs for permanent planting in the borders to add colors to the basic scheme of landscape e.g. Crown imperials, Lilies, Foxtail lilies, tall Narcissi along with low growing shrubs like Erythronium, Corydalis, Scilla etc.

Bulbs in containers and boxes

Very lovely result can be achieved with flower bulbs planted in containers and boxes. When placed in residential areas, plazas or along approach roads, they announce the arrival of spring. Planting a varied range can extend the flowering season. Preference should be given to low-growing types that are not sensitive to wind. If quick-change containers are used, the inner planter can be removed after spring flowering and replaced by a planter with summer blooming bulbs or annuals. Movables boxes, planted for example with vividly-colored tulips, narcissi or hyacinths

are ideally suited for brightening up indoor or outdoor events.

Flower bulbs also add much-needed color to boxes planted with shrubs and perennials. They are not only appreciated in shopping centers and industrial parks, but also in office and hotel gardens.

In greenhouses also various bulbous plants can be displayed. Most of them are summer or autumn flowering. Depending upon varieties the bulb may be left on container during their dormant period or it may be removed from the pot and stored in peat. Eucharis, Acidanthera, Amyrallis, Freesia, Nerine, Pancratium, Tritonia and Zephyrananthes are cool greenhouse plant. Similarly warm greenhouse plant include Achemenes, Canna, Clivia, Crinum, Gloriosa haemanthes, Hippeastrum Hymenocallis, Ornithogalum, Polianthus.

Bulbs for water and rock gardens

Flower bulbs are also ideal for banks of nature as well as artificial brooks, ponds and pools. Various types of Alliums, Fritillaries, Iris, Scilla, Chionodoxa and different kinds of Narcisssi are included in this category, which prefer a some what moist habitat. Some bulbs like tulips, Iris recticulata, Etythronium and some types of Narcissi are suited for the open, sunny habitat and dry warm soil with stone outcrops and contours of rock gardens. Low growing bushy plant such as *Anemone Blanda, Oxalis adenophylla and Allium Karataviense* with their roundish inflorescence are also visually attractive in pocket of rock garden.

Planting and after care

We should be ensured for healthy planting material. Any soft or mushy bulb that shows signs of rot or mildew should be avoided. If the bulbs cannot be planted immediately, store them in a cool, dry and dark place with sufficient air circulation.

For early-flowering species such as; Crocus, Allium paradoxum, Corydalis, Galanthus and Anemone, September-October is the correct time for planting. For those, which flower later, October-November is preferable. Bulbs that are early flowering are highly susceptible to drying out and so planting them immediately is preferred. When this is not possible they should be stored at cool temperature in sand or fine peat so that they do not dry out.

The cultivation of bulbous plants is not so difficult. They need just good, friable well- drained compost. The soil should be prepared a week before planting by digging and weeding thoroughly. The acidity/ alkalinity (pH) of the soil ideally should be between 6 and 6.5. It can be increased by adding garden lime or lowered by the addition of peat (which has very low pH of 4). It is also treated with Phorate and Bavistim to prevent soil borne diseases. Addition of handful of bone meal per plant in the soil proves beneficial.

Watering

Water thoroughly to reach the deep-seated roots; superficial sprinkling of water may harm the plants. Spring flowering plants shouldn't be watered up to flowering stage, but it is essential to keep foliage growing as long as possible. While summer and autumn flowering plants such as Dahlia and Gladioli do need watering during drought. Evergreen bulbs also need

watering throughout the year.

Feeding

There is no hard and fast rule for feeding the bulbs. It depends upon types and situation in which they are grown. For long-term blooming year after year, feeding regularly is necessary. To obtain best results, use fertilizer several times during the growing season. The first application should be made about one month after planting. Then again immediately before and after flowering. An inorganic fertilizer can be used that has an NPK 12-10-18 (Kilograms per 100 square miters) or a mixture of organic fertilizers or a time-released fertilizer can also be used. These should be applied just before or during the rain shower so that they become available soon afterwards. Granulated dried cow manure can also be used and is very easily applied. Covering bare soil with a generous mulch of stable manure or compost is usually only practical for small areas. Regular feeding is also needed for container grown plants.

After care

Staking should be done when and whatever needed. The removal of spent bloom is recommended for longer lasting display. However it is out of question for large areas. The leaves produce food reserves for the bulb and so must be retained until they turn brown and withered. In mixed border other perennials hide such withering leaves. But in formal beds they should be lifted after flowering. And other plants should refill beds.

Over withering and Storage

Some bulbous plants can be over watered in the garden for 3-4 years. Naturalizing bulbs in grasses, under trees, shrubs, shouldn't be lifted until they overcrowd. Crocus, Narcissus and Snowdrops are such examples. Some half hardly and tender varieties like Begonias and Gladioli should be lifted each year and stored for planting later. Such bulbs should be carefully lifted and dried for a week in a cool and dry place. Any damaged and diseased bulbs should be discarded. Clean and healthy bulbs with protective tunics are stored in boxes, open mesh bags etc. while bulbs without such tunic are put in the box and are then covered with peat or sand. e.g. Dahlias and Lilies. Certain bulbs can be protected outdoors from penetrating frost by thick mulch of leaf mold. This mulch should be neither airtight nor watertight. Some bulbs like cyclamen should be treated as houseplants. ●

Flori-business on the rise in Nepal

Mr. Suresh Bhakta Shrestha
The standard Nursery
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Floriculture in Nepal

Flower and plants have always been in par of our culture primarily for religious offering and festivals. There are sporadic cases of nurseries started about 40-50 years back. Until recently, floriculture in Nepal was not a commercial agro industry but was a hobby of the upper class. However, the nursery industry has emmerged in the last ten fifteen years. It has come up with greater impact with the inception of Floriculture Association Nepal (FAN) in 1992. Most of activities were carried out with the financial and technical support from Agro Enterprise Centre (AEC) to bring the floriculture sector to the stage what we see today. Some of the major activities carried by FAN are to;

* Organize exhibitions and trade fairs.
* Conduct training programs (for production of flowers and plants)
* Conduct trial commercial production of different crops
* Study and prepare business plan for few identified crops
* Establish Floriculture Wholesale Market
* Publish Floriculture Enterpreneur Directory
* Launch and promote the first ever florist shop in the country

After carrying out a listed activities the impact on general public and the entrepreneurs was tremendous.

Even	No. of Visitors	Estimated Turnover
Flower Exhibition	1500	30000
Agro Enterprise	3000	150000
1st Floriculture Exhibition	6000	1000000
2nd Floriculture Exhibition	10000	1500000
3rd Floriculture Exhibition	13000	1700000
4th Floriculture Exhibition	15000	2000000
5th Floriculture Exhibition	15000	2100000
6th Floriculture Exhibition	12000	1400000
1st International Floriculture Exhibition	12000	1500000

It can be seen in the above table that the awareness created among general public; and the number of entrepreneurs has also increased. In 1994 FAN conducted a survey to publish a directory of floriculture entrepreneurs at that time were there only 110 nurseries in 34 districts. Currently it is estimated that there are more then 300 nurseries. Out of 300 nurseries in 34 districts it is estimated more than 200 are located in the Valley.

Various training programs were conducted specially designed for professional growers to improve skill on production practices, nursery management and post harvest treatment. Flower arrangement training program was organized to produce quality florists. After this training a group was formed from the participants and a florist store who started in 1995(2052). Out come of that florist store is reflected now with more than 30 florist stores in the city.

FAN started conducting commercial trial production of several cut flower crops. Objectives of those trials were to see if some of the crops could be produced in Nepal in different seasons another was to substitute import from other countries. FAN has been successful achieving some of the targets and now slowly it is coming to reality. It has encouraged our local growers to take up larger projects as well as venture with new crops.

Local growers were facing problem of selling their products and timely payment from buyers if they were lucky enough to sell. Similarly florist entrepreneurs or contract suppliers were facing problem in finding producers or the product source. Hence, FAN came up with an idea of establishment of Floriculture Wholesale Market. Floriculture Wholesale Market has served as a network center for both producer and buyer. It has also solved the problem of payment to growers. The most important role it has played is that it has helped in producing data. Although that data does not represent complete scenario it shows the market trend.

Today it is estimated that total turnover from the floriculture industry is more than 200 million rupees per annum.

The industries are primarily comprised of small (less than one hectare) nursery. Most of the nurseries are production and retail. Most nurseries produce wide varieties of both potted and cut flower crops. Total area under cultivation is estimated about 50 hectares.

At present there are few institutional involved in supporting floriculture sector in association with Floriculture Association Nepal. They are Agro Enterprise center, Farmer-to-Farmer program of Winrock International Export Promotion Centre, under Ministry of Commerce HMG/N and Department of Plant Resources/HMG.

Floriculture Exhibition

Cultivation of cut flowers and potted plants is widely spread throughout the world. It is included in the statistics of 145 countries. In addition, cut flowers are extensively grown in many countries on small outdoor pots. Cut flower acreage and production value in the world are increasing. Based on the seventeen most important production countries, it is

currently estimated at about 60000 hectares.

World demand for cut flowers

World consumption of cut flowers and plants can only be given in approximate figures. World cut-flower markets are growing at a current rate of 6-9% per year. The total consumption in 1985 was about 12.5 billion. In 1990, the consumption rose to about 25 billion dollars. Due to the change in the exchange rate between the dollar and the guilder, this growth is spectacular in the nineties. In 1995, the total world market was about 31 billion dollars. Taking developments in production, imports and economic variables into account, consumption of cut flowers is concentrated in three regions: Western Europe, North America and Japan. The highest growth is expected in Japan and the USA. The West European market is becoming saturated. As a result, its cut flower consumption share is declining. New markets are emerging in the Eastern European countries. In one segment of the market, cut flowers are becoming part of the consumption patterns of people with high incomes. In Japan, domestic consumption of cut flowers will become more regular than before in the past. In the past, consumption was mainly based on special occasions and institutional (hotels, parties, etc). This pattern is changing to a more Western style. Consumption is rising not only in Japan, but in other Asian countries. With rising expendable incomes and a flower-minded culture, consumption will go up. If economic development keeps accelerating in Latin America, a strong demand increase is also to be expected here. Growth in cut flower consumption is greatly dependent on the economic development of different parts of the world and of course on the flower-minded culture.

World demand for potted plants

Worldwide consumption of potted plants is increasing rapidly. The total consumption in 1990 was about 14.2 billion dollars, some 21% higher than in 1985. In 1995, this market already increased to be 19 billion dollars. Also in this market, consumption will rise to about 23-25 billion dollars in 2002. Further growth is expected due to the growing expendable income in a lot of regions in the world. The US, with about one third of the consumption, has the largest share of the total world consumption, followed by Germany (about 20%) Italy and France.

Potential

We can classify market into two part; one is domestic other export market.

There are everyday growing domestic market with annuals, potted and cut flowers. Until sometime back (2-3 years) Kathmandu was the main market but recently Pokhara, Dharan, Biratnager etc. are fast growing markets.

Present flower market estimated for Kathmandu is given below:

* Cut-flowers - Nrs. 9.4 million

* Flowers & plants - Nrs. 18.25 million
* Landscape - Nrs. 20 million

Table below shows the estimated demand of cut flowers in Kathmandu

Crop	Daily	Yearly demand Rate Nrs.	Average w/s (yearly)	Total turnover
Calla lily white	50	18250	4	073000.00
Carnation	1000	365000	6	2190000.00
Dutch Rose	1200	438000	7	3066000.00
Fern Leaves	2000	730000	0.25	182500.00
Gerbera	100	36500	8	292000.00
Gladiolus	1200	438000	5	2190000.00
Gypsophilla	75	27375	2.5	68437.50
Lily	50	18250	25	456250.00
Local Rose	300	109500	2.5	273750.00
Lycoris	50	18250	3	54750.00
Tuberose	300	109500	5	547500.00
Orchids			35	.00
Total				**9394187.50**

Nepal is uniquely positioned in the world map in the field of bio-diversity. Being such a small country it is recently placed 25th position in the world. Nepal is divided into six phyto-geographical provinces and 10 bio-climatic zones. Nepal is home for 7183 species of plants and out of that 250 species are endemic. Which means no other country has those plants. It has 5160 species of flowering plants and 380 species are fern and fern allies. Nepal with its unique geographical position and climate offers excellent-growing condition for orchids. As a result about 363 species under 97 genera has been recorded until today. Hence it shows the level of potentiality yet to be explored.

Nepal has hundreds of microclimates giving Nepal a great bio-diversity and large numbers of native plants, many which have been collected on expeditions and bred for commercial purposes in other countries.

If we try to picture Nepal in the world map with the floriculture industry, it is nil. But we can see some hope if we act now, we have some advantages over developed countries, climatic and geo-physical, which has already been mentioned above. Nepal has comparatively cheap labour than other countries and that is one of the reasons that the developed countries are shifting their production sites to developing countries like Africa and South America. Now they have even come to India and China. Our major competitors would be India and

China, which also has cheap labours and technical manpower. Nepal also has direct flights to most of the major international cities unlike India. They have international connection only from Delhi and Bombay but most of the crops cannot be grown in or around those places.

