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Nepalese FLORICULTURE

"Clean environment & economic prosperity through floriculture"

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FLORICULTURE CO-OPERATIVE LIMITED

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पत्र संख्या
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फोन नं ४२११६३५
४२११८७८
४२११९३२
४२११६६५
४२११६८७
४२११९१५
फ्याक्स ४२११९३५
सिंहदरबार, काठमाण्डौं
नेपाल

शुभकामना

कृषि क्षेत्र भित्रको एक उदाउँदो व्यवसाय र आम नेपालीको परम्परा एवम् संस्कृतिसँग जोडिएको पुष्प खेती रहेको छ। नेपालको कृषि पर्यावरणीय विविधता, यहाँ पाइने स्थानीय तथा रैथाने पुष्प तथा पुष्पजन्य प्रजातिहरूका पहिचान, संरक्षण, सम्वर्द्धन, प्रवर्द्धन र व्यवसायिक प्रयोजन गरेमा रोजगार सृजना हुने र किसानहरूको प्रमुख आयआर्जनको श्रोत बन्ने सम्भावना र अवसर रहेको छ। यस सन्दर्भमा पुष्प खेती र व्यवसायको विकास, विस्तार तथा प्रविधि आयातमा निजी व्यवसायीहरूको समेत योगदान छ।

पुष्प व्यवसायीहरूको संस्था "Floriculture Association Nepal (FAN)" ले पुष्प सम्बन्धी विविध लेख रचनाहरू एवम् तथ्याङ्क समेटिएको "Nepalese Floriculture Book (Volume 26)" विशेषांक प्रकाशन गर्न लागेकोमा खुशी लागेको छ। यो पुस्तिकाले पुष्प र पुष्पजन्य व्यवसाय सम्बन्धी विविध विषयहरूको अभिलेखीकरण गरेकोले पुष्प व्यवसायीहरू, उद्यमी, विद्यार्थी, अनुसन्धानकर्ता, अध्ययनकर्ता तथा यसमा चासो राख्ने सम्पूर्ण सरोकारवालाहरूको लागि उपयोगी हुनेछ भन्ने आशा लिएको छु। अन्तमा पुष्प व्यवसायमा तथा सम्पूर्ण पुष्प क्षेत्रमा FAN को निरन्तर रचनात्मक संलग्नता रहने विश्वास राख्दै प्रगतिको शुभकामना दिन चाहन्छु।

श्रावण, २०८०

(डा. गोविन्द प्रसाद शर्मा)
सचिव

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शुभ–कामना

नेपाल भौगोलिक बनावट सबै प्रकारका फूल उत्पादनका लागि उपयुक्त मानिन्छ । एफएनसीसीआईको सदस्य फ्लोरिकल्चर एसोसिएसनले हरेक वर्ष आयोजना गर्दै आएको पुष्प मेलाले पनि मुलुकभित्र व्यवसायिक पुष्प खेतीको प्रवर्द्धनका लागि महत्वपूर्ण भूमिका खेल्दै आएको छ । संघकै अनवरत प्रयासका कारण फूलको आन्तरिक खपत वृद्धिका साथै विस्तारै निर्यात समेत हुन थालेको छ ।

नेपालमा पनि फूलको माग निरन्तर बढी रहेको छ । आन्तरिक मागको धेरैजसो प्रतिशत स्वदेशी उत्पादनले पुरा गर्न थालेको छ । केही अनुकुल परिस्थिति नभैदिएको भए आन्तरिक मागलाई स्वदेशी उत्पदानले पुरा गर्ने अवस्था बनिसक्ने थियो । कोभिड महामारी देखि नै थलापरेको पुष्प व्यवसाय अहिलेसम्म पनि राम्रोसंग तङग्री नसकेको यस व्यवसायमा लागेका साथीहरूबाट सुनेको छु ।

स्वदेशी पुष्प व्यवसायलाई फस्टाउने वातावरण बनाउन आन्तरिक उत्पादनलाई प्रवर्द्धन गर्नुपर्ने, पुष्प नीतिलाई संघीय संरचना अनुसार परिमार्जन गर्नुपर्ने, पुष्प व्यवसायी कृषकहरूको हकमा भ्याटमा अनिवार्य जानुपर्ने प्रावधान हटाउनुपर्ने लगायतका सुझावहरू संबोधन हुनुपर्नेमा महासंघको पनि जोड छ ।

एसोसिएसनले प्रकाशन गर्न लागेको Nepalese Floriculture Book पुष्प व्यवसाय गर्न चाहना राख्ने सबैलाई महत्वपूर्ण सन्दर्भ सामग्री हुने मेरो विश्वास छ । साथै पुष्प परनिर्भरता चाँडै हटाई मुलुकका लागि आवश्यक सबै प्रकार र जातका फूलहरू उत्पादन गरी राष्ट्रिय आवश्यकता पुरा गर्न तपाईहरूलाई सफलता मिल्दै जाओस भन्ने शुभेच्छाका साथ यहाँहरूको उत्तरोत्तर प्रगतिको कामना गर्दछु ।

अन्त्यमा, Nepalese Floriculture Book प्रकाशन कार्यको पूर्ण सफलताका लागि हार्दिक शुभ-कामना व्यक्त गर्दछु ।

(चन्द्र प्रसाद ढकाल)
अध्यक्ष

मितिः २०८० भदौ ४ गते, सोमबार ।

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फ्लोरिकल्चर एशोसिएसन नेपाल
Floriculture Association Nepal (FAN)

Ref.:

सन्देश

फ्लोरिकल्चर एशोसिएसन नेपाल (फ्यान) ले समग्र पुष्प व्यवसायी सदस्यहरुको हक हितलाई उचो राखि निरन्तर रुपमा पुष्प व्यवसायको बिकास बिस्तार तथा प्रबर्द्धनको कार्य गर्दै आइरहेको छ । विगत वर्षहरुमा सरकारको लगानी बिनाने निजी क्षेत्रको एकल प्रयासबाट नेपाली पुष्प व्यवसायले उल्लेख्य उपलब्धि हासिल गरि सकेको थियो । तथापी पुष्प प्रबर्द्धन नीति २०६९ पास भई लागु भए पछि नेपाल सरकार कृषि तथा पशुपन्छी बिकास मन्त्रालय तथा मातहतका निकायहरुसंगको सहकार्यमा पुष्प व्यवसायले भने फड्को मार्‍यो । हाल नेपालमा पुष्प तथा पुष्पजन्य बस्तुको करिब ३ अर्ब भन्दा बढिको बार्षिक कारोबार रहेको छ । हरेक बर्ष १० देखि १५ प्रतिशतको दरले पुष्प तथा पुष्पजन्य वस्तुको बजार माग थपिने गरेको छ । तथापी अझै आन्तरिक बजारको मागलाई स्वदेशी उत्पादनले पुरा गर्न सकिरहेको छैन । पुष्पको बजार माग र आपुर्तिको असन्तुलनलाई सन्तुलित गर्नका लागि फ्यानले सरकार, संघ संस्था एवं उद्यमी व्यवसायीसँग बहस पैरवी र सहकार्य गर्दै आइरहेको छ । यति हुदा हुदै पनि पुष्प व्यवसाय तथा व्यवसायीहरुले बिभिन्न कालखण्डमा बिभिन्न समस्या र चुनोतीहरुको सामना गर्नु परिरहेको अवस्था छ ।

नेपाल सरकारले आ.ब. २०८०/०८१ को आर्थिक बिद्येयक मार्फत बस्तु तथा सेवाको कारोबारमा थ्रेसहोल्डको व्यवस्था गरी लागु गर्नाले नेपाली पुष्प व्यवसायी तथा पुष्प कृषकहरु मारमा परेको छ । पुष्प तथा पुष्पजन्य बस्तुको कारोबार गर्दा रु. पचास लाख र बस्तु तथा सेवाको कारोबार गर्दा रु.बीस लाख भन्दा बढि भएमा अनिबार्य भ्याटमा दर्ता हुनु पर्ने व्यवस्थाले पुष्प कृषकहरुले उत्पादन गरेको बस्तु, बजार मुल्य श्रृंखला अन्तर्गत रही कारोबार गर्दा थ्रेसहाल्ड नाघेको अवस्थामा अनिबार्य मु.अ.करमा दर्ता हुनु पर्ने भएको हुदा यसले आन्तरिक उत्पादनको मुल्य समेत बृद्धि हुने र आयातित बस्तुसंग प्रतिस्पर्धा गर्नु पर्ने स्थितीमा नेपाली पुष्प कृषकहरुले उत्पादन गरेको बस्तुको लागत बृद्धि भई आयातीत पुष्पको बजार मुल्यसंग प्रतिस्पर्धा गर्न नसक्ने अवस्था सृजना हुने भएकोले पुष्प कृषकहरुलाई सहयोग पुर्‍याउन थ्रेसहोल्ड तथा अनिबार्य मु.अ.कर मा दर्ता हुनु पर्ने प्राबधान हटाउनु पर्ने बिषयमा ध्यानाकर्षण सहित सम्बन्धित सरोकारवाला मन्त्रालयसंग पहल गरिरहेका छौं ।

नेपाल सरकारले आ.ब.०७९/८० मा प्लाष्टिक जन्य फूलको आयात निर्यात, बिक्री बितरण, उत्पादन र भण्डारण गर्नमा राजपत्रमा सुचना प्रकाशन गरी पूर्ण रोक लगाएको थियो । तर हाल नेपाल सरकार बन तथा वातबरण मन्त्रालयले प्लाष्टिक जन्य फूल आयात निर्यात र प्रयोग गर्नका लागि उक्त प्रतिबन्धलाई हटाउने तयारीमा रहेको जानकारी प्राप्त भएकोले प्लाष्टिक जन्य फूलको प्रयोगले वातावरणलाई समेत नराम्रो असर गर्ने भएकोले यसको आयात निर्यात, बिक्री बितरण, उत्पादन र भण्डारण गर्न गराउन नहुने भनि लगाईएको प्रतिबन्धलाई कायमे राख्नु पर्ने बिषयमा सम्बन्धित मन्त्रालयसंग पहल गरिरहेका छौं ।

सरकारको प्राथमिकता आ-आफ्नै भएतापनि पुष्प उद्योगको लागि पुर्वाधारको बिकास, नीतिगत व्यवस्थापन, जनशक्तिको उचित बिकास र प्रबिधिको हस्तान्तरणका क्षेत्रमा सरकारको लगानी हुनु आवश्यक छ । यस क्षेत्रमा उच्च प्रबिधियुक्त ग्रिनहाउस, थोपा सिंचाई तथा मिष्ट सिंचाई प्रणालीसंगै वाटर सोलुवल फर्टिगेसन सिस्टम, निर्यान्त्रित (रोग तथा किराको लागि) प्रणाली सहितको नयाँ प्रबिधि भित्र्याउनको साथै थप लगानी गर्न अत्यन्त आवश्यक छ । यी प्रबिधीको प्रयोगले आन्तरिक गुणस्तरिय उत्पादनमा बृद्धि हुने साथै गुणस्तरिय उत्पादनबाट अन्तराष्ट्रिय बजारमा प्रतिस्पर्धा योग्य वस्तुको बिकास हुनेछ यसैको माध्यमबाट विश्व पुष्प बजारमा हामीले आफ्नो पहुच पुर्‍याउन सघाउ पुग्नेछ । पुष्पको छुट्टै बजार बिकास हुन अति आबश्यक छ । पुष्पको बजार निर्माणको लागि DPR तयार भई बागमती प्रदेश सरकार कृषि तथा पशुपन्छी बिकास मन्त्रालयमा पेश भईसकेको छ । बिशेष पुर्वधारयुक्त पुष्पको बजार बिकासका लागि सरोकारवाला मन्त्रालय/निकायबाट सहयोगको अपेक्षा गरेका छौं ।

अन्तमा हामीलाई सहयोग गर्ने नेपाल सरकारका अंगहरु, उद्यमी व्यवसायीहरु, विज्ञहरु लगायत पदाधिकारी र कर्मचारी साथीहरुलाई आ-आफ्नो क्षेत्रबाट पुष्प व्यवसाय र एशोसिएसनलाई उपलब्ध गराउनु भएको सल्लाह, सुझाब र सहयोगको लागि हार्दिक आभार प्रकट गर्न चाहन्छु । आगमी दिनहरुमा याहाँहरुको सदैब साथ र सहयोग रहनेछ भन्ने समेत आशा लिएको छु ।

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मीन बहादुर तामाङ्ग
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सम्पादकीय

फ्यानले हरेक बर्ष पुष्प सम्वन्धी लेख, रचना, अध्ययन, अनुसन्धान, सुचना तथा आधुनिक खेती प्रबिधी सम्बन्धित बिबिध बिषयहरूलाई समेटी पुस्तक प्रकाशन गर्दै आएको छ । यसै क्रममा यस बर्ष पनि बार्षिक रूपमा प्रकाशन हुदै आएको Nepalese Floriculture पुस्तक २६ औं संस्करणको रूपमा प्रकाशन गरी तपाँईहरु समक्ष ल्याई पुऱ्याएका छौं ।

पुष्प आफैमा प्रकृतीको एक सुन्दर उपहार हो । आजको विश्व जगतमा दिनानुदिन परिवर्तित जीवनशैली भित्र पुष्पको उपभोगको मात्रा बढ्दै गईरहेको छ । यो क्रम हाम्रो देशमा पनि क्रमिक रूपमा बिकाश भईरहेको छ । कोभिड महामारीको दुई बर्ष निराशाजनक रहेको नेपाली पुष्प बजार बिस्तारै पुरानै लयमा फर्कन सुरु गरेको तथ्याङ्कले देखाउदछ । नेपाली पुष्प व्यवसायले बजारको मागको तुलनामा उत्पादन गर्न सकेको अवस्था छैन । उत्पादन बढाउनका लागि लाग्ने साधानहरूको आपुर्तिमा हामी पर निर्भर छौं । तिनै तहका सरकारले देश भित्र लागत घटाउन अति आबश्यक बिषयहरूमा ध्यान दिन सकेको छैन । तथापी पुष्प उद्यमीहरूले बिभिन्न श्रोतको उपयोग गरी पुष्प व्यवसायमा उल्लेखनिय उपलब्धी हासिल गरेको उदाहरण हाम्रो सामु छ ।

बजारको माग अनुसार उत्पादन बिबिधीकरण आजको बिश्व जगतको माग हो । प्रत्येक बर्ष नयाँ नयाँ पुष्पको माग बढ्नुले उपभोक्ताको सचेतना स्तर बृद्धिलाई देखाउदछ । तसर्थ उत्पादनका सम्पुर्ण सामग्रीको अधिकतम प्रयोग गरि बिबिधीकरण सहित नविनतम उत्पादन प्रणालीको बिकास गर्नु आजको नेपाली पुष्प क्षेत्रको आबश्यकता हो । उत्पादनले देश भित्रै अवसरको श्रृजना गर्दछ र यससंग जोडिएका बिबिध सह-सामाग्रीहरूले समेत बजार पाउदछ । तर उत्पादनमा लाग्नु त्यति सहज भने छैन । तसर्थ उत्पादनमा संलग्न उद्यमीहरूलाई हरतरहबाट सहयोग गर्न तर्फ सबै सम्बन्धित सरोकारवालाहरूको ध्यान जानु जरूरी छ । नेपालका मौलिक रैथाने आलंकारिक बोट बिरूवाहरूलाई व्यवसायिक उत्पादनमा ल्याउन धेरै ढिला भईसक्यो । वनस्पती बिभाग तथा पुष्प बिकास केन्द्रले रैथाने आलंकारिक बोट बिरूवाहरूको आबश्यक अध्ययन अनुसन्धान गरी व्यवसायीक उत्पादन तथा प्रबर्द्धन गर्नु पर्ने पनि आजको बिशेष आवश्यकता रहेको छ ।

प्रस्तुत अंकमा बर्षै भरी गोदावरी फूलको उत्पादन गर्ने प्रबिधीको प्रयोग, खानायोग्य आलंकारिक फूल फूल्ने बिरूवाहरु, हिमालयन चेरी फूल, गुलाब खेतीमा आईपर्ने मुख्य रोग किरा तथा तीनको व्यवस्थापन, क्याला लिली खेती प्रबिधी जस्ता आदि लेखहरु समेटिएको छ । पुष्प क्षेत्रमा लाग्नु भएका उधमी व्यावसायीहरु, अध्ययन अनुसन्धानमा लाग्नु भएका महानुभावहरु, सरकारी तथा गैर सरकारी संघ संस्थाहरु लगायत सम्पूर्ण पुष्प प्रेमी महानुभावहरूले थोरै भएपनि पुष्प सम्बन्धी सामग्रीहरु प्राप्त गर्नु हुनेछ र यसबाट लाभान्वित हुनु हुनेछ भन्ने आशा लिएका छौं ।

अन्त्यमा यस प्रकाशनमा लेख रचना उपलब्ध गराई सहयोग गर्नुहुने लेखकहरु, विज्ञापन दाताहरु प्रति हार्दिक धन्यवाद ज्ञापन गर्दछौं । आगामी दिनहरूमा पनि यहाँहरूको अमुल्य सुझाब, सहयोग र सद्भावको अपेक्षा गर्दछौ । प्रकाशनका क्रममा भएका कमि कमजोरी प्रति औल्याई परिमार्जन सहित यसको स्तर उन्नती गर्न र समय सापेक्ष बनाउन यंहाँहरूको सहयोगको सदैब हार्दिक अपेक्षा राख्दछौं ।

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TABLE OF CONTENTS

Year-round Chrysanthemum Flower Production

Author: Rinus de Vreede,
Senior expert PUM the Netherlands.

Introduction:

Chrysanthemum flowers go a long way back. Let's first have a look at the meaning of the name. In Greek Chrysos means gold and Anthemom means flower. Chrysanthemums generally symbolize longevity, fidelity, joy, and optimism. Various colors symbolize other important meanings as well. Red chrysanthemums for instance symbolize love and deep passion. Yellow chrysanthemums symbolize neglected love or sorrow. The history of growing mums, as chrysanthemum are called for short, goes more than three thousand years back to China. They were grown as a flowering herb. Chrysanthemums come in many shapes. Sometimes one flower per stem (disbud) or many flowers like Santini. The spray chrysanthemum type is in between, they have multiple flower heads. Apart from the most cultivars having beautiful flowers there are also species that are used for making tea and some cultivars are edible. Not many people know that there is also chrysanthemum beer and perfume! At this moment in Nepal the chrysanthemum is mostly a seasonal product and many of them are imported from India. But growers are interested in year-round growing and creating continuous sales.

Around 1920, the Americans discovered that chrysanthemums are sensitive to day length. This results in flowering when days get shorter in autumn. This is called photoperiodicity. This gave a great breakthrough in commercial growing that started around 1956 in England. A few years later the Dutch also started in the Westland area.

The cultivation of chrysanthemums in the Netherlands boomed from small family businesses to large blocks of ten hectares. Automation played a major role in this. The indoor climate is computer controlled in modern greenhouses with LED lighting. The harvested branches go to the shed (separated from the greenhouse) via conveyor belts underground. Here they are defoliated, bound, and sleeved by machine.

In 2021, the worldwide production of chrysanthemum was almost five billion stems. In Asia, the production was 916 million in the countries such as Vietnam, Malaysia, Japan and China. The market for flowers to decorate homes in Nepal is increasing, due to a higher standard of living.

Long day/short day

As mentioned above chrysanthemum is sensitive to day length. If we plant them in June, days are long, and they will grow. In August, days get shorter, and buds will develop so in the end they will flower in October or November. We call this cultivation "natural season". The plant is following the natural season.

A chrysanthemum plant has two stages in its life, the first is vegetative and the second is generative. Vegetative means "growing, making leaves and getting stronger". The plant does this under long day circumstances by nature in summer. But in other periods we can cheat the plant and extend the day so the plant 'thinks' it is summer, and it will grow. To do this cheating only a

little light is required using 13 or 15 W power saving lamps, one per 10 square meters. The lights are used from 5 pm to 11 pm so the lamps are switched on before it is dark outside.

The second stage is generative and means the plant is initiating buds and developing flowers. This is done when nights are longer than 12-13 hours, so in winter by nature. We can also imitate this artificially by using a blackout system. Because Nepal is rather close to the equator (27 degrees north latitude) blackout is only necessary from 5 pm to 8 pm in summer. When it is completely dark outside the blackout can be opened. The material for blackout can be black plastic (cheaper) or black cloth(less climate problems). The blackout system can be simple and cheap or fully automated. Of course, a supporting system of poles and wires is necessary.

Long day/short day section

Natural long day: May 1 – July 1
Day extension for vegetative growth necessary: from July 1 - May 1.
Natural short day: Sept 15 – April 15
Blackout necessary for bud initiation and flowering: from April 15 - Sept 15.

Climate

The climate for growing chrysanthemums in Kathmandu Valley is suitable for growing chrysanthemums for a large part of the year. In winter, the amount of sunlight is not a problem, but the temperature is too low. This could be solved by better insulating the tunnels and using (electrical) heating. The blackout system can also be used to keep the heat of the day inside. The choice of cultivar is also of great influence, choose cultivars that are temperature tolerant. It is difficult to indicate a minimum 24-hour temperature because the duration is also important. In general, a minimum temperature of 15 °C is necessary but a few days at lower temperature is no problem.