Constraints

Floriculture industry is moving forward in considerable pace. However, it ispresently concentrated only for the local market. This industry is still facing numerous constraints and problems. This sector still needs to come up in an organized manner, in terms of production, post harvest and marketing, from both sides growers and government. Most of the nurseries currently operating today were started as hoies which and later turned into business. This area has very few (almost non existence) experts in floriculture field to conduct research or support to develop floriculture industry. Which has resulted in poor quality output due to lack of proper production know how and technology. Some of the nurseries are conducting their own researchs. There is no post harvest handling infrastructures such as refrigerated rooms and vans with the growers or government to support. Those facilities are needed for export purposes. There is no or very little cargo space for perishable items and freight charges are very high which makes almost impossible to compete in international market.

Another major problem currently faced by growers is availability and regular supply of inputs such as fertilizer and chemicals. For example some chemical available in the market until yesterday world not be in the market without any notice or reason. And those products have such an importance that particular chemical could put the whole production into dilemma. Not to mention the tools and machineries. There are so many products local growers don't even know about that there is a product as such even exist and their uses. Constrains to growth include poor transportation and lack of inputs. Transportation is limited to non-climate controlled trucks in climate that can easily reach 40°C. The Highway system is limited. There is only one international airport with no cooling facilities. Few greenhouses or protective coverings exists in the country, making it difficult to control diseases and damage during the summer monsoon. Soils are the primary growing medium in containers, and no method of pasteurizing the soil. Because most producers are growing many crops in very small scale, it is difficult to produce any of them at a high quality standard. It is also difficult to specialize because of market size and demand. This lack of specialization becomes a scheduling impossible.

Prospect for development of the industry depend on greater production specialization; obtaining reliable supplies of inputs or identifying local, effective alternatives; and identifying consumer's preferences. Also manpower, infrastructure, marketing and incentives from government.

Investment

Investment part is one of the major constraint floriculture industry is facing if it is to be set up an export oriented industry. Investment is so high that any private entrepreneur cannot alone invest in such projects. However, HMG/N has put this industry in National Priority Industry list and government also has made provision to lend loan with interest rate at 12% per annum though ADB/N as priority sector landing. However, that rate is still high and banks adds some more percentage as service charge.

Policy

Nepal Government does not have a clear policy for floriculture. However some existing policies could be related or utilized for floriculture sector.

* Floriculture is listed under national priority industry
* Custom duty on floriculture products is 10%
* Prevailing export tax is 0.1%
* No VAT
* Import of inputs for floriculture like greenhouse films an other materials are allowed at reduced import duty
* Interest rate is 12% per annum through ADB/N as priority sector lending
* Up to 100% equity investment by foreign company allowed.

In coordination among related organization from HMG/N, FAN and others, there is a need for policy or system, which will enable FAN and HMG/N to come together in initiation of production, infrastructure and marketing as a whole in package deal. There are few things needed to incorporate in existing policy or formulate floriculture policy. And they are;

* Need to attract foreign collaboration for the development of floriculture to provide technical know how for cultivation of flowers to meet international market standard. And to provide guidance in identifying market and development.
* Provide incentives up to a take-off stage as is done elsewhere for infrastructures and market promotion.
* Easy and simplified access to capital and loan procedures
* Promote diversification and value addition activities
* Promotional activities by participating in international exhibitions through diplomatic channels, embassy or consulates.

During formulating policy for floriculture it would be a positive point if the policy makers could review our neighboring countries like India and China.

Research, HRD & Innovation: These days technical know how can be imported from

the suppliers, retailers and other third parties to some extent. As a result, one would be able to produce products, which requires limited technology and knowledge. To overcome such problem there most be training center to produce skilled manpower in high-tech floriculture from production to post harvest handling. Rampur Campus could play a vital role in producing qualified manpower. If the nation or entrepreneur comes up with balanced innovation between production factors, economic variable, domestic demand and networks there is a good chance of survival in the domestic or international market. Develop our indigenous plant for commercialization with patent (IPR).

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रजनीगंधा बारे वेलिविस्तार

- शेखर विष्ट

परिचय :

रजनीगंधा एक डण्ठी युक्त, भद्र सेतो रंगको अति सुगँधीत मनमोहक आलंकारीक फूल हो । अमारिलिस जाती अर्न्तगत पर्ने यो फूलको वानस्पतिक नाम "पोलियाँथेसे टयूरोसा" हो । आम रुपमा अंग्रेजी भाषामा ट्यूवरोज, फ्रेंचमा ट्यूवेरेयूज, इटालिनमा टयूवेरोजा, र उर्दू भाषामा गुल-एसब्बो नामले चिनिने यो फूललाई कतै कतै गंधराज पनि भनिन्छ ।

हरियो लाम्चो जमिन-पट्टी अर्धचन्द्रकार भएर घुम्रीने लसून वा स्थानीय सुनाखरीको पात जस्तो देखिने यसको पातको लम्बाई २० से.मी., चौडाई २ से.मी. हुन्छ । शेला युक्त यो विरुवाको डण्ठी सामान्यत ९० देखि १२० से.मी. लामो हुन्छ र उक्त डण्ठीको टुप्पामा करिब ३० से.मी. क्रमश हार मिलेर तलबाट माथितिर फुल्दै जान्छ ।

उत्पत्ती, विकाश र प्रचार प्रचार :

रजनिगंधाको उत्पत्तीस्थल मध्य अमेरिकाको मेक्सीको मानिन्छ । हाल विश्व भरिनै परिचित र प्रचलित यो फूल भारतमा मुगल युग देखिनै राजा वादशाहहरू बिच प्रिय थियो भने नेपालको राणाकालमा पनि दरवारका वगैंचाहरूमा सजिएका हुन्थे ।

समय सापेक्ष रुपमा आफ्नो उत्पत्ति स्थलबाट क्रमशः युरोप र एशिया हुँदै विश्वभर रजनीगंधा सुपरिचित छ । यो कन्दीय वनस्पतिको प्रशारण विशेष गरेर वानस्पतिक विखण्डन वा सकर विभाजन प्रकृयाद्वारा गर्ने गरिन्छ ।

किसिम :

मुख्यत एक पुष्प र बहु-पुस्पपत्रीय गरि २ किसिमको रजनीगंधा लाई वर्णसंकरिय विधिद्वारा भिन्न रुप दिईएको छ । नेपालमा हालसम्ममा यो फूल विरुवा बारे खासै विकास गरिएको नभएपनि भारतको बैंगलोर स्थित भारतिय वागवानी अनुसन्धान संस्थाले सन् १९८३ मा एक पुष्पस्पपत्रिय र बहुपुष्प पत्रिय रजनीगंधाबाट वर्णशंकर जातको विकाश गरी थप २ जात उत्पत्ति गरी एक पुष्पपत्रीलाई श्रृंगार र बहुपुष्प पत्रीय रजनीगंधालाई सुवाशीनी नामाकरण गरिएको छ । मूल जाती र वर्ण शंकर जातीमा उत्पादन परिमाण र आकारमा भिन्नता पाईन्छ । वर्ण शंकर जातका दुवै रजनीगंधामा वास्ना हुन्छन् र फूलको कोपीलाको टुप्पा केही गुलाबी हुन्छन् । फूलको आकार ठूलो हुन्छ भने उत्पादन पनि करिब ३०% बढि भएको पाईन्छ । तर मुल जातमा भने एकपत्रीयमा मात्र वास्ना हुन्छ ।

उपयोगिता र महत्व :

रजनीगंधामा मनमोहक सुगन्ध, भद्र सोतो रंग र टिकाउपन जस्ता गुणहरू विद्यमान रहेकाले केवल सौखिनहरूका लागि मात्र नभएर व्यवसायिक दृष्टीले पनि उपयुक्त र महत्वपूर्ण सावित भएको छ । आकर्षक

आकार तथा टिकाउ पूर्ण गुण भएका कारण आन्तरिक पुष्प सजावट गर्ने, बुके आदी बनाउने कार्यमा महत्वपूर्ण स्थान बनाउदै आएको छ। नेपालमा यसको प्रयोग एकदशक अघिदेखि मात्र भएतापनि छिमेकी राष्ट्र भारत, पाकिस्तान, बंगलादेश र श्रीलंकामा रजनीगंधा विशेष गरेर एक पुष्प पत्रिय को "गजरा" तथा "वेणी" आदी बनाई सम्भ्रान्त परिवारका लागि महिलाहरू प्रत्येक दिन आफूलाई भद्र र सुन्दर बनाउन प्रयोग गर्ने परम्परा धेरै वर्षै अघि देखि प्रचलनमा रहेको छ भने पूजाका मण्डप, विवाहमण्डप, सुहागरात कक्ष, आदीमा रजनीगंधाको मालाद्वारा सजाउने गरिन्छ। तयस बाहेक रजनीगंधाको सुगन्धित तेलको माग अरवियन मुल्कमा अत्याधिक रहेको छ भने विभिन्न अत्तर तयार गर्न सुगन्धीत श्रृंगार सामाग्री, साबुन आदी बनाउन पनि त्यतिकै प्रयोग हुने हुँदा दिनानुदिन रजनीगंधाको व्यवसायिक महत्व पनि बढ्दो छ।

नेपालमा रजनीगंधा उत्पादनको सम्भावना र हालको अवस्था :

नेपालका तराई, भित्रीमधेश रजनीगंधा खेतीका लागि विशेष उपयोगी छन् र मध्य पहाडी भेगमा पनि यसको खेति गर्न सकिन्छ। केही दशक अघि देखि सुरु भएको नेपालको सजावटी फूलको व्यवसायको लागि आवश्यक रजनीगंधाका माला तथा गुच्छाहरूको आपूर्ति मुख्य रुपमा छिमेकी मुलुकबाट हुँदै आएकोमा हाल नेपाल भित्र करिब ७ हेक्टर को क्षेत्रफलमा व्यवसायिक रुपले रजनीगंधा उत्पादन भैरहेको तथ्याङ्क FAN द्वारा संकलित छ। उक्त तथ्याङ्कको आधारमा आगामी २ वर्ष भित्र नेपालको सजावटी फूल व्यवसायका लागि आवश्यक रजनीगंधामा नेपाल आत्मनिर्भर हुने निश्चित छ, भने सुगन्धित रजनीगंधाको तेल उत्पादन व्यवसाय संचालन गर्नसके यसको व्यवसायिक खेतीलाई व्यापकता दिन सकिने सम्भावना प्रवल देखिन्छ।

रजनिगंधा खेतीको विधिः

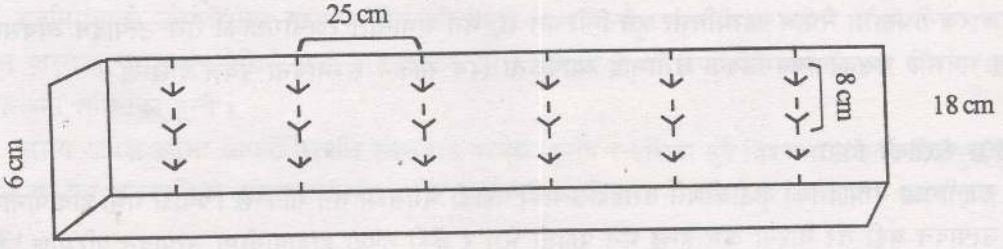
रजनीगंधा उत्पादनका दृष्टीकोणले तराईदेखि मध्ये पहाडी भेगसम्म गर्न सकिन्छ। ज्यादा गर्मी हावापानीमा यसको उत्पादन बढी तर वास्ना कम हुन्छ भने पहाडी भेग र केही ठण्डा हावापानीमा उत्पादन परिमाण केही कम तर बढि वास्नादार र गुणस्तर युक्त फूल उत्पादन हुन्छ।

जमिन तयारी :

यो गानायुक्त विरुवा भएकोले मलिलो P.H. 6-7 बीच यसको लागि उपयुक्त भएपनि पानी नजम्ने तर सिंचाईको व्यवस्था भएको जस्तोसुकै जमिनमा पनि रजनीगंधाको सन्तोषजनक उत्पादन गर्न सकिन्छ, तर जमिन पारिलो हुनुपर्छ। राम्रो उत्पादनको लागि खनजोत, मलजल र गोडमेलमा विशेष ध्यान दिनु आवश्यक हुन्छ। रजनीगंधा रोप्न छनौट भएका जग्गालाई प्रथम पटक खनजोत गरिकन केहीदिन सुकाएर दोस्रो पटक फेरी ३० देखि ४० से.मी. गहिरो गरी जोत्ने त्यसपछि जमिनमा सिंचाई गरी ३ दिन अखीन दिने र अन्तिम तयारी गर्दा प्रति घ.मी. ५ के.जी. प्राङ्गरिक मल र (NPP = 1 : 2 : 2) खण्ड युक्त रासयनिक मल १०० ग्राम प्रति वर्ग मिटरको दरले माटोमा मिसाई जोत्नु पर्छ। रजनीगंधाको लागि ढिलो लाग्ने तर कडा खालको, खाद्यतत्व आवश्यक पर्ने हुँदा, हड्डी चुर्ण तथा पिनाको प्रयोग गर्नु उपयुक्त मानिन्छ। उपरोक्त बमोजिम तयार गरिएको जमिनलाई सम्म पारी एक मि. चौडाईको र आफ्नो सुविधा अनुसारको लम्बाई युक्त ६" अग्लो ड्याङ उठाउनु पर्छ र ड्याङ देखि ड्याङ बिबचको दूरी ४० से.मी हुनु पर्छ।

बिउ छनौट र रोपण विधि :

राम्रो उत्पादन प्राप्त गर्नका लागी गुणस्तरयुक्त विउको छनौटमा पनि ध्यान दिनुपर्ने हुन्छ। फूल उत्पादनका लागि ३ से.मी. व्यास भएको गाना उत्तम भएता पनि २.५ से.मी. व्यासको गानाको रोपाइबाट अधिक लाभ लिन सकिन्छ। उपरोक्त नापको टुसा ननिक्लिएको गानालाई गानाबाट छुट्याई वेभिष्टनको ०.२% घोलमा ३० मिनेट दुवाई उपचार गर्नुपर्छ। उक्त गाना जमिनबाट करिब एक महिना अघिनै खनेको हुनुपर्छ। रजनिगंधालाई एकवर्षिय वा बहुवर्षिय वालीको रुपमा खेती गर्न सकिने भएकोले कति जमिनको लागि कति गानाको आवश्यकता पर्छ भन्ने कुरा हामी कति वर्ष उत्पादन लिनका लागी रोप्दैछौं भन्ने कुराले निर्धारण गर्दछ। किनकी एकवर्षका लागी मात्र बालि लिने उद्देश्य छ भने एकै स्थानमा २ वा ३ गाना रोप्न सकिन्छ तर २ वा ३ वर्ष उत्पादन लिनु छ भने एक स्थानमा एकै गाना मात्र रोपाई गर्नुपर्ने हुन्छ। अतः बहुवर्ष उत्पादन लिने उद्देश्य भए कम गाना लाग्दछ र एकवर्ष मात्र लिने योजना भए बढि रोलाको आवश्यकतामा हुन्छ। सामान्यत एक हेक्टरमा करिब ७०,००० रोला विउको आवश्यकता पर्दछ रोपाईका लागी छनौट भएका रोलाहरूलाई नाको आधारमा सानो भए ३ से.मी. गहिरो र ठूला गाना भए ६ से.मी. सम्म गहिरोमा बोट बोटको दूरी १८ से.मी. र हार देखि हार बिचको दूरी २.५ से.मी. हुने गरी पहिले देखि तयार गरिएको जमिनमा रोप्नु पर्छ। रजनीगन्धाको रोप्ने समय भने तराई भेगमा बैशाख, जेठ मा र पहाडमा चैत्र, वैशाखमा रोप्नु उपयुक्त हुन्छ।



सिंचाई तथा गोडमेल :

कृषि व्यवसायमा जुनसुकै बोट विरुवा राम्रोसँग हुँर्कन प्रयाप्त सिंचाइ र सरसफाईमा पनि त्यतिकै ध्यान दिनु पर्छ। रजनीगन्धा गानाको रोपाई पछि, टुसा आउन थालेपछि प्रथम पटक सिंचाई गर्नुपर्छ। त्यसपछि जमिको चिस्यान हेरेर १०-१५ दिनमा सिंचाई गर्दै रहनु पर्छ। तर पानी जम्न भने दिनु हुँदैन।

रोपाई गरेको करिब ७० दिनमा रजनीगंन्धा टुसाउन थाल्छ र टुसाएको ३०-३५ दिनमा फूल फूलन थाल्छ। यो डण्डीयुक्त फूलको डण्डी करिब ६०-१२० से.मी. लामो हुन्छ र फूलहरू त्यसको टुप्पामा २५-३० कोपिला फुल्दछन्। रजनीगन्धालाई टुसा आउनु अघिनै गना नहल्लीने गरी हलुका गोडाई गर्नुपर्छ र यदि बहुवर्षिय खेती गर्नु छ भने पहाडमा पौष, माघमा र तराई तथा भित्री मधेशमा फाल्गुण, चैत्रमा शुकेका पहेंला पात सबै हटाई राम्रोसँग गोडेर गानाको ३ इन्च वरबाट वरिपरी पहिलो वर्ष रोप्दा प्रयोग गरिएकै अनुपातमा मलखद हाली माटोले पुर्नुपर्छ र सिंचाई गर्नुपर्छ।

उत्पादन अवधि र परिमाण :

रजनीगन्धा को उत्पादन एकल पुष्पपत्रिय जातमा वर्ष भरिनै एकपछि अर्को डण्ठी टुसाएर फुल्दछ तर बहुपुष्पपत्रिय (Double) रजनीगंधा भने सामान्यत वर्षको २ पटक आषाढ-श्रावणमा र पौष-माघमा फुल्दछ

तर काठमाडौंमा भने आषाढ देखि कार्तिकसम्म क्रमशः फूलेको पाईन्छ। रजनीगंधाको उत्पादन परिमाण प्रति हेक्टर निम्न तालिकाबाट प्रष्ट पारिएको छ।

उत्पादन वर्ष	फूलको तौल	डण्ठी संख्या	गाना उत्पादन	
			ठूलो	सानो
प्रथम वर्ष	४० - ६० क्वीन्टल	१,५०,०००	१ - २	४ - ६
दोस्रो वर्ष	७० - ७५ क्वीन्टल	२,००,०००	४	६ - १०
अन्तिम वर्ष	३० - ४० क्वीन्टल	७५,०००	८	१२ - २५

तर बराबर मलजल गरेमा र राम्रो माटो छ भने यो भन्दा बढि उत्पादन लिन सकिन्छ।

एक हेक्टरमा उत्पादित रजनिगंधाको फूलबाट करिब ६ के.जी. शुद्ध सुगंधित रस (तेल) निस्कन्छ भने सुगन्धित ठोस २८ देखि ३० केजी सम्म निस्कन्छ।

रोग किरा र यसको रोकथाम :

सामान्यत आवश्यक सरसफाइमा राम्रो ध्यान पुऱ्यायमा रजनीगंधामा रोग कीराको प्रकोप ज्यादै न्यून हुन्छ। रजनीगंधा टुसाउन थालेपछि (ना.फ.पो. = 2 : 1 : 1) नाइट्रोजन फसफोरस र पोटासको कृतिम खाद्य तत्वको ३ ग्राम प्रति १० लि. पानीको घोलमा 1 : 1 सि.सि. व्यविष्टीन र मालाथीन वा रोगर मिसाई प्रति महिना छर्केमा राम्रो परिणाम प्राप्त गर्न सकिन्छ।

यदि किराको प्रकोप बढेमा ०.२% मालाथीन वा रोगर वा मेटासिस्टक युक्त पानीको घोल प्रति हप्ताका दरले ३ पटक छर्केमा नियन्त्रण गर्न सकिन्छ।

गानाहरू भण्डारण गर्दा स्कलेरोसियम रटका कारण कुहीन थालेमा २ ग्राम ब्रेसिकोल को धुलो प्रतिलिटर पानीमा घोलेर छर्केर बचाउ गर्न सकिन्छ।

रजनीगंधा फूल कटाई तथा टिपाई व्यवस्थापन (Post harvesting) :

रजनीगंधाको उत्पादन हामी केका लागी गर्दैछौं भन्ने उद्देश्य अनुरुप नै यसको कटाई वा टिपाईको तरिका र व्यवस्थापन निर्धारण हुन्छ। यदि डण्ठी सहितको पुष्पसज्जा कार्यका लागि प्रयोग गरिदैछ, भने प्रत्येक डण्ठी केही हल्का पहेंलो र कोपिलामा सुनौला वा गुलावी रंग चढिसेकपछि सबैभन्दा तल्लो एक वा २ लहरको कोपिला फक्रियको डण्ठीलाई धारिलो चक्कु वा सिकेचरले फेदैमा काटी डाँठको फेद काटेको भाग पानीमा डुब्ने गरी उपयुक्त भाँडोमा राखनु पर्छ। डण्ठी काट्ने काम विहान वा बेलुका गर्नु राम्रो हुन्छ।

त्यसपछि २५, ५० डण्ठीको मुट्ठा बनाई अखवारमा राम्ररी वेरेर विक्रिका लागि पठाउनु पर्छ। यदि बजार टाढा छ भने अखवार सहितलाइ जुटको बोरा वा, परालले पुनः बेरेर पठाउनु पर्छ। यदि रजनीगंधाको फूल माला, वा गजरा बनाउन प्रयोग हुनेगरी टिप्नु छ भने कोपिला फक्रेको वा अर्ध फक्रेको अवस्थामा फूल मात्रै टिपेर बजार पठाउन सकिन्छ। यसो गरेमा क्रमशः माथिका कोपिला भोली पल्ट टिप्न योग्य हुँदै जान्छन्।

उपरोक्त बाहेक सुगंधित तेल वा अत्तर उत्पाद गर्नुछ भने कोपिलापूर्ण विकसित भै सुनौला वा गुलाफी रंग चढी सकेको तर नफक्रदैको अवस्थामा सुर्योदय हुनु अगावै टिपेर अखवारमा पोको पार्ने र पुनः कागजको

डिब्बामा प्याक गरी जतिसक्दो भाँडो उत्पादन स्थल पुऱ्याउनु पर्छ। रजनीगंधाको सुगंधित तेल वा अत्तर निकाल्नका लागी परिपक्क नभएको र फक्रि सकेको फूल त्यति उपयोगी गुणस्तरको मानिदैंन।

गानाखनाई तथा भण्डारण :

रजनीगंधाको गानालाई फूलको उत्पादन लिईसकेपछि पातहरू पहेंला भएपछि जमिनबाट खन्नुपर्छ। यो कार्य तराई तथा भित्री मधेशमा फाल्गुण, चैत्रमा र मध्य पहाडमा पौष, माघमा गर्नु उपयुक्त हुन्छ। गाना खन्ने कार्य आगामी वर्ष उत्पादन लीनु छैन वा तेस्रो वर्ष पुरा भएको छ भने गर्नुपर्छ। गाना जमिनबाट खनिसकेपछि सफागरी सुख्खा हावादार चिसो घाम नलाग्ने ठाउँमा भिंजाएर राख्नु पर्छ। यसरी २ महिनासम्म भण्डारन गरी पुनः रोपाई गर्नु उपयुक्त हुन्छ। यदि ज्यादै गर्मी स्थान छ वा २ महिना भन्दा बढि समय भण्डारण गर्नु छ भने भण्डारण कार्य सितगृहमा ३ देखि ५ सेन्ट्रिग्रेट तापमानमा भण्डारण गर्नुपर्छ। गाना भने रोप्ने समयमा मात्र गानाबाट छुट्याउनु राम्रो हुन्छ र गानाको तल्लो खण्ड केही काटेर छुट्टयाई रोप्नुपर्छ।

Postharvest handling of cut flowers in Nepal : Current situation and some suggestions

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Introduction

Proper postharvest handling of cut flowers plays a significant role in their final longevity, and the relevant knowledge and role of people along the chain (grower, wholesaler, retailer and customer) is vital. The important factors for postharvest care of cut flowers are: cool temperature, high humidity, good water relations, additional feed with anti-microbial agents and anti-ethylene products in case of ethylene sensitive flowers. This article is based on data collected during a study "Floriculture Development in Nepal" sponsored by Japan International Cooperation Agency (JICA), Nepal and study carried out by Center for Policy Research and Analysis (CPRA), Kathmandu during 2001-2002. Of all those interviewed, none of the flower growers seem to have the knowledge of the detrimental role 'ethylene' could play in reducing the longevity of ethylene sensitive cut flowers and the means by which one can overcome this problem. Ethylene also known as 'ageing hormone' is a poison even at a very low concentration for many ethylene sensitive cut flowers such as carnation, gypsophila, freesia etc and reduces flower life dramatically.

The current situation of posthavest handling of cut flowers in Nepal and the role of different groups (growers, wholesalers, retailers and customers) in the flower chain is briefly described.

Growers

Growers within the Kathmandu valley harvest cut flowers in the morning and transport cut flowers either wet (flower stem dipped in a bucket of water) or dry (wrapped with newspaper) from their production area to the direct consumers (hotels, banks etc) or wholesale market or their own retail outlet. However, growers outside Kathamandu valley transport cut flowers dry (wrapped with newspaper and jute sacks). The mode of transportation may be private car, mini-bus or bus but in all cases it is not refrigerated. Growers lack refrigerated storage facilities and transportation.