Propagation

An obvious method of propagation lies in the use of seed. Unfortunately, chrysanthemum seed does not produce homogeneous seedlings, so this method is only used to develop new cultivars. The standard propagation method for chrysanthemums is via cuttings from mother plants. This means that all those millions of cuttings of a cultivar can ultimately be traced back to the 1st cutting that came from a seed. My advice is to buy cuttings from a specialised mother plant company (breeder). You can contact breeders in Holland or India, and they have trained pickers to pick equal cuttings. Unrooted cuttings can be kept in cold store at 4 °C for 2 weeks and are easy to transport. My advice is to select specialized farms in Nepal to produce cuttings.

Transplanting of cutting plant

Rooting

When the cuttings have arrived, they must be rooted. This is usually done in a seedling or propagation tray, using a mix of garden peat and coco peat to fill the trays. Sometimes styromull or burned rice husk is added to the rooting medium. The bottom cm of the cutting is dipped in a rooting hormone containing IBA 0.1%. The cuttings are then inserted in the trays filled with medium and thoroughly wetted once. Most important is that the rooting medium (plug) is well aerated. The moisture level should start wet and then dry a little; this will give you strong white roots. The most common rooting mistake is giving too much water. After sticking the cuttings, they are placed under fog or under transparent plastic for

8-10 days to keep the humidity high. When the roots are 1 cm long, the fog can be stopped, or the plastic can be removed. Two things are disastrous for rooting, those are sun and wind. When the roots are 5 cm or they come out of the bottom of the peat block they are ready for transplanting. Don't forget day extension in the rooting area!

Fertilizer and pH

Chrysanthemum can grow in many soil types, but drainage is important. Also very important is the availability of fertilizer (food for plant) and the acidity of the soil. For a good absorption of the fertilizers, the optimum pH is 5.5 - 6 in the soil. At lower or higher pH some fertilizers are less absorbable. The amount of food is optimum between 0.8 EC to 1.2 EC, but also the balance between the elements is important. It would be optimal to do a soil analysis (laboratory) that makes you know exactly what is needed for the plant. But in case you don't know I advise 12-10-18 (N-P-K), 5 kg per 100 square meters. It is also possible to use cow dung or compost, but you don't know what kind and what amount of fertilizer is in it. During growth, water soluble fertilizer is added to the water you apply for growing. Prepare a tank with a solution of 1 gram of fertilizer per litre and feed it to the plants.

Start of crop

Before planting, remove all old plant debris and weeds. Next apply a base dressing fertilizer and do rotovating (loosen up the top 15 – 20 cm of the soil). After transplanting apply water to the plants thoroughly and thereafter water sparingly. Give as little as possible the first 2 weeks so roots are forced to grow. It is no problem if the plants fade a little during the day as long as they look fresh the next morning. When the roots are 10 cm long, apply more water so the growing starts. If you give too much water in the beginning, the plant will not develop the healthy roots. During growth check the soil twice a week to know the water demand. Use a soil drill to look at the soil 5-15 cm deep to feel with your hands the humidity of the soil.

Simple blackout system

Then the crop starts growing and when plants are strong enough, let's says about 35 cm high with large leaves, short day period can start. Depending on time of the year this means turning of the light or starting with blackout. 7-8 weeks later when colour appears at the flower buds, you can stop with the blackout.

During the growth of the chrysanthemum the farmer needs to be on the lookout for many fungus diseases and insects that will attack our precious chrysanthemum crop. The most important fungus disease is white rust. This disease only affects chrysanthemum and is very contagious. The white rust spores can germinate if there is free water on the leaf for as little as two hours. It can be water from overhead watering or from condensation. Condensation appears when the temperature rises more than 1 °C per hour. Fortunately, there are some plant protection products to protect the chrysanthemum against white rust. Even better is the use of white rust resistant cultivars but they are not always available in the color or flower form you desire.

Two main insects that will attack the chrysanthemum are the California thrips and the leaf miner. These insects are not so easy to get rid of. Resistance is lurking. If you use chemicals, then change the chemical after three sprayings. It is better to use bio pesticides. It is recommended to check the crop at least twice a week for diseases or other irregularities.

Planning

The chrysanthemum is an excellent crop to grow all year-round. Depending on how many sections there are at the nursery, a section can be planted every week or fortnight. This would be ideal. The total cultivation time is about 17 weeks. Divide the cultivation time by the number of sections and you will know at what interval you can plant. Make sure the next cuttings are ready for transplanting in time. I would add here that planning for chrysanthemums is made easier by using a week-day calendar

Harvest

Then it is time to harvest, bring your precious chrysanthemum to the shed as soon as possible. Defoliate the chrysanthemum, put five or ten stems together in a bunch, and put a sleeve around the bunch. Then place the bunch in a bucket with clean water. Chrysanthemums are known for their long vase life, but you will understand that the conditions of storage and transport have an influence. Even after that, the place where the vase stands largely determines the vase life. In a cool room the chrysanthemums last longer than in a warm room in a draught.

Ready for harvest

Study club

One of the most important tips for novice chrysanthemum growers is to join each other in visiting farms on a regular base. Create a group of like-minded people, so farmers with the same crop, it would of course be good if there were also experienced growers in the group. Visit as group 1 or 2 nearby farms each month. Each grower will encounter the same problems, and if you help each other the level of knowledge of the group will raise quickly, much faster than if everyone had to figure it out for themselves. Also, for this reason, a chrysanthemum WhatsApp group is formed to share knowledge and have contact with an expert. Of course, there is the social part after the meeting to have a nice chat, drink some tea and eat snacks.

Conclusion

Growing chrysanthemum year-round is possible in Kathmandu valley if there can be heating in the greenhouse and choose low temperature tolerant cultivars. The chrysanthemum is a flower that will not let you down easily. Growing chrysanthemum is a nice cultivation that has many possibilities. If you plant regularly, for example once a week or every fortnight, you will also harvest regularly. In this way a circle of continuous production can be created. Still, you have the possibility to have extra production for special flower days or wedding days. I wish you success in growing chrysanthemum.

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विभिन्न जातका रूख, फलफुलको बोट, सजावटी विरूवा, मौसमी फुल, कार्पेट ग्रास र गार्डेन डिजाईनका लागि हामीलाई सम्झनुहोस् ।

Edible flowers of Ornamental Plants

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Abstract

People around the globe are demanding more enticing and delicious food. The aesthetics and quality of foodstuff contribute to appearance and nutritive value of consumed meals. Edible flowers could increase the allure and charm of some foods. Since ancient times, edible flowers have been added to meals to enhance its nutritive and sensory characteristics. Most countries now consider edible flowers to be the newest cuisine trend, and consumption of edible flowers has substantially expanded in recent years. Recently, researchers have looked at the wide range of phytochemicals, antioxidants, bioactive, and nutraceutical components found in edible flowers. This paper provides a concise summary of the knowledge currently available on the use of edible flowers, their nutritional and sensory value, and the edible flowers species that are most frequently found.

Keywords: *Edible flowers, Food, Nutritional, Ornamental plants, Phytochemicals*

Introduction

Edible flowers have played a significant role in human diet since ancient times (Lim, 2014). The oldest recorded usage of flowers in food preparation dates back to 140 B.C. in ancient Greece, Rome, and Egypt (Falconnier, 2006). Flowers were mostly used in ancient times for their medicinal properties rather than their nutritive value (Grzeszczuk et al., 2016). Recent research on the chemical makeup of wild and ornamental flowers has revealed the presence of significant bioactive and nutraceutical compounds, such as carotenoids, dietary fibers, fatty acids, flavonoids, isothiocyanates, phenolic acids, sterols, polyols, prebiotics/probiotics, vitamins, phytoestrogens, essential mineral elements, carbohydrates, and amino acids (Cavaiuolo et al., 2013; Lim, 2014; Koike et al., 2015). Edible flower consumption is rising on a global scale. Contrary to common assumption, flowers add a unique combination of flavors and sensations to savory dishes and desserts while also improving the nutritional content of food preparations (Takahashi et al., 2020). Edible flowers can be used to enhance nutritional and sensory characteristics of food such as color, fragrance, and flavor. For garnishes or as an ingredient, they are added to salads, soups, entrées, desserts, and beverages (Kelly et al., 2003). Some flowers can be used in stir-fry meals or stuffed (Kaisoon et al., 2012). Unfortunately, with the acceptance of fast food in the diet of the young people, data on the traditional and cultural usage of edible flowers tend to diminish as a result of urbanization (Takahashi et al., 2020).

With the globalization, the market for edible flowers is expanding in today's society due to increased consumer awareness and a desire to return to previous lifestyles; presumably healthier lifestyles where edible flowers played a significant part (Rop et al., 2012). Consumers are trying edible flowers more frequently because they want to try new flavours and textures, go back to

their old lifestyles, or get the edible flowers' beneficial ingredients and bioactive compounds (Fernandes et al., 2020). They can be eaten fresh (for instance, marigold flowers in salads), as well as in savoury dishes with meat and fish, in soups, and drinks (wine, beer), in sweets, jellies and desserts, as well as in spices, and dyes (Takahashi et al., 2020). They can be used dry (as infusions or in desserts as dried rose petals), as powder (Chen and Wei, 2017), crystallized, or as foams (molecular gastronomy) (Fernandes et al., 2019). Some plants are commonly known exclusively for the biological, flavouring, or nutritional properties of their fruits or leaves, but their edible blooms are typically not used in cooking, as in the cases of passion fruit, chive, and pumpkin (Fernandes et al., 2019b). It may be advantageous to prevent, regulate, or treat both acute and chronic diseases by consuming functional foods that contain naturally bioactive substances in the right amounts. When taken naturally or with little processing, edible flowers retain their vitamins, proteins, essential oils, and antioxidants (Fernandes et al., 2019c). Following this trend, edible flowers have also lately been linked to a number of biological features, including a reduction in the symptoms of ulcerative colitis, antihyperglycemic, anticholinergic, anti-inflammatory, anti-edematous, anti-oxidant, anti-HIV, anti-obesity, and antimicrobial (antibacterial and antifungal) activity, spasmolytic, spasmogenic, insecticidal, gastroprotective, genotoxic, immuno-stimulating and immunomodulatory, neuroprotective effect, defence against oxidative damage to erythrocytes, and even anticancer potential (Lara-Cortés et al., 2013; Benvenuti et al., 2016; Lu et al., 2016; Meurer et al., 2019; Nowicka and Wojdyło, 2019; Yang et al., 2019; Nguyen et al., 2019).