The cut flower growers in Nepal seem to have very limited knowledge of postharvest care of cut flowers. During this study, it was

found that except for a very few growers who only treat cut flowers with citric acid or sugar, many others don't give any posthavest treatment to cut flowers except dipping flower stems in water. In fact, citric acid alone is not a complete postharvest treatment because it only helps to reduce pH (makes solution more acidic), thereby reducing chances for microbial agents such as Hydroxyquinoline sulphate (HQS) or Hydroxyquinoline citrate (HQC) is more effective in increasing vase life of non-ethylene sensitive flowers such as Chrysanthemum. This treatment may be useful for other non-ethylene sensitive flowers such as Heliconia, Bird of paradise etc. Some chemicals for postharvest treatment of non-ethylene sensitive flowers can be water conditioner (trade name is Chrysal OVB) or anti-bacterial agent (trade name is Chrysal RVB.) These chemicals help in smooth flow of water into flowers by preventing plugging in the stems. Longer vase life can be attained or flower bud can open when these chemicals are added with sugar. For ethylene sensitive flowers such as carnation, aster, freesia, nerine, etc. treatment with anti-ethylene products such as 1-methyl cyclopropane (1-MCP) (trade name is ethyl block), Silver thiosulphate (STS) (trade name is Chrysal AVBS) will be beneficial. If cut flowers are given postharvest treatment by growers and others in the chain (wholesaler, retailer, consumer) in conjunction with cutting the bottom of the flower stems on regular basis, the longevity of flowers can be significantly enhanced (from 50-100% or even more). However, to ensure longer vase life of cut flowers proper postharvest treatment by growers is very essential; being the first one in the chain. It is therefore important for the growers to be aware of the postharvest technique.

Wholesalers

This group in the chain lacks the knowledge of the importance of the factors that govern the ultimate life of the products that they are putting on sale. Thus, they are basically displaying cut flowers in room temperature as and when brought by the growers, and wait for the retailers to buy without any postharvest care except dipping flower stems in water. Lack of knowledge of postharvest care (water quality temperature, humidity, wounding effect etc) and refrigerated facility could be the factors why some cut flowers perish before being sold in Floriculture Association of Nepal (FAN) wholesale market. However, excessive wastage of flowers has been reported only in gladiolus and rose cut flowers (not estimated) particularly when the product gluts the market. Efforts should be made to set up refrigerated facilities at the wholesale market and store flowers in clean containers with clean water. Fresh and clean water should be discarded immediately and never kept in close contact with fresh or un-wilted flowers. Staff working at the wholesale market should be trained regarding postharvest care of cut flowers.

Retailers

Retailers are displaying their products in the

roadside flower shops: which is a good marketing strategy in a country where use of cut flowers is new. However, displaying cut flowers outside under direct sun, exposed to vehicle emission (contains ethylene; poison for ethylene sensitive flowers) or dust accelerates senescence process and the cut flowers life becomes shorter. All flower retailers or florists surveyed in this study do not have refrigerated facility. This group too seems to be unaware of good postharvest care but some of them do know that good water connection is important and thus cut the bottom of the stem at 1.5 to 2cm (but not under water) every alternate day. Cutting at the bottom of the flower stems from time to time keeps xylem vessels open (which otherwise gets plugged) and maintain the water flow uninterrupted. This activity of cutting (slant cut) few centimeters at the bottom of stems (under water if possible) every alternate day will be more beneficial if flowers are also treated by growers. In addition, sugar plus HQS will increase vase life of (Asparagus) in a refrigerator (under 4°C) and tropical cut flowers (Heliconia and Bird of paradise) in room temperature (12-15°C) will be advantageous. However, retailers should refrain from displaying fresh or non-wilting cut flowers under direct sun and other pollutants and rather store in-doors. Retailers should also immediately discard senescing or wilting flowers and keep fresh or non-wilting flowers separately. During visit to several florists in Kathamandu valley, some were found exhibiting wilted carnation and gypsophila flowers mixed with fresh flowers. Retailers too, need training on postharvest care of cut flowers. Since retailers are in direct contact with the consumers, it becomes the responsibility of the retailers to disseminate the basic post-harvest care information of cut flowers to the customers so that the customers can enjoy their flowers for a longer duration by enhancing flower vase life and quality.

Customers

Nepalese flower buyers have been found to have very poor knowledge of post-harvest care of cut flowers. This is quite obvious because use of cut flowers as bouquet or table decoration is of recent origin in Nepal. About 95 percent of buyers surveyed have no basic knowledge on care of cut flowers such as cutting bottom end of flowers stems regularly, adding citric acid plus sugar into the solution, adding sugar plus anti-microbial agent, etc. No flower buyers seemed to know the importance of anti-microbial agent that must be added along with sugar. Sugar addition does provide food for the cut flower or foliage thereby increasing its vase life. However, increase in vase life may not be always consistent when anti-microbial agent leads to microbial growth at the cut stem-end resulting plugging of the xylem vessels. Plugging of xylem vessels in the flower stem causes water stress in the petals and eventually flower petals wilts of withers.

Institutional (Five star Hotels of Banks) customers, on the other hand, have been

found to have better understanding of the postharvest care of cut flowers. However, even in this case, despite of the trained manpower being employed by these institutions, only 50 percent were aware of the basic knowledge of post harvest care. Thus, training on postharvest care to employees of these institutions is still essential.

Conclusion

Cut flower industry in Nepal is growing steadily since the beginning of the industry in the late eighties of the last century. However, proper postharvest handling of cut flowers in Nepal is largely ignored as is evident from this study. Much loss of fresh cut flowers can be avoided if due consideration is given to factors that influences postharvest losses. Postharvest treatment will be a must for exporting Nepalese cut flowers into foreign markets. All exported cut flowers in the international markets are given postharvest treatment to ensure adequate vase life by adding additional food plus other chemicals and are stored and transported in a refrigerated facility. Some possible export markets of Nepalese cut flowers in Asia are South Asian Association for Regional Cooperation (SAARC) countries, Singapore, Hong Kong, Thailand, South Korea and Japan. Nepalese cut flowers may reach customers in these countries from between 2-4 days. Without proper postharvest care of Nepalese cut flower it will be unable to have adequate longevity as compared with the local cut flowers (cut flowers grown in that country where Nepalese cut flowers will be exported) that have an advantage of 2-4 days or other imported cut flowers that are treated and stored and transported refrigerated. Competition of cut flowers in the international market is very intense and lack of proper postharvest care of Nepalese cut flowers will be a big disadvantage. In Nepal, a refrigerated transport facility for export of cut flowers may not be feasible now (involves huge cost) but treating cut flowers with chemicals that ensures increase in the longevity is something achievable. Such chemicals do add up extra cost; many Nepalese cut flower growers are with an opinion that postharvest care is just adding up cost. However, the benefit is immense and this is what Nepalese cut flowers should aim now. In future, when the export volume will increase refrigerated transport facility will follow suit.

While postharvest treatment of many cut flowers are well established and can be immediately used, trial of this treatment can be done to establish confidence of the technique. Nevertheless, research should be directed towards study of postharvest technology; established technique should be tested in different cut flowers grown under Nepalese conditions and best treatment disseminated to the growers and other in the flower chain. As a guideline some recommended chemicals for various cut flowers are described in another paper entitled "Chemical treatment of some important cut flowers to increase longevity" in this issue. Use of effective postharvest

technique will increase vase life of cut flowers thereby reducing chances of postharvest loss and ensuring higher return. Furthermore, it will also give more satisfaction (flower vase life increase from 50-100% with good quality) to the local customer and since she/he gets more value for money the customer is likely to get satisfied and come again for more flowers. More flower sales means more profit to the grower and the industry will hopefully grow bigger.

Thus postharvest care of cut flower is one area where local flower growers, nurserymen and people handling cut flowers or foliage need proper awareness, training, investment and commitment.

■

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Disclaimer

Trade names of chemicals used in this paper are only for citing example and not an endorsement.

SPARE SOME SPACE TO WATERPLANTS IN YOUR GARDEN

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It is one of the tragedies of progress that large cities are being developed covering the lovely countryside with concrete. Now people look for greeneries, which lie far away. It is a psychological necessity for man to visit the wilderness that is untouched by civilization. But again man has no time to spare due to his work load. They seek a quick refreshing trip to nature. It is only possible if he can create a little piece of nature in his home. He can ease his tensions and exhaustion by looking at the artificial man made environment which can be a second paradise in earth. He can make one's way out of crowded city and evoke the feeling of nature in that smallest area. No one with feeling however, can deny that there is a spirit of tranquility that steals over the onlooker and gives him feeling of peace and relaxation in the garden which is faithfully copied from nature by the artistic creation of man. Water garden is one of the components of a complete garden. Realising the tranquil effect of water, Japanese generally creats water in some form in the main garden picture. Actually water is valued in every garden because it provides a cooling effect during hot and humid summer.

One of the most charming features of the use of water in the garden is that it acts as a reflecting mirror. The image of trees are reflected in water, over hanging branches and even buildings are reflected which adds lively decorations to the pond. Even a small stretch of water with rockeries around can make the mind serene. The moon can be made to appear even more mysterious and enchanting when viewed behind branches or when flung back from the mirrored surface of the pool.

The poorest and the simplest man can enjoy great beauty in his garden for nature is simple and within the means of every one. For making or water garden, one has to select the site. Once it is decided one has to place a line of paving slabs around the outline where the pool will be built. If possible one may live with this shape for a few weeks. Some times one may change the site selection or prefer a different location which saves from a disappointing venture. The shape of pond and island should be marked out on the soil before any digging is done. This can be achieved with the help of short stakes and string. It is better to hollow out a part of the pond that is to be filled with water leaving an island exposed.

The soil bed should be tamped down firmly so as to consolidate the earth. It is necessary to line the bed with cement or plastic if the soil is porous. Ponds should not be too deep. 1 mt. deep is the best and the edges of the pond slope gently downwards than to have a sharp steep bank. Small Stones can be filled around the slope in order to assist in holding the soil. The floor of the pond can be made of two levels inorder to accomodate plants which like shallow water and as well as those which like deeper water.

An improtant consideration is the water supply. Generally large quantities of water are not required after the initial filling. Even in a discoloured pond you should not continuosly run in fresh water or make frequent changes as this tends to stir up the sediment. Finally to look right, an artificial pool needs to be in the sort of position where a natural pond might occur, on a low lying area of your garden it will look natural.

A water garden need not be confined to tradition water course and water fountain or any one or more of this feautre. A water garden should not directly be exposed to sun. It will also need a certain background. A weepingwillow overhanging the water garden provides a restful setting. Running water has naturally more ornamental effect than a silent pool. A cascade or waterfall adds to the garden. Pool are often built not deep enough. If they are too shallow, water will freeze to solid in winter and dry excessively in summer. The minimum depth for even the smallest pool is about 15 inch.

The most successuful water garden are situated out in the open, in full sunlight. Most aquatic plants thrive in warmer water and open site will extend the flowering period in both autumn and spring. For the same reason, it is advantageous to give protection from cold wind. A belt of trees, hedges or building can all provide suitable cover, hsade on the other hand will promote leafy growth but hinder flowering.

Never allow the surface of the pond to be covered with foliage or the effect of tranquil will be lost. Plant should not cover more than 1/3 of the water surface.

Fish keep the water fresh and oxygenated plants like Lagarosiphon discharge oxygen with the water and help to prevent stagnation. Plants like Suggittaria, Vallisnaria Nacharis & Elodea remove the nuisance of clouding of water.

By making an artificial stream in the garden, we can enjoy the beauty of tranquil water and the pleasant souund of rushing rivers, croaking of frogs & chirping of birds. They break the quiet spell and are country noise that is preferable to the roar of traffic. There ae plants which love to be by the side of running water. So here we can develop a marsh garden which is safe for children and where water is scarce yet the feeling of waterside effect is there. Bamboos, handrangia, Ferns & Willows can be accomodated in a marsh garden.

We must remember that most moisture loving plants like acid soil condition so compost sawdust, cowdung & leaf mold can be added to the mixture. Marsh may be partially surrounded by trees to provide shade for some plants while other part

remain sunny and open.

Water gardening provides for cultivation of water plants, marsh plants & moisture loving plants.

Typha has attractive head which are popular for floral decoration. Water hyacinth, though a nuisance in village ponds, with it's light lilac, blue flowers & round glossy leaves look pretty in a small corner of the water graden.

Listed below are the suitable waterplants for pool and water garden:

Nymphea, Scirpus, Caltha, Lotus Iris, Acorus, Berginia, Willow

Bag Plants :

Primula,lilium Haemerocallus, Arum, Lillies, Hosta, Iria, Calla Lily, Ginger lily, Cardamom & Ferns.

Floater :

Water hyacinth, Azolla.

Pool surrounded by rock work and trees like Maple, Cherroes and Willow adds great charm and the effect is superb.

Maintenance :

For keeping the water garden up to date one must not let scum in water. It will give an awful look if the water debris are not removed. Decayed leaves should be casted and crystal clear water should be revealed which gives pleasant and cooling atmosphere to the garden. So why not be cretive enough to bring paradise down to earth.

'Gardening' - a fun for children

– *Indira Thapa*

Today we are learing the slogan "Save the environment" all over the world. Our surroundings are so much exhausted that we should once again bring the Green revolution especially in our country Nepal. Different organizations, government. NGO, INGO's, are involved in making better environment. But it is worthless until and unless we ourselves not be aware of this serious topic. If we every individual in a family grow and rear a single plant at our home, there will be a garden at each home and finally a park in a locality.

So here an attempt is made to introduce our children with gardening. There is an English proverb "Catch them young". If the parents are interested in gardening their children are involved in the same by association. The garden will be maintained more if the male members and children of the house are involved in it to the trial activity of the modern women. Children should be taught gardening from their very childhood.

In the project very small pots and quick growing cultivars with early bearing habits should be selected. In the first step very small pots, say 10 cm. across should be used. The following cultivars are considered highly suitable for the young gardeners.

Marigold	:	Inca, French types
Phlox	:	Drummondii dwarf mixed
Alyssum	:	Spinosum, Tortuosum
Petunia	:	Multiflora single
Pansy	:	mixed simple type (small flowered)
Gomphrena	:	Red and white strains
Portulaca	:	Single and double types

Tools needed: Introduce children with the required tools kuto, Sieve, Tray, Mug, bowl, Ghocha etc.

Children should be guided while planting. Planting comprises following steps :-

Step 1 - Take sand soil manure, dried leaves, broken

Step 2 - Sieve the soil and sand separately.

Step 3 - Mix soil, sand and manure in the ration 2:1:1

Step 4 - Put some pieces of broken pot at the bottom of the pot placing one or two pieces (crocking) over the drain hole so that the excess water will drain out.

Step 5 - Spread the dried leaves at the bottom of the pot.

Step 6 - Now put the silt mixture in the pot (1.5 cm left from the top).

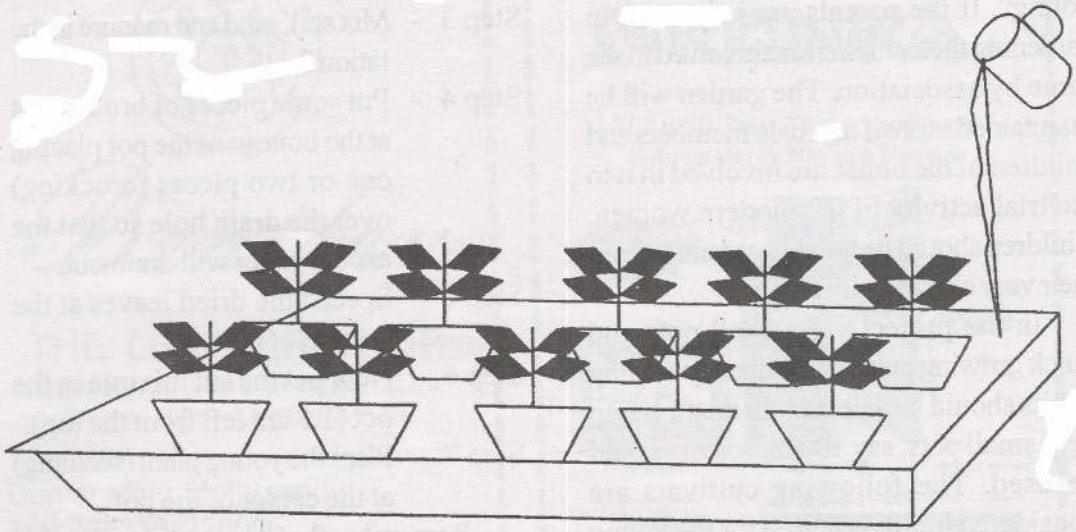
Step 7 - Plant the young plant (seedling) at the center of the pot.

Remember that the small pots tend to dry up quickly and this will need frequent watering. Small Children cannot be so watchful to water their plants when needed. Therefore, they should be taught how to

water their plants in the capillary system. For this a plastic tray of 45 cm. *30cm. is needed. Such a tray will hold only 15 pots. In the beginning this is enough. As in figure, instead of watering the pot, the child will need to pour water from a mug into the tray holding the flowerpots. From the tray water will rise above through the drain holes of the pots thereby soaking the soil there in.

One liter of water once daily is sufficient for the 15 pots in a tray. How water rises in the pot by capillary action should be explained to them. And this will make them more interested in the scientific cause and effect. A competition of whose plant survive, grow better and healthier should be done.

Other phenomena relating to the science of gardening and plant growth should be explained to them for the better understanding of the natural things around them. To illustrate this some questions and answers are tried here :-



Question :

1. How does a living from a non-living differ ?
2. Is plant a living being ?
3. What is the food of a plant ?
4. Does a plant take food ?
5. What is potting compost ?
6. What is humus ?
7. Is humus indispensable for the garden soil or potting compost ?
8. What are manure and fertilizers ?
9. Why does the garden plant need so much care ?
10. Why has the flower pot a hole at the bottom ?
11. What is crocking, what purpose does it serve ?
12. Do all plants grow in pots ?
13. What type of plant needs less care and attention ?

Answers :

1. A living being moves, takes food and grows but non-living does not.

2. Yes, plant is living being because it takes food and grows in spite it does not move.
3. Water, carbon dioxide, mineral, nutrients are the basic foods of the plants.
4. Plant absorbs water by roots and takes carbon dioxide from the atmosphere through the pores of the leave, where they prepare food. So leaves are called the kitchen of the plants.
5. Potting compost consists of loam, humus and fertilizers.
6. Vegetable matters when decomposed from humus. Leaf mould, cow manure, decomposed oil cake and green manures are the good source of humus.
7. Yes, it is indispensable for a garden soil or potting compost, because humus makes the soil friable and granular and also increases the useful microbial population in the soil.
8. Manuresare obtained from the decomposed organic substances, where as fertilizers are some selected chemical compounds.

Manures	Fertilizers
Leaf mould	Ammonium Sulphate
Cow manure	Calcium ammo nitrate
Stable manure	Super phosphate
Compost	Potassium sulphate
Decomposed oil cake	Diammonium phosphate
Bone meal	Muriate of potash, etc.
Fish meal, etc.	

9. The natural plants are hardy and grow themselves in nature. Although garden plants have originated from them, they are always reared by gardeners. They produce more flowers, fruits or vegetables and need more care.
10. For the drainage fo surplus water from the pot.
11. The art of placing a piece of broken pot (khapata) over the drain hole so that the pot soil does not choke the hole.
12. Yes, all plants can be grown in pots. However, the saplings of large plant species cannot attain their normal height when grown in the pots.
13. Cacti and succulents need less care and attention because they are fleshy and can store water. But these plants are a threat for children. ○

सफल व्यवसायी विमन ईन क्लोरिकल्चर

नेपालको हावापानी फूलका लागि सुहाउँदो भएता पनि २०५२ सालतिर नेपालमा फूल व्यवसायलाई एउटा Hobby को रुपमा वा सहायक व्यापारको रुपमा मात्र यहाँको मानिसहरुले अपनाएको थियो कसै कसैबाट cut flower व्यापारलाई नर्सरी व्यापारसँग पनि जोडिएको थियो । Cut flower व्यापार विश्व व्यापार भैसकेता पनि नेपालमा व्यवसायीक रुपले पुष्प व्यापार गर्ने व्यक्तिहरु थिएनन् । यहाँको मानिसहरुको लागि यो व्यवसाय नौलो र चुनौतीपूर्ण थियो । ज्योती र म T.U. पढाई सिध्याएर अब के गर्ने भने सोचाई तिर पुगेका थियौं । हामी आफू पनि रोजगार हुने अरुलाई पनि रोजगारी दिन सक्ने नौलो र चुनौती पूर्ण व्यवसाय गर्न चाहन्थ्यौं । त्यसैले यो व्यापारलाई हामीले आत्मासात गर्न चाहयौं तर हामीसँग फूल विरुवाको प्राविधिक ज्ञान थिएन । त्यसै समयताका (२०५२ मा) फ्लोरिकल्चर एसोसिएसन् नेपालले माली ट्रेनिङ्ग दिएको थियो । हामी पनि यसै traning मा सहभागी भयौं । यस ट्रेनिङ्गबाट हामीले फूल विरुवा सम्वन्धि धेरै ज्ञान पायौं । फेरी FAN ले Bouquelt Arragment Traning दियो । यसबाट हामीलाई फूल कसरी सजावट गर्ने भन्ने सिप पाउनुको साथै फूल व्यवसाय प्रति उत्सुकता भएका तिन जना थप साथीहरु (सपना खरेल, अर्चना के.सी., रक्षा थापा)सँग परिचित हुने मौका दिन्थ्यो ।

तर हाम्रो सिमित पूँजीले मात्र यो व्यवसाय गर्न ज्यादै गाह्रो थियो किनकी त्यसबेला मानिसहरुमा फूल प्रति मोल भएता पनि फूल किनेर घरमा सजाउने, साथी भाईलाई दिने, कुनै समारोह उत्सवहरु फूलबाट सजाउँने चलन एकदम न्यून थियो ।

सुरुमा यो व्यवसायलाई संचालन गर्न FAN ले कृषि उद्यम केन्द्रबाट आर्थिक तथा प्राविधिक सहयोग जुटाई दियो । हामीले २०५२ चैत्र २२ गते भृकुटी मण्डप प्रर्दशनी हलमा नै "Women In Floriculture" लाई जन्म दियौं । त्यसपछि यसको show room लाई कमल पोखरीमा WEAN को सो रुममा राख्यौं । यस व्यापारलाई सफल बनाउन धेरै मेहेनत गऱ्यौ । कुनै पनि संस्था वा मानिसहरुले दिएको अर्डर पुरा गर्न रात दिन काम गरेर पुरा गर्थ्यौं । मन्दिर र विवाहको मण्डप सजाउनु पर्दा रातभरी बसेर सजाउनु पर्थ्यो । यस व्यवसालाई marketing गर्न हामी आफै हरेक होटल, ट्राभल एजेन्सी, बैंक, फाईनान्स कम्पनीमा गएर सर्म्पक गर्न जान्थ्यौं ।

यस व्यवसायलाई जन साधारणको माझ पुऱ्याउन अझ महत्वपूर्ण भूमिका विभिन्न पत्रपत्रिकाहरुले (अस्मीता, कान्तिपुर, हिमाल, सगरमाथा, समाचार पत्र, हाकाहाकी Sunday, Despatch wave जस्ता पत्र-पत्रिकाहरुले पनि उल्लेख्य सहयोग गरी दिएको थियो । यस व्यवसायको परिचय जब मानिसहरुमा हुन थाल्यो । तर नेपालमा फूलको उत्पादन प्रयाप्त नभएको कारण यस सोरुमलाई चाहिने फूल हामी आफैले विभिन्न ठाउँमा उत्पादन गऱ्यौं । (ग्लालस-गोदावरी, गुलाफ-हेटौडा, खैरेनी, मन्जीटार यसले गर्दा बाहिर पनि फूल खेतीको विकास विस्तारै हुन थालेको छ ।

२०५५ सालमा आएर यो व्यापार राम्रो मौलाउन पायो । तत्कालिन अवस्थामा यसको सो रुम अगाडी धेरै नयाँ फूल पसलहरु खुली तुरुन्तै प्रतिस्पर्धा गर्नु परेता पनि खुशी कुरा यो भएको छ कि यसको सो रुम खोलिएको क्षेत्र नै अहिले फूल बजारको रुपमा स्थापित हुन पुगेको छ । अझ यस व्यवसायलाई व्यापक बनाउन हामीले विभिन्न गैर सरकारी संस्थाहरु

(WEAN, WICOM, Swis contact....) सँग मिलेर विभिन्न ठाउँमा फूल खेती कसरी गर्ने भने तालिम दिनुको साथै बजार खोजी गर्ने काम गरी आएका छौं ।

यस्तै विभिन्न संघ संस्था (FAN, पोखरा उद्योग वाणिज्य संघ, Osaca Club Japan) मार्फत फूल सजावट सम्बन्धि तालिम दिंदै आएका छौं । स्कूलका नानीहरुको फूल सजावत competition जज बनि उनीहरुलाई अझ फूलको नजिक बनाउने प्रयास गरी रहेका छौं । आज आएर यस संस्थाले विभिन्न तीता मिठा अनुभव र कठिनाईहरु पार गरेर ५ वर्ष पुरा गरेको छ । यो अवधिमा यस संस्थाले गरको उपलब्धीहरु :-

- फूल व्यवसायलाई विस्तार विकास गरेको छ ।
- फूल उत्पादकहरुलाई उत्प्रेरणा गरेको छ ।
- फूल प्रति मानिसलाई आकर्षण बढाएको छ ।
- फूल सम्बन्धि ज्ञान सूचना उपलब्ध गराउँदै आएको छ ।
- आयतित फूलको प्रतिस्थापना गर्दै आएको छ ।

यस विमन ईन क्लोरिकल्चर संस्थालाई सफल पार्न महत्वपूर्ण प्राविधिक तथा आर्थिक सहयोग गरिदिने "कृषि उद्यम केन्द्र" र "फ्लोरिकल्चर एसोसियसन् नेपाल" प्रति WIF का सबै सदस्य र मेरो तर्फबाट सधन्यवाद कृतज्ञता ज्ञापन गर्न चाहन्छौं ।

अन्तमा WIF र WIF जस्तै अन्य संस्थालाई महानगरपालिका, संघ-संस्था, दातृ संस्था, श्री ५ को सरकारले प्राविधिक तथा आर्थिक सहयोग गरी अझ अगाडी बढ्न सहयोग गरिदिन अनुरोध गर्दछौं ।

Urban Environment and Roadside tree

By Mrs. Lajmina Joshi

Urban environment

Urban environment means the total urban surroundings including human beings, plants, animals and microbes and their total relation. All these factors play a great role in creating or disrupting the environment. Various types of environment problems are generating because of rapid growth of population and urbanization. Poor environmental conditions have serious impact on the quality and longevity of life.