Only a small portion of the world's diverse array of edible flowers has been researched. In Nepal, flowers of Bauhinia varigata and Musa species are consumed as vegetables. Therefore, to boost their acceptance as food components and reduce possible dangers, more in-depth understanding about this natural matrix is required (Lu et al., 2016). Flowers cannot be consumed by humans because not all of them satisfy the criteria that must be met for something to be called edible, such as being non-toxic, harmless, and having nutritional value. Some flower species include poisonous or antinutritional compounds, including alkaloids, cyanogenic glycosides, hemagglutinins, trypsin inhibitors, and oxalic acid (Pires et al., 2019). For example, some of these substances have been discovered in the blooms of *Yucca filifera, Erythrina americana, Erythrina caribaea* and *Agave salmiana* (Lara-Cortés et al., 2013; Navarro-González et al., 2014). Therefore, those flowers must be regarded as inedible and are therefore prohibited from being consumed by humans (Pires et al., 2019). However, the growing understanding of the chemical makeup and biological characteristics of edible flowers, as well as the range of toxicity (Katisart and Konsue, 2019) and the accessibility of innovative analytical tools (like HPLC) to identify their chemical components (Piovesana et al., 2019), make edible flowers attractive possibilities for the development of functional foods (Gostin and Waisundara, 2019)

Production and market of edible flowers

Growers and sellers are attempting to respond to the active demand from consumers for edible flowers. However, because edible flowers are seasonal and perishable, the majority of growers cannot support themselves by simply producing those (Fernandes et al., 2020). Cut flowers, herbs, lettuces, and others seasonal crops are typically cultivated alongside edible flowers in order to compliment them and provide chances for value-added products (Husti et al., 2013). Edible flowers are completely distinct from other crops in terms of production. Although, edible

flowers and ornamental flowers have very similar production requirements, it is important to distinguish between which are edible and which are not (Fernandes et al., 2020) The selling season is entirely dependent on the variety because different flowers bloom at different times of the year (Hudson, 2014).While some flowers have a long harvest season, some have a shorter one. There are no statistics available on the global production of the majority of edible flowers (Fernandes et al., 2020).

Consumption of edible flowers

Consumer adoption of a "new food" or "unfamiliar food" may be influenced by cultural variations and consumption habits. Since 2000 years ago, edible flowers have been included in human diet. There is historical evidence of the use of edible flowers in various regions, including Asia, ancient Greece and Rome, medieval France, Europe, Victorian England, and the Middle East. Flowers have been consumed for centuries in Asian nations (Cichewicz and Nair, 2002). Edible flower eating is already widespread in Asian cuisine, and over time, it has spread to other civilizations as well, including Europe. Meals are made more appetizing by their scent, flavor, and look, and their nutritional benefits and high levels of protein and fiber have encouraged their consumption all over the world. Edible flowers were used in ancient China's herbal medicines in addition to being food items (Wongwattanasathien et al., 2010). The blossoms of many rose species were employed in purees and omelets in ancient Rome (Melillo, 1994). *Calendula officinalis* flowers were utilized as a salad element in medieval France. The inflorescences of breaded elder (*Sambucus nigra*), were frequently consumed in Central Europe (Kopec, 2004). In most cases, edible flowers are usually eaten whole but sometimes only their parts are consumed, like petals of roses (*Rosa spp.*), tulips (*Tulipa spp.*) or chrysanthemums (*Chrysanthemum spp.*). Occasionally only flower buds are eaten, such as when daisies (*Bellis perenis*) or garden nasturtiums (*Tropaeolum majus*) which are substituted for expensive capers (Kopec and Balik, 2008). Some flower portions, such as those of the *Echium bulharea*, must be removed before eating because they are excessively abrasive and might lodge in the throat; the same is true of roses since the bitter basal regions of their petals should also be removed (Henschel, 2004). Currently, edible flowers are eaten directly as veggies or used as a garnish or component in meals like salad and mild curries. Some flowers can be used as fillings or as ingredients in stir-fries (Lu et al., 2016).

Nutritional and chemical composition of edible flowers

Edible flowers of ornamental plants are a substantial source of chemical compounds and nutrients. Prior to 2000, the majority of edible flower study focused on the nutrition, smell, and volatile oils (Bouic, 2001). The primary bioactive components of edible flowers, phytochemicals, have received increased focus in recent research (Lu et al., 2016). Water is the primary constituent of edible flowers and water often makes around 70 to 95% of edible flowers. Depending on the part of the flower, different nutrients and phytochemicals are present in different amounts (Pires et al., 2019). For instance, pollen contains proteins, carbohydrates, lipids (both saturated and unsaturated), carotenoids, and flavonoids, whereas a balanced blend of sugars (fructose, glucose, and sucrose), amino acids (mostly proline), proteins, inorganic ions, lipids, organic acids, phenolic compounds, alkaloids, terpenoids, and other compounds can be found in nectar. Flowers' petals and other portions are more nutritious in terms of vitamins (yellow flowers are usually a very

good source of vitamin A), minerals, and antioxidants (Nicolson et al., 2007; Mlcek and Rop, 2011; Fernandes et al., 2017). Edible flowers are rich in carbohydrates, dietary fiber, and minerals including potassium, phosphorus, calcium, and magnesium. The most prevalent phytochemicals identified in edible flowers were flavanols, flavones, anthocyanins, and phenolic acids (Lu et al., 2016).

Common edible flowers species

More than 180 species, representing around 97 families and 100 genera, are categorized as edible flowers (Lu et al., 2016). Some of the edible flowers are listed in Table 1.

Table 1: List of edible flowers

S.N.	Common name	Botanical name	Flower colour
1	Hollyhock	*Alcea rosea*	Various colours
2	Tuberous begonia	*Begonia X tuberhybrida*	White, Pink, Yellow, Red, Orange and combinations
3	English daisy	*Bellis perennis*	White to Purple petals
4	Pot marigold	*Calendula officinalis*	Yellow, Gold/Orange
5	Corn flower	*Centaurea cynaus*	White, Pink, Blue
6	Garden Chrysanthemum	*Chrysanthemum coronarium/morifolium/ indicum/parthenium/frutescens/ indicum*	Yellow to White
7	Chrysanthemum	*Dendranthema grandiflorum*	Red, Yellow
8	Carnation	*Dianthus barbatus*	Pink, White, Red
9	Carnation	*Dianthus caryophyllus*	Red, Pink, White Yellow
10	Gladiolus	*Gladiolus species*	Various except true blue
11	Day lily	*Hemerocallis fluva*	Tawny orange
12	Hibiscus	*Hibiscus rosa-sinensis/Hibiscus sabdariffa*	Orange, Red and Purple red
13	Lavender	*Lavandula angustifolia*	Lavender, Purple pink, White
14	Scented geranium	*Pelargonium graveolens*	White, Red, Pink, Purple
15	Rose	*Rosa species*	White, Pink, Yellow, Red, Orange
16	Lilac	*Syringa vulgaris*	White, Pink, Purple Lilac
17	African marigold	*Tagetes erecta*	White, Gold, Yellow, Red
18	Signet marigold	*Tagetes tenuifolia*	White, God, Yellow, Red
19	French marigold	*Tagetes patula*	Orange, Yellow
20	Nasturtium	*Tropaeolum majus*	Red, White, Yellow, Orange
21	Violet/Pansy	*Viola odorata*	Violet, Pink, White, Lilac

22	Johnny Jump Up	*Viola tricolor*	Violet, White, Yellow, Pink, Multicoloured
23	Pansy	*Viola wittrokiana*	Red, Blue, Yellow, White
24	Sunflower	*Helianthus annus*	Yellow
25	Begonia	*Begonia boliviensis/semperflorens*	White, Pink, Yellow, Red
26	Tulips	*Tulipa species*	Various colours
27	Snapdragon	*Antirrhinum majus*	White, Orange, Red, Blue
28	Coral tree	*Erythrina americana*	Red
29	Fuchsia	*Fuchsia hybrida*	Red
30	Common daisy	*Bellis perennis*	White, Purple
31	Salvia	*Salvia officinalis*	Lilac
32	Dandelion	*Taraxacum officinale*	Yellow
33	Petunia	*Petunia hybrida*	Red, Rose, White
34	Butterfly pea	*Clitoriaternatea*	Blue
35	Winter jasmine	*Jasminiumnudifolium*	Yellow
36	Jasmine	*Jasmine sambac*	White
37	Bird of Paradise	*Strelitzia reginae*	Orange
38	Orchid tree	*Bauhinia varigata*	Pink White
39	Orchid tree/Camel's foot tree	*Bauhinia purpurea*	Pink
40	Moringa/Drum stick	*Moringa oliefera*	White
41	Dendrobium orchid	*Dendrobium species*	Various colours
42	Honey suckle	*Lonicera japonica*	White/Pale Yellow
43	Banana flower	*Musa domestica*	Pale yellow
44	Paper flower	*Bougainvillea species*	Various colours
45	Agathi	*Sesbania grandiflora*	White
46	Petunia	*Petunia hybrida*	Various colours
47	Mexican creeper vine	*Antigononleptopus*	Pink
48	Daylily	*Hemerocallis fulva*	Various (cultivar-dependent)
49	Yulan magnolia	*Magnolia denudate*	White, Creamy white
50	Azalea	*Rhododendron simsii*	Pink, Red, Purple
51	Cape jasmine	*Gardenia jasminoides*	White
52	Cocks comb	*Celosia cristata*	Purple, Red, Orange, Yellow, White, Pink, Maroon
53	Begonia Bonfire	*Begonia boliviensis*	Red, Orange
54	Impatiens	*Impatiens walleriana*	Red, Pink, Blue, Orange, Purple, White
55	Poppy	*Papaver rhoeas*	Scarlet-red, Pink, White

56	Lotus	*Nelumbo nucifera*	White, Pink, Yellow, Red, Bi-colour
57	Yucca	*Yucca filifera*	Creamy white
58	Verbena	*Verbena hybrida*	Blue, Violet, Purple, Dark red, Yellow, White, Bi-color
59	Monkey flower	*Mimulus x hybridus*	Bright scarlet, Orange, Yellow, Multi-color
60	Scarlet beebalm	*Monarda didyma*	Bright red
61	Arabian Jasmine	*Jasminum sambac*	White
62	Black locust	*Robiniapseudoacacia*	Creamy-white (rarely Pink or Purple)
63	White dead-nettle	*Lamium album*	White
64	Caper bush	*Capparis spinosa*	White, Pinkish white
65	Common daisy	*Bellis perennis*	Red, White, Pink
66	Breaded elder	*Sambucus nigra*	White, Pink
67	Star flower	*Borago officinalis*	Blue
68	Marshmallow	*Althea officinalis*	Pale Pink, Reddish Pink, rarely White
69	Common Mallow	*Malva sylvestris*	Red Purple
70	Anise hyssop	*Agastache foeniculum*	Violet, Orange, Rosy
71	Fragrant olive	*Osmanthus fragrans*	White, Yellow, Orange
72	Prickly pear	*Opuntia ficus indica*	Orange, Yellow Orange, Red
73	Starry wild jasmine	*Jasminum multipartitum*	Yellow, White, Pink
74	Hong Kong lily	*Lilium brownii*	White
75	Pacaya Palm	*Chamaedoreatepejilote*	Greenish Yellow
76	Iron Cross	*Oxalis tetraphylla*	Pink with greenish center
77	Ornamental onions	*Allium cernuum/ neopolitanum/ senescens/ victorialis*	Purple, Pink, White, Blue, Yellow
78	Hyssop	*Hyssopus officinalis*	Purple, Blue

Conclusion

With a focus on cuisine and the food business, edible flowers are being utilized more frequently to enhance the aesthetic appeal of diverse dishes. Consumers are paying more and more attention to them as they look for more attractive and healthy substitutes with lower manufacturing and processing environmental impacts. There is significant potential for the growth in consumption of edible flowers in the upcoming year. Edible flowers are a plentiful natural resource that is valued for their nutritional qualities, including a low fat and energy content. They can also be sought as a natural source of bioactive compounds, like phenolic compounds, which may play a significant role in promoting health and preventing disease. Among numerous edible flower species in the globe, only a small part of them have been studied. In order to properly exploit edible flowers, boost their acceptance as possible food ingredients, and prevent any potential risks, further study should be done.