The environment conditions are also influenced due to trees planted along the roadside and their impact due to tree crowns which intercept the sun's rays and precipitation, retard wind speed and loss of heat by radiation.

Roadside tree

Every body knows the meaning of roadside trees. It means trees planted on both sides of the road as avenue tree. Tree is a permanent woody plant capable of attaining at least 6m height with a single woody self- supporting trunk or stem. They are very fascinating because of their graceful appearance and the abundance of bloom with exquisite beauty. Shapes crown, foliage, stem and flower etc are important components of the tree which attract human beings. They provide shade from the sun on hot days and prevent soil erosion. Dense shelter5belt of 5-6rows of trees planted in closed spacing along the highways are able to reduce the noise of heavy traffic. They also play an important role in reducing global warming, balancing oxygen-carbon dioxide ration and in landscaping thus creating a pleasant urban environment. Their value is hence unimaginable and indescribable in the present context.

Role of roadside tree

In the very beginning people used to plant trees in the courtyard in view of its aesthetic value and beautification purposes. But now people are aware of the immense value of trees and have begun to plant tree on Roadside Avenue tree. Now the plantation of tree on roadside has become demanding and extended to newly built roads and also on highways. The advantages of tree plantation are:

1. 1. Road side tree provides shade and shelter not only to the exhausted pedestrian but also to travelers in vehicles. Besides grazing herd of cattle and stray animals also find safe from storms, rain and sun.
2. It protects against hot winds (Loo) in the terai region by

moderating the air temperature in the summer and also protects from cold winds. The temperature under the tree is 3° - 8° less than in the open.

3 It prevents soil from being blown away by wind or washed away with the rush of rain water by firmly binding the soil along the roadside with the help of the roots.

4. It filters dust and other particulate pollutants affecting seriously in roadside areas by accumulating the dust particles saving other areas from such pollution.

5. The crown of the trees greatly prevents the road surface from damage by obstructing the mechanical force of heavy downpour of rains and hailstorms or from cracking during hot weather.

6. It reduces the monotony of driving by providing a more pleasant drive with less destruction

7. It gives caution to the fast moving vehicles by making the edges and curves of the road conspicuous.

8. Color band printed around the tree bole make a natural guide for safe driving, chiefly in dim light and darkness.

9. It gives a beautiful, charming and safe enchanting outlook of modern roads.

10. Full bloom tree avenue help to bring change in the appearance of the landscape creating pleasant urban environment and also one can enjoy this delightful sight even from a distance or from a raised front.

11. It forms a reserve of timber and fuel as national asset in case of emergency or shortage of timber and fuel.

12. It provides protection against noise pollution generated by traffic, over population and concentration of people in urban areas and industrial centers by absorbing, suppressing or reflecting the sound waves.

Some tips for selection of roadside tree

Considering all these utility of roadside trees, we should give some attention while selecting tree species for roadside plantation. All the trees are not suitable for roadside plantation. So following points should be considered while planting trees.

1. Tree hole should be clear for at least 3-4m so that their first branches do not obstruct high loaded vehicles, particularly on narrow roads.

2. Should have a dense crown so that they can provide good shade and protection from rain, sun and hail.

3. Should be chosen with regard to the

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2. Should have a dense crown so that they can provide good shade and protection from rain, sun and hail.

3. Should be chosen with regard to the

soil and rainfall of the area concerned.

4. Should not have many spreading crowns, which may obstruct the growth or the opposite row of tree.

5. Should be considered for the color of the flowers and waves as the color like red, yellow, blue, orange and purple show a very effective display.

6. The root system of the trees should be neither very shallow nor very spreading. Trees with deep root system are the best. Tree with shallow root system topple down in storms and obstruct traffic. Trees with very robust and spreading root system damage the masonry work of the road and footpaths and even adjacent buildings.

7. Fuel and fodder tree species should not be chosen as they will invariably tempt the neighboring inhabitants to lop or even felt the trees.

8. The trees should not have hanging aerial roots such as Bar (Ficus benghalensis). Their aerial roots will need to be constantly removed to avoid obstructions to traffic and to pedestrians.

9. The tree which shed their leaves during summer and rain should not be planted as shed and protection from sun and rain are most needed during this season. Besides the fallen leaves in rainy seasons may block the drainage system and even make road slippery.

10. Too many species should not be mixed within short distances. Two or three ornamental species having flower of different colors may be selected for mixed plantation.

11. The tree should not be very soft wooded and brittle as they break in storms and block traffic.

12. Trees on the two sides of the road should be alternate with each other and not be opposite.

13. Trees should not be very spreading.

We have got number of indigenous and exotic flowering trees, which can be successfully utilized to beautify our cities, towns and village. Along with the road plan, a plantation plan should be made and strictly adhered to. For the existing roads dead and decaying trees should be replaced systematically according to a plan. Species such as Azadiracta indica, Grevillia robusta, Ficus sp should be selected for the purpose of shade. Species such as Michelia champaca, Cupressus torulosa, Saraca indica and Eucalyptus sp. are generally grown for their shape of bole and crown. Some of the flowering tree may be selected in such a way that at least few trees are in flower throughout the year. Mostly trees flower during summer but some of the ornamental tree flowers in different periods. Some of the indigenous trees for roadside avenues are listed below.

Scientific Name	Common Name	Local Name	Family	Flowering time	type
Aesculus indica	Buck eye	Lekh pangram	Hippocastanaceae		Baisakh
deciduous					
Albizia lebbeck	Silk tree	Siris	Leguminoseae	Baisakh	Deciuous
Bauhinia variegate	Orchid tree	Koiralo	Leguminoseae	Chaitra- Baisakh	Deciuous
Callendea neematocephala		Leguminoseae	Baisakh	Deciuous	
Callistemon lanceolata	Bottle brush	Kalki phul	Myrtaceae	Year round	Evergreen
Erythrina sp.	Coral tree		Leguminoseae	Jestha	Deciuous
Fraxinus floribunda	Ash tree	Lankuri	Oleaceae	Jestha	Deciduous
Grevillea robusta	Silk oak	Kangio phul	Proteaceae	Baisakh	
Everygreen					
Jacarinda mimosifolla	Blue mimosa		Mimosaceae	Baisakh	Deciduous
Lagerstroemia indiaca	Crape myrtle	Ashare phul	Lythraceae	Asar	Deciduous
Magnolia grandiflora	Bull bay	Rukh Kamal	Magoliaceae	Baisakh	Evergreen
Michelia champaca	Sunachamp	Champ	Magnoliaceae	Baisakh	Evergreen
Michelia fuscata		Kankanchampa	Magnoliaceae	Baisakh	Evergreen
Plumeria rubra	Temple tree		Apocynaceae	Baisakh-Jestha	Deciduous
Prunus ceresoides	Himalayan cherry	Painyu	Rosaceae	Falgun-Chaitra	Deciduous
Prunus persica	Flowering peach	Aaru phul	Rosaceae	Falgun	Deciduous
Pyrus pashia		Mayal	Rosaceae	Falgun	Deciduous

Beautiful Ornamental Orchids of Nepal

Madhu Ghimire
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Orchids, One of the most beautiful flowering plants in the world, comprise a unique group of plants and occupy the top position among all the flowering plants. They have a great economic importance, primarily for their horticultural appeal. Their flowers are unusally oriented, long lasting and are of excellent form. They are extraordinary beautiful, ornamental and are of immense source of aesthetic pleasure.

Orchids are very beautiful and fascination plants. They are often considered as 'Floral Royalty in the Plant Kingdom'. Orchids are on of the integral parts of Nepal's Natural heritage as well. These Nepalese orchids are very popular as ornamental plants due to their long lasting colourful flowers, variously shaped pseudo-bulbs shiny green leaves. They are ornamentally used as indoor and outdoor decoration.

The demand of ornamental plants is increasing day-by-day due to over growing population and growing living standard of people. The ornamental plants are either grown in pots for decoration or planted in the garden around home. herbaceous types of ornamental plants are grown in pots while other plants like Dhopi (gymnoperm) is grown in the ground in the garden. Different varieties of ornamental plants are grown in Nepal. Among them orchid represents one of the most popular ornamental plant now a-days. Like other ornamental plants orchids are also grown in pots. They are also grown in branches of other trees or in wooden boxes.

Altogether there are 38 species of important orchids belonging to 18 genera in Nepal. Out of them, orchid species cultivated in Nepal for ornamental use belong to the following genera : Aerides, Arundina, Ascocentrum, Bulbophyllum, Calanthe, Coelogyne, Cymbidium, Dendrobium, Eria, Rhynchostylis, Tudelia, Vanda and so on. Ornamental orchids of Nepal and their time of flowering are given in the following tabel:

S.N.	Scientific Names	Flowering time
1.	*Aerides multiflora*	*June-July*
2.	*Aerides odorata*	*July-August*
3.	*Ascocentrum amphulacum*	*June-July*
4.	*Arundina graminifolia*	*August-October*
5.	*Boulbophyllum leopardianum*	*June*
6.	*Calanthe masuca*	*July-September*
7.	*Calanthe plantagenia*	*March-April*
8.	*Calanthe tricarinata*	*April-may*
9.	*Coelogyne cristata*	*March-April*
10.	*Coelogyne corymbosa*	*March-April*
11.	*Coelogyne ovalis*	*September-October*
12.	*Cymbidium devonianum*	*June*
13.	*Cymbidium eburneum*	*March-May*
14.	*Cymbidium elegans*	*September-November*
15.	*Cymbidium iridioides*	*September-December*

16.	*Cymbidium hookerianum*	*April-June*
17.	*Cymbidium lancifolium*	*July-August*
18.	*Dendrobium aphyllum*	*April-May*
19.	*Dendrobium chrysanthemum*	*June*
20.	*Dendrobium candidum*	*April*
21.	*Dendrobium cerpidatum*	*April-May*
22.	*Dendrobium densiflorum*	*April-May*
23.	*Dendrobium formosum*	*May-June*
24.	*Dendrobium heterocarpum*	*March-April*
25.	*Dendrobium longicornu*	*October-November*
26.	*Dendrobium moschatum*	*June-July*
27.	*Dedrobium nobile*	*April-May*
28.	*Epigeneium amphum*	*September-November*
29.	*Eria coronaria*	*Octarber-November*
30.	*Esmeralada clarkei*	*October-November*
31.	*Phaius tancarvilliae*	*June-July*
32.	*Phalaenopsis mannii*	*April-May*
33.	*Pleione humilis*	*February-March*
34.	*Pleione praecox*	*Octarber-November*
35.	*Rhynchostylis retusa*	*May-July*
36.	*Trudelia cristata*	*March-June*
37.	*Vanda tessellata*	*July-August*
38.	*Vadopsis undulata*	*March-April*

Propagation and cultivation :

These beautiful orchids can propagate easily and simply in our home or nurseries by simple division and top cutting methods. Tissue culture methods can be applied for the propagation of these orchids in large scale but this method is very costly and cost effective for nurserymen. This propagation of orchids by simple division and to cutting is applied and useful for local users. For example a mother plant of Cymbidium and Dendrobium can be split into two or more plants of propagation by division is suitable for all sympodial orchids (orchids whose main stem grows horizontally with new growth rising from and along the rhizome).

However, monopodial orchids cannot be divided in this way. Monopodial orchids have one foot; the plants grow perpendicular and their branches lateral. Examples include Ascocentrum, Vanda, Trueilia. Monopodial orchids are propagated by 'top cutting'. When the plants grow to the considerable length, cut off the top of the orchid below on or more roots and plant the top section. This stump will quickly send up one or more suckers and these will develop into flowering plants.

Keikis

Some orchid reproduce by means of 'Keikis'. The term 'Keikis' means 'baby'. It refers to the plantlets that grow from the nodes of pseudo bulbs above the level of the potting materials, sometimes in flowering spikes, and rarely from the roots. Keikis's develop in quite a number of genera especially *Dendrobium*. It seems that all species of Dendrobium are capable of reproduction in this manner, in particularly Eugananthe section and notable the species *nobelii*. Many nurseries rely on this method for most of their plant reproduction in the world.

When old back pseudo-bulbs are cut into 3-8 pieces and placed in a plastic bag with a small amount of moist Sphagnm moss, they start to grow and produce plantlets. Often each node at the bottom of a flower spike can be the source of a Keikis if correctly treated. In the case of dendrobium, cut the spike into short with the node in the middle of each piece after flowering. Submerge vertically in Sphagnum moss encloses in a clear plastic bag. Once the Keikis are of sufficient size, take out the plant from the bag and repot again. Rare and endangered species such as phaius

tancarvilliae, can be increased rapidly using this method, rather than by the division of back bulbs. Keikis from time to time do develop along the roots of various phalaenopsis species. Keikis also develop along the flowering spikes of these species.

Through propagation of orchids by means of top cutting and Keikis is traditional. But it is very effective in context to developing countries like Nepal. Propagation of orchids by this method does not require sophisticated equipments, it is affordable by local people or nurseryman and there is no chance of variation of the species.

For the growht of any plant, certain requirements must be met. These are :

- Suitable temperature levels
- An adequate supply of water
- Plenty of fresh, moving air
- Suitable light levels and
- Suitable and adequate supply of essential mineral salts

Orchids can be grown in clay or plastic pots, although provisions of extra drainage holes are advantageous. Orchid roots need a constant supply of moisture.

Orichids have been grown in many varied media, ranging from Osmunda fibre, rice husks, wood bark, coal, and even gravels. The final chice depends on cost, suitability and availability but these days the use of the chopped pine bark usually meets most requirements. It is readily available and comparatively inexpensive.

Most cultivated orchids would grow naturally on trees, so these are often grown on slabs of tree fern fiber, corkbark or even actual tree branches. In most area tree fern fibre slabs are most suitable. These slabs must be well weathered as fresh material can cause damage to roots. Generally, slabs are cut 20 to 30mm thick, with the copper of plantic-coated wire inserted to allow them to be hung. Plant can be attached to a slab by :

- Cutting a small flap in the mount and wedging the plant into this or
- Tying the plant on with monofilament fishing line or thin plastic cover extra moisture and humidity required for re-establishment.

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Chemical treatment of some important cut flowers to increase longevity

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Introduction :

Postharvest handling is an important feature of a successful cut flower production system and controlled/modified environment storage and chemical treatment are two components of efficient postharvest handling system. However, this paper will focus only on chemical treatment of cut flowers to increase their longevity.

Chemical is an essential postharvest operation to increase longevity of cut flowers. The function of this treatment depends on types of chemical used. It ranges from anti-microbial effect (Hydroxyquinoline-sulphate (HQS), supply of food (Sucrose), Inhibition of ethylene biosynthesis (Aminooxyacetic acid (AOA) or inhibition of ethylene sensitivity (Silver thiosulphate (STS), 1-Methylcyclopropane (1-MCP). There ares several commercial formulations for post-harvest care of cut fowers such as Floralife, Chrysal, Oasis etc. Lack of availability of these formulations in Nepalese market, probably high cost on direct import, lack of knowledge of post-harvest care etc have deterred flower growers in Nepal from using these formulations. It is anticipated that upon reading this paper flower growers in Nepal can effectively prepare chemicals and treat cut flowers and decrease post-harvest loss, increase flower vase life, increase consumer satisfaction and eventually profit.

Chemicals can be treated to cut flowers to increase longevity in following two ways:

a. Pre-treatment or Pulse treatment:
   In this category, cut flowers are treated with chemicals for a short time ranging from few minutes to few hours but at higher concentration (e.g., STS 4mM for 15 minutes in spray carnation) and thereafter in water.
b. Continuous treatment:
   In this category, cut flowers are treated with chemicals for the entire duration of the flower life (shelf life and vase life) but at lower concetration (e.g., Sucrose 2% plus HQS 250ppm in tuberose).

Preparation of chmical solution :

a. Sucrose solution : (e.g., Sucrose 20%; 500ml volume).
   To prepare this solution, weigh 100g

of sucrose, dissolve in distilled water and make up the volume to make it 500ml (w/v). Pratically, use of distilled water at commercial level may not be feasible hence use of clean water is recommended. However, grower must make sure the water containing high fluoride causes injury and accelerates senescence in cut flowers.

b. Hydroxyquinoline-sulphate (e.g., HQS 200; 500ml volume).
To prepare this solution, weigh 0.1g of HQS. dissolve in distilled water and make up the volume to make it 500ml (w/v).

c. Silver thiosulphate (e.g., STS 4mM; 100ml volume).
Prepare stock solution of chemicals with following strengths.

1. 0.1M $AgNO_3$ (silver nitrate) (50ml)
$AgNO_3$ mol wt. 269.87; 0.845 for 50ml volume (w/v).
2. 0.1 m $Na^2S_20_3$ $5H_2O$ (sodium thiosulphate) (100ml)
Na2S2O35H2O mol wt. 248.18g; 2.48g for 100ml volume (w/v).

To prepare 4 mM STS (100ml)

Ttep 1. Take about 60ml of distilled water in a closed capped vial and add 4 ml of 0.1 M silver nitrate.

Step 2. Shake it.

Step 3. To the vial add 32 ml of 0.1 M sodium thiosulphate and immediately shake for few seconds (delay in shaking can result browning of the solution).

Step 4. Make the volume to 100ml by adding distilled water.

Step 5. 4mM STS solution is now ready to used.

Treatment of chemicals :

Pretreatment of cut flowers is mainly done at the growers whereas continuous treatment is done along the flower chain especially by the retailers and customers. After harvesting, flowers are brought to the grading room (no direct sunlight) and grading is done. This process may take from 1-2 h or more depending on the volume of harvest. After grading flowers may be given pretreatment and kept in a cool room (5°C; temperate flowers e.g., carnation, rose etc) or (15°C; tropical flowers e.g., heliconia, anthurium etc) until it is packed and transported to wholeale or retail outlet.

At the wholesale or a retail outlet, continous treatment should be given and a slant re-cutting of the stem should be given every 48h. The customer should also follow the same procedure as the wholesalers and the retailers to ensure good quality and long vase life of cut flowers.

Classification of ethylene sensitivity of some cut flowers:

All cut flowers are not sensitive to ethylene but most of the important cut flowers are sensitive to ethylene. It is therefore very important to know what flower is sensitive to ethylene and what not and if sensitive what degree of sensitivity. Ethylene sensitivity score ranges from to 4, where is insensitive and 4 is very highly sensitive. This means, flowers of category 4, untreated with ethylene inhibitors if exposed to ethylene results dramatic death by either wilting or abscission or both. This

scoring is based on the general pattern of the whole species and not individual cultivars. Thus, there is a possibility what a cultivar from a very highly sensitive species may be insensitive but this is an individual cultivar character and not that of a speicies. Hence, growers when dealing with cultivar whose status (ethylene sensitive) is unknown should be cautious during postharvest handling and should use the background of its speicies as a bench mark regarding sensitivity to ethylene until research is done to classify its sensitivity to ethylene.

Guideline for chemical treatment of cut flowers :

Guideline for chemical treatment of some important cut flowers grown in Nepal is given below. This guideline is based on data published in peer reviewed national and international journals, books and extension notes. Since, this guideline is based on data reviewed in some cultivars of a species. It may be possible that the treatment suggested may be not always effective for other cultivars of the same species. Obviously, that difference in response could be due to cultivar factor and or concentration factor of the chemical used. Furtheremore, difference could also result due to stage of harvest (stage of harvest depends on when and where to market; what is listed here is a general stage). Such response has been widely observed in several species when treated with the same chemical. It is thus, advised to growers and all other users of this information to test the efficacy of the treatment before actually treating in a large scale. This information should be treated as a guideline and not a recommendation.

1. Anthurium
   Sensitivity to ethylene : No
   Stage of harvest : Three quarters open flowers in spadis
   Pre-treatment : benzyladedine (BA) 200mg/L for 10s to a min. Or pulse the re-cut stems for 10 to 20 minutes in 1000 ppm silver. (Rinse the stems with fresh water after the treatment).
   Storage temperture : >13°C
   Vase life (control : treatment) days : 23:43
2. Antirrhinum (snap dragon)
   Sensitivity to ethylene : Yes
   Classification of ethylene sensitivity : 3
   Stage of harvest : 5 open florets
   Continuous treatment : sucrose 5% plus HQS 200mg/L
   Storage temperature : 2°C
   Bud oepning : increases
3. Aster
   Sensitivity to ethylene : Yes
   Classification of ethylene sensitivity : 1
   Stage of harvest : 5 open flowers
   Continuous treatment : Aluminium sulphate 0.4% plus sucrose 2 %
   Storage temperature : 2°C
   Vase life : 5.1-5.5:13.2-14.6
4. Dendrathema (chrysanthemum)
   Sensitivity to ethylene : No but leaves are sensitive
   Stage of harvest : 2-3 outer ray florets when horizontal (standard); 30-50% flowers open (spray).
   Continuous treatment : Aluminium

sulphate 0.2% plus sucrose 3 %
Storage temperature : 2°C
Bud opening : increases
Vase life : 7.3:12.3

5. Dianthus (carnation)
Sensitivity to ethylene : Yes
Classification of ethylene sensitivity : 4
Stage of harvest : paint brush stage
Pre-treatment : STS 0.2mM treated for 2h.
Storage temperature : 2°C
Vase life : 7:20

6. Dianthus (spray carnation)
Sensitivity to ethylene : Yes
Classification of ethylene sensitivity : 4
Stage of harvest : 30-50% flowers open
Pre-treatment : STS 4mM, treated for 15 min, followed by a 16h pulse in sucrose 10% and 200 ppm Physan.
Storage temperature : 2°C
Bud opening : increases
Vase life : 7.9:13.5

7. Freesia
Sensitivity to ethylene : Yes
Classification of ethylene sensitivity : 1 or 2
Stage of harvest : first bud beginning to open
Pre-treatment : Pulse with STS 2mM for 30 minutes
Storage temperature : 2°C
Bud opening : 35.4% more than control
Vase life : 25% more than control

8. Gerbera
Sensitivity to ethylene : Yes
Classification of ethylene sensitivity : 1
Stage of harvest : Fully open
Continuous treatment : sucrose 4% plus silver nitrate 20ppm
Storage temperature : 2°C
Vase life : increase; increase by 1.5 times

9. Gladiolus
Sensitivity to ethylene : No
Stage of harvest : pink stage (first appearance of color in the lowest florets)
Pre-treatment : pulsing with sucrose 20% plus silver nitrate 1000 ppm for 20h.
Continuous treatment : Trehalose 0.1M plus HQS 200mg/1
Storage temperature : 2-5°C
Bud opening : increase bud opening
Vase life : increase; Trehalose delay wilting of floret by 2 days.