References

Benvenuti, S., Bortolotti, E., & Maggini, R. (2016). Antioxidant power, anthocyanin content and organoleptic performance of edible flowers. Scientia Horticulturae, 199, 170-177.

Bouic, P. J. (2001). The role of phytosterols and phytosterolins in immune modulation: a review of the past 10 years. Current Opinion in Clinical Nutrition & Metabolic Care, 4(6), 471-475.

Cavaiuolo, M., Cocetta, G., & Ferrante, A. (2013). The antioxidants changes in ornamental flowers during development and senescence. Antioxidants, 2(3), 132-155.

Chen, N. H., & Wei, S. (2017). Factors influencing consumers' attitudes towards the consumption of edible flowers. Food Quality and Preference, 56, 93-100.

Cichewicz, R. H., & Nair, M. G. (2002). Isolation and characterization of stelladerol, a new antioxidant naphthalene glycoside, and other antioxidant glycosides from edible daylily (Hemerocallis) flowers. Journal of Agricultural and Food Chemistry, 50(1), 87-91.

Falconnier, D. (2006). Incredible Edible Flowers. University of Illinois Extension: Urbana, IL, USA, p.1-6.

Fernandes, L., Casal, S., Pereira, J. A., Pereira, E. L., Saraiva, J. A., &Ramalhosa, E. (2019a). Physicochemical, antioxidant and microbial properties of crystallized pansies (Viola× wittrockiana) during storage. Food Science and Technology International, 25(6), 472-479.

Fernandes, L., Casal, S., Pereira, J. A., Saraiva, J. A., &Ramalhosa, E. (2017). Edible flowers: A review of the nutritional, antioxidant, antimicrobial properties and effects on human health. Journal of Food Composition and Analysis, 60, 38-50.

Fernandes, L., Casal, S., Pereira, J. A., Saraiva, J. A., &Ramalhosa, E. (2020). An overview on the market of edible flowers. Food Reviews International, 36(3), 258-275.

Fernandes, L., Pereira, J. A., Saraiva, J. A., Ramalhosa, E., &Casal, S. (2019c). Phytochemical characterization of Borago officinalis L. and Centaurea cyanus L. during flower development. Food Research International, 123, 771-778.

Fernandes, L., Saraiva, J. A., Pereira, J. A., Casal, S., &Ramalhosa, E. (2019b). Post-harvest technologies applied to edible flowers: A review: Edible flowers preservation. Food Reviews International, 35(2), 132-154.

Gostin, A. I., &Waisundara, V. Y. (2019). Edible flowers as functional food: A review on artichoke (Cynara cardunculus L.). Trends in Food Science & Technology, 86, 381-391.

Grzeszczuk, M., Stefaniak, A., &Pachlowska, A. (2016). Biological value of various edible flower species. Acta ScientiarumPolonorumHortorum Cultus, 15(2), 109-119.

Henschel, D. (2004). Planérostliny k jídlu. Granit.

Hudson, S. 2014. Lauren Richardson Grows Edible Flowers on Her Parents Farm at Glenlyon. Weeklytimes. https://www.weeklytimesnow.com.au/agribusiness/farm-magazine/lauren-richardson-grows-edible-flowers-on-her-parents-farm-at-glenlyon/news-story/948063a907a9d0a3cbe4d8796d6f123a (accessed April 20, 2020)

Husti, A., Cantor, M., Buta, E., & HORȚ, D. (2013). Current Trends of Using Ornamental Plants in Culinary Arts. ProEnvironmentPromediu, 6(13), 52-58.

Kaisoon, O., Konczak, I., &Siriamornpun, S. (2012). Potential health enhancing properties of edible flowers from Thailand. Food research international, 46(2), 563-571.

Katisart, T., & Konsue, A. (2019). Acute toxicity of flower extracts from Dolichandroneserrulata in mice. Pharmacognosy Research, 11(3), 230-235.

Kelley, K. M., Cameron, A. C., Biernbaum, J. A., &Poff, K. L. (2003). Effect of storage temperature on the quality of edible flowers. Postharvest Biology and Technology, 27(3), 341-344.

Koike, A., Barreira, J. C., Barros, L., Santos-Buelga, C., Villavicencio, A. L., & Ferreira, I. C. (2015). Edible

flowers of Viola tricolor L. as a new functional food: Antioxidant activity, individual phenolics and effects of gamma and electron-beam irradiation. Food Chemistry, 179, 6-14.

Kopec, K. (2004). Jedlekvety pro zpestrenijidelnicku. Vyziva a Potraviny, 59, 151-152.

Kopec, K., &Balik, J. (2008). Kvalitologiezahradnickychproduktu. Brno: MZLU,p.34-40.

Lara-Cortés, E., Osorio-Díaz, P., Jiménez-Aparicio, A., & Bautista-Bañios, S. (2013). Nutritional content, functional properties and conservation of edible flowers. Review. ArchivosLatinoamericanos de Nutricion, 63(3), 197-208.

Lim, T. K. (2014). Edible medicinal and non-medicinal plants. Flowers. Vol. 7 and 8. Springer Science+Business Media, Dordrecht, Netherlands.

Lu, B., Li, M., & Yin, R. (2016). Phytochemical content, health benefits, and toxicology of common edible flowers: a review (2000–2015). Critical Reviews in Food Science and Nutrition, 56(sup1), S130-S148.

Melillo, L. (1994). Diuretic plants in the paintings of Pompeii. American Journal of Nephrology, 14(4-6), 423-425.

Meurer, M. C., Mees, M., Mariano, L. N. B., Boeing, T., Somensi, L. B., Mariott, M., ... & da Silva, L. M. (2019). Hydroalcoholic extract of Tagetes erecta L. flowers, rich in the carotenoid lutein, attenuates inflammatory cytokine secretion and improves the oxidative stress in an animal model of ulcerative colitis. Nutrition research, 66, 95-106.

Mlcek, J., &Rop, O. (2011). Fresh edible flowers of ornamental plants–A new source of nutraceutical foods. Trends in Food Science & Technology, 22(10), 561-569.

Navarro-González, I., González-Barrio, R., García-Valverde, V., Bautista-Ortín, A. B., &Periago, M. J. (2015). Nutritional composition and antioxidant capacity in edible flowers: Characterisation of phenolic compounds by HPLC-DAD-ESI/MSn. International Journal of Molecular Sciences, 16(1), 805-822.

Nguyen, C., Baskaran, K., Pupulin, A., Ruvinov, I., Zaitoon, O., Grewal, S., ... & Pandey, S. (2019). Hibiscus flower extract selectively induces apoptosis in breast cancer cells and positively interacts with common chemotherapeutics. BMC complementary and alternative medicine, 19(1), 1-14.

Nicolson, S. W., Nepi, M., &Pacini, E. (Eds.). (2007). Nectaries and nectar (Vol. 4). Dordrecht: Springer.

Nowicka, P., &Wojdyło, A. (2019). Anti-hyperglycemic and anticholinergic effects of natural antioxidant contents in edible flowers. Antioxidants, 8(8), 308-319.

Piovesana, A., Rodrigues, E., & Noreña, C. P. Z. (2019). Composition analysis of carotenoids and phenolic compounds and antioxidant activity from hibiscus calyces (Hibiscus sabdariffa L.) by HPLC-DAD-MS/MS. Phytochemical Analysis, 30(2), 208-217.

Pires, T. C., Barros, L., Santos-Buelga, C., & Ferreira, I. C. (2019). Edible flowers: Emerging components in the diet. Trends in Food Science & Technology, 93, 244-258.

Rop, O., Mlcek, J., Jurikova, T., Neugebauerova, J., &Vabkova, J. (2012). Edible flowers—a new promising source of mineral elements in human nutrition. Molecules, 17(6), 6672-6683.

Takahashi, J. A., Rezende, F. A. G. G., Moura, M. A. F., Dominguete, L. C. B., & Sande, D. (2020). Edible flowers: Bioactive profile and its potential to be used in food development. Food Research International, 129, 108868.

Wongwattanasathien, O., Kangsadalampai, K., &Tongyonk, L. (2010). Antimutagenicity of some flowers grown in Thailand. Food and Chemical Toxicology, 48(4), 1045-1051.

Yang, P. F., Yang, Y. N., Feng, Z. M., Jiang, J. S., & Zhang, P. C. (2019). Six new compounds from the flowers of Chrysanthemum morifolium and their biological activities. Bioorganic Chemistry, 82, 139-144. v

Flowering of Himalayan cherry (*Prunus cerasoides*) in Nepal

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Abstract:

Prunus cerasoides Buch.-Ham. Ex. D. Donis the botanical name of the beautiful Himalayan cherry and is distributed in the Himalayas and other regions of Asia. Survey was carried out in Kathmandu valley, Pokhara and Chitwan to understand this species. Three colours of flowers were observed in the Himalayan cherry: light pink, white and pink. In the similar locations, light pink type cherry tree flower earlier followed by white whereas flowering was late in pink type flowers. Altitude of the location influenced the time to flower induction and the same trend was observed in all the types.

Introduction:

Prunus cerasoides is the name of the species for the Himalayan cherry and its Nepali name is Painyu. It has similar vernacular names in different places such as Bhenkal (Uttarakhand, India), Pajja (Himachal Pradesh, India), and Dieng Kaditusoo (Meghalaya, India. Himalayan cherry is found in the mid hills of Nepal and has been reported from several districts especially from Lumbini Pradesh, Gandaki Pradesh, Bagmati Pradesh and Koshi Pradesh of Nepal. Unlike its popular cousin the Sakura (Prunus serrulata), it is not so familiar globally but, in the Himalayan region, where it originates it is becoming popular recently. In the Himalayan region, cherry primarily flowers in autumn that ranged any where from October-January depending on the altitude of the locations. The flowering period of the Himalayan cherry may range from 2-3 weeks after full bloom.The parks, towns and forest are laden with cherry blooms during the flowering season. There is even weeklong Himalayan cherry festival celebrated in the mid November at Shillong, Meghalaya since 2016 (Govil, 2018).

Despite of the recent popularity, this plant species is still not much researched for its ornamental value. This tree species has been found important for bee keeping in the hills and as fodder for the cattle (Tiwari et al., 2009).The plant is reported to exist in the northern and north-eastern hill states of India, hills of Nepal, Pakistan, and Bhutan in South Asia. Besides South Asia, it is also reported to exist in many Asian countries such as Myanmar, China, Thailand, Vietnam, Indonesia, and Japan etc.

This research will attempt to review and study the types of this species in some parts of Nepal.

Materials and Methods:

Relevant information regarding *Prunus cerasoides* was generated from research database such as Google scholar, Research Gate and Google. Information of interest was type of Himalayan

cherry and flowering time in Nepal. Flower colours were assessed visually either from the internet or physically. Data was generated by visiting the site of tree during the time of flowering. Survey was done in Kaski, Chitwan, Lalitpur, Bhaktapur and Kathmandu of Nepal.

Results:

Types of Himalayan cherry:

In Nepal, Himalayan cherry based on the colour of the flowers are of three types such as light pink, white and pink (Photos 1-3).

Photo 1: Light Pink Himalayan cherry (Godavari, 1560masl, PC: Sudhir Shrestha)

Photo 2: White Himalayan cherry (Godavari, 1560masl, PC: Sudhir Shrestha)

Photo 3: Pink Himalayan cherry (Shivapuri, 1875masl, PC: Sudhir Shrestha)

Flowering of Himalayan cherry in Nepal:

There was no influence of the latitudes and longitudes of the observed locations within the geographical range of (26.9099°N to 28.2096°N) and (83.9856°E to 87.9283°E) (Table 1). Types and altitude seem to influence the time to flowering in Himalayan cherry. Light pink seems to flower earlier than white and pink types. Himalayan cherry in higher altitudes flowered much earlier than the lower altitudes. In case of light pink Himalayan cherry, flowering began in second week of October in Shivpuri, Kathmandu (1875masl), third week of October in Godavari (1560masl), second week of November in Bhaktapur (1401masl) and Ilam (1206masl) and first week of December in Pokhara (822masl). Similarly, in case of white Himalayan cherry, flowering began in the third week of October in Shivapuri, Kathmandu (1875masl) and second week of November in Godavari, Lalitpur (1560masl) and third week of January in Chitwan (250masl). The trend was alike in the case of the pink Himalayan cherry too. Flowering was much earlier (first week of November) in Shivapuri, Kathmandu (1875masl), second week of November in Godavari (1560masl) as compared to Bhaktapur (1401masl; Third week of December). There is clear trend of altitude influence on the flowering time in different types.

Table 1: Flowering of Himalayan cherry and flower colour in different region of Nepal.

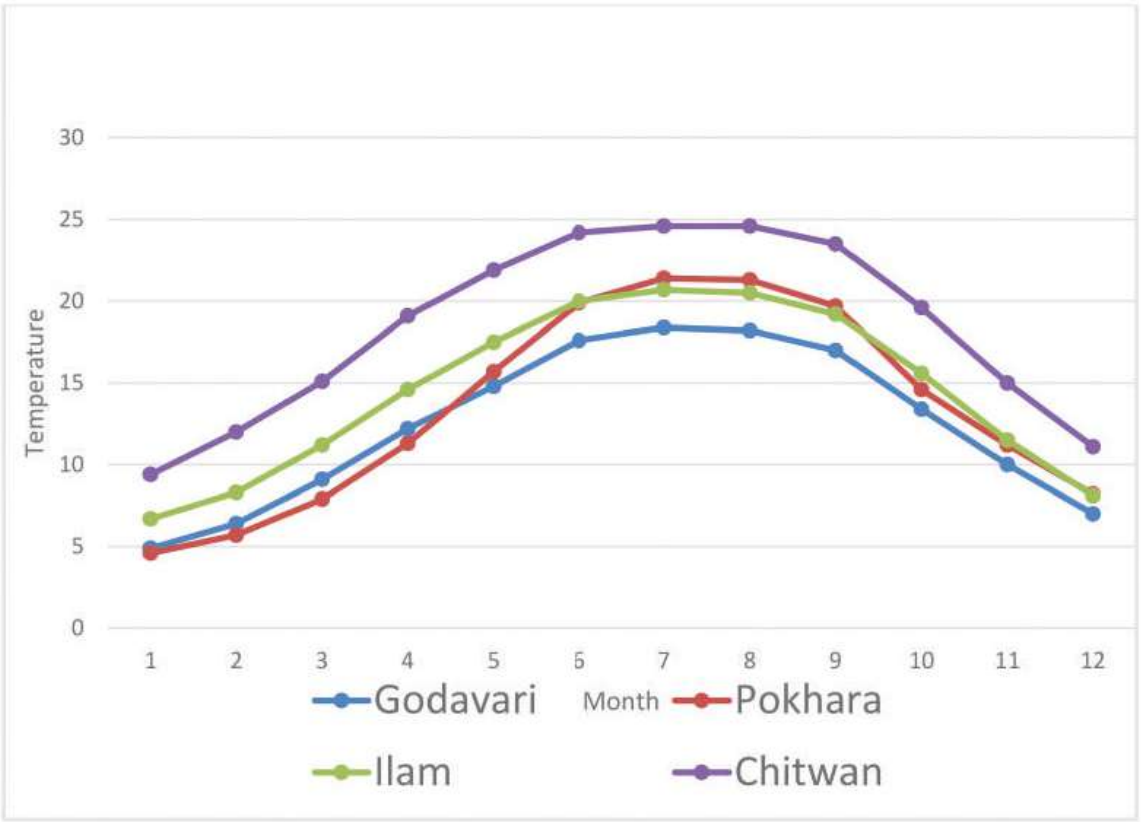
S/N	Name of location	Altitude (m)	GPS coordinates	Flowering time	Flower colour
1	Ilam, Koshi,	1206	26.9099°N 87.9283°E	Second week of November	Light pink
2	Bhaktapur, Bagmati,	1401	27.6710°N 85.4298°E	Second week of November Third week of December	Light pink Pink
3	Godavari, Bagmati,	1560	27.6016°N 85.3653°E	Third week of October Second week of November Second week of November	Light pink White Pink

4	Shivapuri Nagarjun National Park, Kathmandu, Bagmati	1875	27.4831°N 85.2329°E	Second week of October Third week of October First week of November	Light Pink White Pink
5	Pokhara, Kaski, Gandaki,	822	28.2096°N 83.9856°E	First week of December	Light pink
6	Chitwan, Bagmati	250	27.771°N 84.602°E	Third week of January	White

Source: Field survey and Internet search

Minimum temperatures of town and cities in Nepal at the time of flowering:

The minimum temperature in Nepal when flowering occur averaged 12^{0}C in Godavari (1560masl) and Ilam (1206masl), and below 10°C in Pokhara (822masl) and Chitwan (250masl)



(Figure 1).

Figure 1: Minimum temperature of town/cities in some town/cities of Nepal

Source: https://en.climate-data.org

Discussion:

Types of Himalayan Cherry:

In Nepal, three types based on colour of flowers were available: light pink, white and pink. In India, Himalayan cherry with light pink, white and pink colour has been reported whereas white colour flower of Himalayan cherry is reported from Japan. Similarly, light pink and pink colour Himalayan cherry is reported from Thailand.

Flowering of Cherry:

Himalayan cherry began flowering in the Himalayas from October until January. Flowering is influenced by type and altitude. Light pink flowers earlier than white and pink in the similar altitude and all types of Himalayan cherry flowers earlier in the higher altitude than lower altitudes in similar sequence. All colours of Himalayan cherry defoliate, and flowers based on the altitude but doesn't seem to be influenced by the global positions. The flowering occur when the minimum temperature is equal to or less than 12°C in Nepal. The falling night temperature and shorter day length is perhaps associated with defoliation, flower bud initiation, flowering, and emergence of leaves. Himalayan Cherry of white flower colour has been reported to flower earlier at higher elevation than the lower elevation in the Sikkim Himalayan region (Lachumpa, 2012).The earliest flowering begins from 7000-8000' (first week of November) (2334-2667m), 5000' (second week of November) (1667m) and 3000-4000' (third week of November) (1000-1333m). Similar, trend has been observed in light pink, white and pink Himalayan cherry in different altitudes of Nepal. This clearly shows that Himalayan cherry can be planted across Nepal and enjoyed by people across the nation at different time of the year. Cluster plantation at different altitudes in villages, towns or cities or barren land in the forest could give a mass effect during the flowering season drastically improving the landscape and attracting visitors. In Japan, flowering of the Japanese cherry (Sakura) begins in the third week of March from the south Japan (with very few exceptions) and ends in the first week of May in the north Japan. It provides opportunity for domestic as well as international tourist to visit different destinations with Sakura flowering and enjoy HANAMI (picnicking under full blossoming Sakura tree). This variation in the initiation of flowering is due to early onset of spring in the south Japan as compared with the north Japan.

Conclusion:

Himalayan cherry has been found in different parts of Nepal. Flowering was influenced by types of Himalayan cherry and altitudes. Unlike, the prevailing belief that the Himalayan cherry can be only grown in the mid hills (natural habitat), this paper shows that this beautiful tree can be grown from the highest reported altitude (2680masl, Chapota, India) to the lowest altitude (3masl, Kurashiki, Japan). Presently, flowering of Himalayan cherry can be enjoyed from October (1875masl) to January 250masl).

References:

Govil, B. 2018. Lay out a picnic blanket and enjoy the Japanese art of hanami (seeing flowers) right here in our pink-coloured backyard. Outlook travellerhttps://www.outlookindia.com/outlooktraveller/explore/story/69162/cherry-blossoms-bloom-early-in-shillongand-theres-a-festival-to-celebrate-it-too Accessed on 5th February 2023

Lachungpa, D. 2012 Cherry Blossoms http://sikkimnow.blogspot.com/2012/07/cherry-blossoms.html Accessed on 14th February 2022

Tiwari, P., Tiwari, J. K., and Ballabha, R. 2009. *Prunus cerasoides* D. Don (Himalayan wild cherry): A boon to hill-beekeepers in Garhwal Himalaya. Nature and Science Vol 7 (7) 21-23.