10. Gypsophila
Sensitivity to ethylene : Yes
Classification of ethylene : 4
Stage of harvest : Inflorescence with 20-30% flowers open
Pre-treatment : STS 0.2mM plus sucrose 5-10% for 24h (in recent papers pulsing is done for 6h)
Storage temperature : 2°C
Bud opening : 25%:64%:76%
Vase life : 4:11.9:10.9

11. Hliconia
Sensitivity to ethylene : No
Stage of harvest : first bract open
Pre-treatment : BA 200mg/L for 10 s or for a minute
Storage temperature : 13-16°C
Bud opening : increase
Vase life : 7:21

12. Lilium
Sensitivity to ethylene : Yes
Classification of ethylene : 1-4
Stage of harvest : first flower fully open; when the first flower is still at bud stage (in Japan only)
Pre-treatment : STS 1mM pluse sucrose 10% for 30 min.
Continuous treatment : HQS 150mg/1 plus sucrose 2% plus 50mg/1 silver nitrate
Storage temperature : 2°C
Bud opening : increase
Vase life : increase vase life 1.8 times

13. Narcissus (Daffodils)
Sensitivity to ethylene : No
Stage of harvest : first floret open
Pre-treatment : STS 0.1mM pulsed for 20h
Storage temperature : 2°C (keep separately from other cut flowers; exudate blocks xylem vessels)
Bud opening : increase
Vase life : 8.3:11.3

14. Nerine
Sensitivity to ethylene : Yes
Classification of ethylene sensitivity : 2
Stage of harvest : spathe split
Pre-treatment : pluse with sucrose 10 or 20% plus HQS 200mg/1 for 24h
Storage temperature : 7-10°C
Bud opening : increase opening of florets
Vase life : 5.2 days higher than control

15. Rosa hybrids (rose)
Sensitivity to ethylene : Yes
Classification of ethylene sensitivity : 3
Stage of harvest : bud stage with fully horizontal calys
Continuous treatment : sucrose 3% plus HQS 200mg/1
Storage temperature : 2°C
Bud opening : improves
Vase life : 5.8:9.0

16. Strelitzia reginae (bird of paradise)
Sensitivity to ethylene : No
Stage of harvest : first floret emerge
Pre-treatment : pulsing with sucrose 40% for 24h
Continuous treatment : Trehalose 0.1M plus HQS 200mg/1
Storage temperature : >7°C
Vase life : increase

17. Polianthes (tuberose)
Sensitivity to ethylene : No
Stage of harvest : 2-3 florets open
Pre-treatment : pulsing with sucrose 20% plus HQS 250ppm for 24h; stored dry for 6d and threreafter given continous treatment
Continuous treatment : sucrose 2% plus HQS 250ppm
Storage temperature : 2°C (dry)
Bud opening : 50%
Vase life : 6:11

18. Tulipa (tulip)
Sensitivity to ethylene : Yes
Classification of ethylene sensitivity : 1-2
Stage of harvest : half open
Continuous treatment : 50mM trehalose with 50μM CAP (chloramphenicol)
Storage temperature : 2°C
Vase life : increases

■

Some potential wild flora of Nepal for the development of commercial floriculture

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Floriculture is a big business in the world now. Many hybrid flowers are being used in cut and port flowers. Most of the hybrid flowers of to day have been development from their wild relatives. The present material of Carnation, Gladiolus, Chrysanthemum, Lilies, Roses, Tulips, Gerbera, Cymbidium, Dendrobium, Vanda, Iris, Peonies, Primroses, Aster etc. have been developed from their wild relatives through a series of hybridization and improvements. Thus the wild flora provides valuable materials for developing new varieties and could be utillzed for breeding improved varieties as well as attractive plant material for garden landscape.

Nepal is rich in floral diversity. Many beautiful wild plants have been the ornamental assets of Nepalese landscape from plains to mountains and high alpine regions of the country. Large trees with beautiful architectural shapes adorned with beautiful flowers, many shrubberies having unique essence of natural shapes adorned with beautiful flowers, many shrubberies having unique essence of natural beauty and large numbers of herbs with their high decorative value, diverse color and aroma make Nepal presentable as really a rich country with the heavenly beauty of its natural flora. Some 5400 flowering plants have been identified so far, many of these are really attractive. These wild plants can be utilized to develop new and novel varieties. Some of these species have been already domesticated and improved in Europe. One of the examples is *Primula denticulate*. There is a need for selection of desirable characters of these plants to develop into improved varieties as well as to develop culture practices for the use in garden decoration. The present methodology of growing cut and pot flowers in developed countries has been very sophisticated, so it is high time to start the selection and improvement of our wild flora for the development of commercial floriculture. Here is a list of some potential wild plants of Nepal, which may be suitable material for developing such innovative plants useful for floriculture development in the future.

List some potential wild plants for commercial floriculture

S.No.	Scientific name	Habit	Zonal Distribution
1.	Aconitum laevae	Herb	Alpine
2.	Aconitum violaceum	Herb	Alpine
3.	Adonis chrysocyathus	Herb	Alpine
4.	Aerides multiflora	Orchid	Tropical – temperate
5.	Aerides odorata	Herb	Tropical – subtropical
6.	Ajuga lupulina	Herb	Alpine
7.	Anemone obtusiloba	Herb	Temperate
8.	Anemone polyanthes	Herb	Alpine
9.	Anemone rupicola	Herb	Alpine
10.	Aquilegia pubiflora	Herb	Upper temperate
11.	Arundina graminifolia	Herb	Subtropical-Temperate
12.	Aster falconeri	Herb	Alpine
13.	Astilbe rivularis	Herb	Temperate
14.	Bergenia ciliate	Herb	Temperate
15.	Bistorta affinis	Herb	Sub alpine
16.	Calanthe brevicornu	Orchid	Temperate
17.	Calanthe masuca	Orchid	Temperate
18.	Calanthe plantaginea	Orchid	Temperate
19.	Calanthe tricarinata	Orchid	Temperate
20.	Caltha palustris	Herb	Sub alpine
21.	Cardiocrinum giganteum	Herb	Temperate
22.	Chirita urticifolia	Herb	Temperate
23.	Clematis barbellata	Climber	Alpine
24.	Clematis Montana	Climber	Temperate
25.	Clematis phlebantha	Climber	Upper temperate
26.	Clematis roylei	Climber	Upper temperate
27.	Clematis tibetana	Climber	Sub alpine
28.	Clerodendrn japonicum	Climber	Sub tropical
29.	Codonopsis covolvulacea	Climber	Upper temperate
30.	Coelogyne corymbosa	Orchid	Temperate
31.	Coelogyne cristata	Orchid	Temperate
32.	Coelogyne nitida	Orchid	Temperate
33.	Corallodiscus lanuginosus	Herb	Sub alpine
34.	Corydalis govanianum	Herb	Sub alpine

35.	Corydalis juncea	Herb	Sub alpine
36.	Cremanthodium arnicoides	Herb	Sub alpine
37.	Cremanthodium nepalense	Herb	Sub alpine
38.	Cyananthus labatus	Herb	alpine
39.	Cymbidium aloefolium	Orchid	Tropical-subtropical
40.	Cymbidium devonianum	Orchid	Subtropical
41.	Cymbidium elegans	Orchid	Temperate
42.	Cymbidium hookerianum	Orchid	Temperate
43.	Cymbidium iridiodies	Orchid	Temperate
44.	Cymbidium lancifolium	Orchid	Temperate
45.	Cypripedium cordigerum	Orchid	Sub alpine
46.	Cypripedium himalaicum	Orchid	Sub alpine
47.	Delphinium brunonianum	Herb	Alpine
48.	Delphinium himalayai	Herb	Sub alpine
49.	Delphinium vestitum	Herb	Sub alpine
50.	Dendrobium aphyllum	Orchid	Tropical-subtropical
51.	Dendrobium chrysanthum	Orchid	subtropical
52.	Dendrobium densiflorum	Orchid	Temperate
53.	Dendrobium fimbriatum	Orchid	Temperate
54.	Dendrobium formosum	Orchid	Subtropical-temperate
55.	Dendrobium moschatum	Orchid	Subtropical
56.	Dendrobium nobile	Orchid	Subtropical
57.	Dipsacus inermis	Herb	Temperate
58.	Didymocarpus pedicillatus	Herb	Temperate
59.	Epilobium latifolium	Herb	Temperate
60.	Euphorbia sikkimensis	Herb	Sub alpine
61.	Euphorbia wallichii	Herb	Sub alpine
62.	Gerbera gossypina	Herb	Temperate
63.	Habenaria arietina	Orchid	Temperate
64.	Habenaria ensifolia	Orchid	Temperate
65.	Hedychium aurantiacum	Herb	Temperate
66.	Hedychium ellipticum	Herb	Temperate
67.	Hedychium gardenerii	Herb	Temperate
68.	Hedychium thyrsiforme	Herb	Temperate
69.	Incarvillea emodi	Herb	Sub alpine
70.	Iris decora	Herb	Sub alpine
71.	Lagotis cashmeriana	Herb	Alpine

72.	Leontopodium stracheyi	Herb	Alpine
73.	Leontopodiun jacotianum	Herb	Alpine
74.	Lilium nanum	Herb	Sub alpine
75.	Lilium nepalinse	Herb	Temperate
76.	Lilium wallichianum	Herb	Subtropical
77.	Luculia gratissima	Herb	Temperate
78.	Mahonia nepaulensis	Herb	Temperate
79.	Meconopsis dwojii	Herb	Sub alpine
80.	Meconopsis grandis	Herb	Sub alpine
81.	Meconopsis paniculata	Herb	Sub alpine
82.	Meconopsis hrridula	Herb	Sub alpine
83.	Melastoma normale	Herb	Subtropical-temperate
84.	Nepeta nervosa	Herb	Sub alpine
85.	Notholirion macrophylla	Herb	Sub alpine
86.	Osbeckia nepalensis	Herb	Temperate
87.	Oxyspora paniculata	Herb	Temperate
88.	Paeonia emodi	Herb	Sub alpine
89.	Paraaquilegia microphylla	Herb	Sub alpine
90.	Pedicularis trchoglossa	Herb	Sub alpine
91.	Pedicularis trchoglossa	Herb	Sub alpine
92.	Phaius flavus	Orchid	Subtropical
93.	Phaius tankervilleae	Orchid	Temperate
94.	Phlomis bractiosa	Herb	Sub alpine
95.	Pleoine hookeriana	Orchid	Temperate-sub alpine
96.	Pleoine praecox	Orchid	Temperate-sub alpine
97.	Polimonium caerulium	Herb	Alpine
98.	Primula aureate	Herb	Sub alpine
99.	Primula calderiana	Herb	Sub alpine
100.	primula denticulate	Herb	Temperate
101.	Primula denticulate	Herb	Sub alpine
102.	Primula involucrate	Herb	Temperate-Sub alpine
103.	Primula macrophylla	Herb	Sub alpine
104.	Primula oblique	Herb	Sub alpine
105.	Primula sikkimensis	Herb	Upper temperate
106.	Primula stuartii	Herb	Sub alpine
107.	Primula wallastonii	Herb	Upper temperate
108.	Primula wigramiana	Herb	Sub alpine

109.	Pterocephales hookeri	Herb	Sub alpine
110.	Reinwardtia indica	Shrub	Temperate
111.	Rheum nobile	Herb	Sub alpine
112.	Rhododendron arboretum	Tree	Temperate
113.	Rhododendron barbatum	Tree	Upper temperate
114.	Rhododendron campalnulatum	Tree	Sub alpine
115.	Rhododendron campylocarpum	Tree	Upper temperate
116.	Rhododendron cinnabarinum	Tree	Temperate
117.	Rhododendron dalhausae	Epiphytic	Temperate
118.	Rhododendron falconerii	Tree	Upper temperate
119.	Rhododendron hogdsonii	Tree	Sub alpine
120.	Rhododendron thomsonii	Tree	Sub alpine
121.	Rhododendron triflorum	Tree	Sub alpine
122.	Rhynchostylis retusa	Orchid	Tropical-subtropical
123.	Rosa macrophylla	Shrub	Sub alpine
124.	Rosa moschata	Climber	Temperate
125.	Rosa sericea	Shrub	Sub alpine
126.	Roscoaea capitata	Herb	Temperate
127.	Roscoea pupurea	Orchid	Temperate
128.	Senecio jacqemontianus	Herb	Temperate-Sub alpine
129.	Spathoglottis ixioides	Orchid	Upper temperate
130.	Spirea bella	Shrub	Temperate
131.	Syringa emodi	Shrub	Upper temperate
132.	Thaermospsis barbata	Herb	Sub alpine
133.	Thalictrum foliolosum	Herb	Temperate
134.	Thalictrum reniforme	Shrub	Upper temperate
135.	Trollius acaulis	Herb	Alpine
136.	Vanda teres	Orchid	Tropical-subtropical
137.	Waldeheimia glabra	Herb	Sub alpine
138.	Woodfordia fruticosa	Shrub	Tropical-subtropical

Note :

Tropical	=	100 – 1000 m
Subtropical	=	1000 – 2000 m
Temperate	=	2000 – 3000 m
Sub alpine	=	3000 – 4000 m
Alpine	=	Above 4000 m

Agro Enterprise Center

कृषि उद्यम केन्द्र

Introduction

Agro Enterprise Center (AEC), an agricultural wing of the Federation of Nepalese Chambers of Commerce and industry (FNCCI) was established in September 1991 under the Cooperative Agreement between FNCCI—the FNCCI is an umbrella organisation of the Nepalese private sector established in 1965 with the aim of promoting business and industry while protecting the rights and interests of business and industrial commodities—and USAID/Nepal. In the growth of past twelve years, AEC has made valuable contributions in Agro Business Development and Promotion.

Since 01 October 2002, AEC has been re-shaped with more focused Mission and Vision.

The Mission

"To expand and strengthen market oriented private sector driven agro enterprises in order to increase the value and volume of high-value products sold domestically and internationally".

The Vision

"The vision of AEC in the national context is to be a strong, vibrant and sustainable private sector led agro-enterprise sector capable of contributing high and broad based economic growth, which is a pre-condition proposed strategy".

Activities Focused Onwards are

- Policy Advocacy and Policy Advices/Studies
- Market and Demand Analysis of High Value Agriculture Crops
- Trade and Development focusing on Trade Fair/Exhibitions and new business development
- Strengthening Agro-Commodity Associations and supports for their development/promotional programmes
- Agro Business Information Service including Market Information Services

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आयोजना गरेको Floriculture Trade Fair 2003

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फ्याक्स नं. ४२६१०२२, ४२६२००७

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