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Alstonia scholaris (L.) R.Br. (छतिवन) - An inappropriate tree species for roadside plantation

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Introduction

Undeniably, beautiful flowering trees along the roadside can lure the attraction of people. Wisely chosen and properly planted avenue trees are also one of the indicators of better city planning practices which can be seen in many cities/urban areas in different parts of the world. It is already too late to realize that without a beautiful and healthy nature the survival of human being is going to be very difficult in the future and the only solution to this problem is to have a better and healthy environment by planting trees in our surroundings. Nepal is no exception to this problem where urbanization is disastrously unplanned.

After the declaration of many new municipalities, rapid urban development has taken place in the Terai region of Nepal. As a result of that many new infrastructures including roads and new settlements are developing for providing better facilities to the public. Local governments are spending lots of money for the beautification of the urban areas by carrying out plantation activities. One of the major activities for beautification includes the tree plantation along the roadsides and around the settlements. But somewhere the local governments are unable to do it in a better way to make it more environmentally and public friendly. Despite of having an environment unit in all municipalities the plantation activity has been taken place without thoughtful planning. Selection of a proper tree species is very important for the plantation activities. If it is mostly for the beautification of the roads, then it should be either an evergreen or a flowering tree of a native species. Unlike exotic species, native species are better adopted to the local environmental conditions and perform very well.

Similar to Kathmandu metropolitan city, other municipalities of Terai region have done roadside plantation without a plantation protocol. A plantation protocol developed by the subject experts is very important to have by each municipality for a planned plantation having appropriate tree species for a specific region. Usually, it has been found that no considerations are given in the selection of plant species as a result of that a mixed species of inappropriate plants can be seen growing randomly along the roadsides.

One of the most common tree species planted in municipalities of Terai region of Nepal is *Alstonia scholaris*. The tree is named after Dr. C. Alston (1685-1760), a professor of Botany at Edinburgh University. The species name *scholaris* refers to the fact that the timber of this tree has traditionally been used to make wooden slates or school boards, especially in Malaysia. It is commonly called as blackboard tree, scholar tree, milkwood, Indian Devil's Tree in English, **छतिवन** in Nepali and **शैतानका झाङ** in Hindi. It is called as Saptaprani in Sanskrit, composed of two words "sapta" and "parni" - which broadly mean seven and leaves, respectively. It is an evergreen tropical tree with dense canopy belonging to the Family Apocynaceae (Dogbane Family). It is

native to southern China, tropical Asia (mainly the Indian subcontinent) and Southeast Asia and Australasia, where it is a common ornamental tree species.

This tree has been introduced in many Indian cities more than fifty years back along the roadsides and from that time it has slowly evolved as a prominent avenue tree, due to its hardy nature, high tolerance against pollution and adaptability. During the flowering season a distinct strong aroma of flowers fills the air as the *Alstonia scholaris* bloom along the city streets.

Biology of the tree

One of the most common tree species found planted along the roadsides in the Terai region is *Alstonia scholaris* (L.) R.Br. The detail of the tree is as described below:

It is a medium to large tree, usually about 20m tall in urban setting, whereas it reaches 50 - 60m in height in natural habitats, with asomewhat tessellated corky grey to grey-white bark. Crown pagoda-shaped, tiered, denser and rounded when mature. The boles of larger trees are strongly fluted to 10 m. The outer blaze is creamy to yellowish in color with abundant, milky latex that flows rapidly when cut. Bark pale brown, smooth - scaly, with large horizontal lenticels, peeling off in rectangular flakes. Inner bark cream, yellow or straw colored, with copious white sap. Leaves glossy dark green above, paler greyish-green below, elliptic to narrowly obovate, sub-coriaceous orleathery, (5-)6-17 (-31) x (1.5-) 2.5-8,5cm, arranged in whorls of 4-8 leaflets (occasionally 10) with 25-45 (-55) pairs of lateral veins that are closely spaced and almost perpendicular to the mid rib. The inflorescence is a much-branched terminal panicle. Flowers are fragrant. Flowering starts in Octoberand lasts till December (Orwa et al., 2009).

Its biophysical limit is 0-900m; mean annual temperature 12-32°C with mean annual rainfall between 1200-1400mm. In Nepal it is reported to occur in the moist forests of Sub-Himalayan region of Eastern and Central between 100 - 300m. Being an evergreen tree with large dense canopy it is highly preferred as an avenue tree in the Terai region of Nepal as it provides lots of shades for the side walkers.

It produces soft wood timber commonly used for making pencils, coffins, and school boards. It is a least concern (LC) plant species according to IUCN (2017) threatened categories,

Fig. 1. Alstoniascholaria trees along the roadside in Yogikuti area, Tilottama Municipality, Rupandehi District

Fig. 2. A. scholaris A: Trunk, B:leaves & inflorescence, C: inflorescence, D: flowers, E: fruits, F: seeds
Source: Middleton and Rodda (2019)

The Myth of Alstonia scholaris

Almost all plant species have some medicinal benefits if taken in recommended quantity. Following the same truth, *Alstonia scholaris* also has both positive and negative health benefits to human being. The tree is known by many names like "शैतानका झाड" in Hindi and Devil's Tree in English. People of Indian tribal communities are often reluctant to sit under this tree or even pass under it for the fear of the devil (Gulshan, 2019).It has been believed that the tree is mostly associated with evil or horror things and has been considered as the abode of the seductive spirits by many Indian tribal communities. In Indian sub-continent the tree is believed to be inauspicious and the Devil's abode which is believed to be due to the strong fragrance of its flowers especially at night that attracts night pollinators.

Negative effects

Much has been studied on the negative aspects of this tree in India. Though *Alstonia scholaris* has medicinal values in Ayurveda medicine however, its pollen cause allergic reaction to human (Shukla, 2020), breathing problem and sleeping difficulty (Raju et al. 2021), andare responsible for worsening the problems to many people who are already suffering from cold and asthma (Kaushika, 2010).

In many cities of India, the tree has caused health hazard in public (Kaushika, 2010; Gulshan, 2019; Shukla, 2020). According to a news published in The Hans India, 29 Nov, 2017, plantation of a large number of *Alstoniasholaris* trees in the city of Vishakhapatnam have caused health hazard to the local people such as seasonal health disorders as the pollen of the trees is causing seasonal fevers, sinusitis, asthma, eye related infections and skin allergies. The city authorities have realized that the trees should not be planted in the public places and need replacement with more appropriate tree species.

A research by Shukla (2020) from India has concluded that the tree is responsible for causing a series of problems to the public which are as following:

- Pollen causes allergic reactions, and its sap is irritant.
- Extracts have infertility effects so medical consultation is very important before its use.
- Pregnant women should avoid this plant because it is responsible to promote birth defects.
- Consult doctors before using any *Alstonia* product if you have chronic disease.

Bhattarai (2020) has reported that in certain mountain districts of Nepal, bark paste is used to treat female sterility and menstrual disorder without knowing its negative effects, thus aggravating the problem.A large number of this tree have been planted along the roadside in Butwal Sub-Metropoliton, Tilottama Municipality, Om Satiya Gaupalika, Siddharthanagar Municipality and the neighboring municipalities of Rupandehi District. The large numbers of these trees planted as avenue trees along the highway could be in near future responsible in causing health problems to the public in the vicinity of the highway as has been reported in many Indian cities. According to a recent research Solomon Raju (2021) reports that a massive plantations of *A. scholaris* in cities cause a health concern for city residents but scattered planting of a small number of trees of this species is a viable option to avoid health problems in sensitive urban people.

In an article published by Indian Express (2010) Kaushika wrote that 5 lakh *Alstonia scholaris* trees were planted in Noida city of India in 1982. Later, the city officials realized that it has damaging effects on asthma patients. If an asthma patient stands near the tree for a longer time, can easily

develop breathing problems (Kaushika, 2010). Considering thisfact, the officials later decided to replace them with Lagerstroemia species. However, no information is available to confirm this fact regarding replacement of *Alstonia scholaris* with other suitable species.

The tree has been described as a toxic plant in Wikipedia and the various studies conducted in rats and mice has found that the extract of plant, at high doses, exhibits marked damage to all major body organs. Intraperitoneal administration is much more toxic than oral. The toxic effects in rats and mice may be due to the echitamine content of the bark, an alkaloid. Thus, it can cause severe damage to human body if the doses of bark extracts are taken without proper medical consultation.

Conclusion

The tree has been introduced as an avenue tree in Nepal, especially in the Terai region, without knowing its many negative effects to the public. In fact, *Alstonia scholaris* should be strictly grown in the medicinal parks or the botanical gardens, only. However, due to the lack of sufficient knowledge and inability of judgement and selection of appropriate avenue trees by the local governments, civic authorities, NGOs, industries, and commercial establishments. This tree species has been planted in a large number as avenue tree in rapidly growing municipalities of Terai region of Nepal. Though no official records of health hazards due to *Alstonia scholaris* is reported from Nepal, but if we consider the research results on the negative effects in Indian cities, the tree is also most likely responsible for causing health hazard in Nepalese communities too. The municipalities should collaborate with local plant nurseries to produce appropriate plant species to meet their objectives rather than planting unwisely chosen plant species. Replacement of this tree should be done timely with Pipal, Neem, Kadam, Gul Mohur, Rajbriksha, Mahuwa, Jamun etc. There are many native tree species that can not only fulfill the demand of avenue trees but also can prove to be good food suppliers to support faunal diversity. Therefore, every municipality needs to develop a plantation protocol with the help of local experts for future plantation activities.

References:

Bhattarai, K. R. 2020. Ethnobotanicalsurvey on plants used in Mai Municipality of Ilam district, EasternNepal. BankoJankari. 30(2): 11-35.

Gulshan, A. 2019. Why the Saptaparni is called the devil's tree, The Hindu. October 22, 2019 https://www.thehindu.com/sci-tech/energy-and-environment

Kaushika, P. 2010. Friendly replacement for Noida's harmful Alstonia. The Indian Express. Nov, 29.

Middleton, R.J. and M. Rodda. 2019. Apocynaceae. Flora of Singapore. 13: 421-630.

Orwa, C., A, Mutua, Kindt, R., Jamnadass, R., S, Anthony. 2009. AgroforestryDatabase:a tree reference and selection guideversion 4.0. (http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp)

Solomon Raju, A. J., K. Prathyusha,K.Punny,D. Sunanda Devi, Venkata Ramana, K. 2021. Indian Devil Tree, *Alstonia scholaris* (L.) R.Br. (Sub-family Rauvolfioideae: Family Apocynaceae): Pollination ecology and seed dispersal versus human health. Species, 22(69): 153-160

Shukla, L. 2020. Saptaparni: Benefits and Side Effects. Myupchar. Aapka Apna Dctor. 15 Dec. https://www.myupchar.com/en/herbs/saptaparni

Floriculture Exhibition in Nepal

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Floriculture is the aesthetic branch of horticulture which deals not only with cultivation and management of ornamental plants (annuals, biennials, and perennials) but also includes domestic as well as international marketing and export of cut flowers, live plants and their economic products like scent, oils, and medicines. Floriculture also deals with the cultivation of flowering plants, decorative foliage plants, cacti, orchids, succulents, bonsai, ferns, plants grown in containers as well as landscape gardening. In many of the recent literature, Floriculture is referred as Ornamental Horticulture. Now, Floriculture has become an innovative business with export viability in Nepal too.

Floriculture exhibition

Floriculture exhibition also called as flower show is an event at which flowers and ornamental plants are displayed for promotion of floriculture business. This is an event for awards in different aspects of floriculture. This is the place where plants can be seen at their best, new landscape design from professionals is on display and new varieties of plants are displayed. So, we can experience something different. Flower shows play very important role in Floriculture development.

Following are the main positive aspects of floriculture exhibition.

Exhibit flowers and plants for:

- creating interest among the people such as flower and plant lovers
- promoting trade
- meeting place for gardening friends
- make people acquainted with new varieties of plants
- compete with others to see the best plants in the show
- Flower shows are mostly yearly program.
- Flowers and plants of different kinds and colors are exhibited.
- approximately 100,000 different garden plants are in the world
- approximately 450 different garden plants are in Nepal

Floriculture exhibition with different names

Floriculture exhibition has been organized in different names, which can be named as below:

- Flower show
- Flower Exhibition
- Flora Expo
- Floral Expo
- Flori-expo
- Floriculture trade fair
- Floriade

Special flower shows

- Besides that, some special shows also are managed for the special occasions like
- Rose show
- Orchid show
- Chrysanthemum show
- Tulip show
- Garden show

First Flower Show of the world

Royal Horticultural Society of London held its first show in 1827 in Chiswick. Pennsylvania Horticultural Society (PHS) held the first public flower show in the US in June 1829, in the Masonic Hall at 717 Chestnut Street. Among the hundreds of plants on display was a spectacular red-leaved poinsettia exhibited by Mr. Poinsett, the U.S. Minister to Mexico. The poinsettia, and the Flower Show, have been a tradition ever since.

5 Best Garden Shows in the World

There are some best flower shows in the world. Topmost 5 shows are listed as below:

- Philadelphia Flower Show
- Chelsea Flower Show
- Hampton Court Palace Flower Show
- Singapore Garden Festival
- Melbourne International Flower and Garden Show

FLORICULTURE SHOWS IN NEPAL

Although Floriculture comes under Horticulture, the practice of flower growing and gardening was started in Royal Botanical Garden (present National Botanical Garden) since 1960 A. D. under the Department of Medicinal Plants (present Department of Plant Resources). Therefore, there will be no mistake to tell that the DPR is the pioneer for the development of floriculture in Nepal. First Flower show in Nepal was organized at Bhrikuti Mandap by Department of Medicinal Plants (present Department of Plant Resources) in 2028 B. S. (1972 A.D.)

Later with objectives to promote floriculture business in the domestic and external market and also to make people aware of floriculture as an industry and motivate them Floriculture Association Nepal (FAN) was established. FAN was formally registered with the government of Nepal in November, 1992 with 11 founding members from nurseryman and people interested in floriculture enterprises. After the establishment of FAN, the Floral Exhibitions in Nepal are being organized by (FAN) since 1993 with support from Agro Enterprises Center. Later, from early 2000, Department of Agriculture supported for annual flower exhibition.

However, after the establishment of Floriculture Development Center (FDC) in 2006 under the Department of Agriculture in Government sector there has been more support in the promotion of floriculture in the country. FDC has supported FAN in managing flower shows too.

Here attempt has been done to enlist the flower exhibitions that were organized in Nepal since the very beginning with some background on Floriculture Exhibition.

Objectives:

- To promote, develop and highlight Flori-business in Nepal.
- To create awareness about the use of flowers and ornamental plants among the people throughout the country
- To create & expand the Flori-business in the national & international market.
- To bring Nepalese floriculture together and create interest among the producers, suppliers, marketers, exporters and other stakeholders
- To introduce new products & services
- To create employment opportunities and skill development
- To facilitate customers to buying different kinds of floral products at once
- To introduce Nepalese floriculture, its development, and its prospects at the National and International level

FLORICULTURE SHOWS IN NEPAL (so far organized)

1. First Flower show at Bhrikuti Mandap organized by Department of Medicinal Plants (present Department of Plant Resources) in 2028 B. S. (1972 A.D.) It continued for several years and there is no information when it stopped. Picture below is the example of the show.


छैठौं पुष्प प्रदर्शनी

भृकुटी मण्डप, ललितपुर ।

प्रमाण पत्र

२०३३

श्रीमान् /श्रीमती/सुश्री ईष्टान्डर्ड नर्सरी ..... ले २०३३ साल वैशाख ३ गते देखि ४ गते सम्म भृकुटी मण्डपमा आयोजित प्रदर्शनीमा भाग लिनु भै उत्कृष्ट(सजावट)प्रदर्शन गर्नु भएकोमा प्रथम ..... पुरस्कार प्रदान गरी यो प्रमाण पत्र दिएको छ ।

डा० श्री समर बहादुर मल्ल

अध्यक्ष

"पुष्प प्रदर्शनी आयोजक समिति"

सह अवधीश

वा०अ०का०

Source: Standard Nursery

2. First Chrysanthemum show at Royal Botanical Garden (Present National Botanical Garden) Godawari in 2053 B. S. (1997 A.D.) was organized with the initiation of Mr. Madhusudan Bista, the then DG of Department of Plant Resources.
3. Continuing the Chrysanthemum show, the 15th show was organized by FAN in 2022 A. D. at Jawalakhel.

4. After the establishment of Floriculture Association Nepal (FAN), the First Floral Exhibition was held at Royal Nepal Academy Premise from 30 April to May 1, 1993 A.D. was organized by (FAN).
5. Second Flower Exhibition was held from April 22 – 25, 1994 A. D. in the Agro Enterprise Exhibition at Bhrikuti Mandap Exhibition Hall.
6. First Floriculture Trade Fair at Bhrikuti Mandap held from April 7 – 9, 1995 A. D.
7. Second Floriculture Trade Fair at Bhrikuti Mandap held from April 4 – 7 , 1996 A.D.
8. 3 International Flora Expo has been organized till now with the first in 2001
   A. D., the 2nd in 2015 A. D. and the 3rd in 2017 A. D.
9. FAN has already organized 7 regional flora expo at Pokhara, 5 regional flora expo at Dharan.

10. In continuation of the Flora Expo, 23rd Flora Expo-2022 was organized with the slogan *"Flower Business for Clean Environment and Economic Prosperity"* from 24th – 27th March, 2022 in Jawalakhel by Floriculture Association Nepal (FAN). There were 51 stalls in this Expo displaying seasonal flowers, ornamental plants, cut flowers, dried flowers, farm equipment, tools, packaging materials, micro and minor irrigation techniques, modern floriculture techniques in the fair. About 450 species of ornamental plants were displayed. Total 47,300 people visited the Expo. In this expo total business was more than NRs. 12 million.

11. Recently No. 1 Province level 5th Floriculture Exhibition and Trade Fair 2079 was organized by Floriculture Association, Sunsari District Committee on Magh 25 to 29, 2079 in Dharan Nepal.

12. In continuation to the Flora Expo, the 24th Flora Expo 2079 is going to be organized by Floriculture Association Nepal (FAN) with the slogan "Flower Business for Clean Environment and Economic Prosperity" at Bhrikuti Mandap, Kathmandu, Nepal from 31, March to to 3, April, 2023. The main objective of the show is commercial development and promotion of floriculture.

Conclusion

These Floriculture exhibitions certainly have promoted the floriculture business in Nepal creating interest of people on ornamental plants, gardening, and flower decoration.
Shows on more aspects can be expected in coming years as for examples:

1. Orchid show
2. Garden show

References

Wikipedia: Chelsea Flower Show
Floriculture Association Nepal (FAN)

Indoor gardening

Bikash Khanal,
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Introduction

Indoor gardening which is never out of season is a joy to many, particularly those living in cities where they do not have open spaces for gardens. A single potted plant is itself a whole garden. In recent years, house plants which can thrive in homes have become increasingly popular for interior decoration which add charm to the architectural beauty of the house and complement the interior setting. Modern architectural designing of homes and flats, having larger windows and well lighted rooms, has made an indoor gardening popular, useful, and absorbing hobby.

Gardening is one of the simplest ways to spend time which, oftentimes, provides a means of working out during weekends, exercising creativity, and giving appreciation to the environment for individuals engaged in this activity. Anyone can do gardening as long as the basic needs of the plants are provided like water, soil, air, sunlight and proper nutrients. Provisions of these necessities are possible with the aid of an automatic irrigation system. This system primarily provides a means of monitoring the status of plants that need to be watered once it is needed.

Fig: Indoor gardening

Place of house plants

- House plants can be placed either in suitable groups as bold accents or singly as a spotlight depending upon the size, color, and style of rooms.
- In an office, tall broad leaved and tough plants like *Philodendron, Sansevieria, Dieffenbachia, Draceana*, and *Ficus elasticacan* be more impressive and harmonious with the surroundings then delicate leaved ferns or bright colored flowering plants.
- Plants with red, pink, or orange flowers like *Amaryllis*, or *Chrysanthemum* or those having bright colored foliage like *Coleus,* and *Caladium* should be placed against the white, light colored or natural wall, against a dark background white flowered plants or those having variegated or white foliage like *Caladium* may enliven (make lively or cheerful) the surroundings.
- Plants having delicate and finely cut foliage like ferns or with small flowers such as *Begonia semperflorens* are generally placed at a closer distance and others set against the bold and rough textured plants.
- The large broadleaved Philodendron or the Rubber plant can be an attractive to the ferns having delicate lacelike foliage.
- Tall plants are best placed at the back, medium-tall plants in the centre and dwarf or trailing ones in the front.
- If the group is to be placed in the centre of a hall or room where it may be viewed from all sides (tall = center, medium= around, dwarf= along the edge.)
- Sometimes, potted plants of *Chrysanthemum* or Aster in bloom and Coleus and Caladium can be grouped inside the room by bringing them from outside to produce a quick and effective display (temporary arrangement).
- Sometimes the plants are grouped and grown in terrarium (glass vases), bottle, bowl, dish, and trough and aquarium cases as elegant table decorations.
- Potted plants can be displayed on the flower, window sill, window ledge, table, desk, bookcase, shelves, trolleys or in window boxes, planters (stands or flower in sunken) wall-brackets. The pots most stand in platters or shallow trays so that water does not drip and spoil the furniture floor or rug (mat).
- Several plants like *Aglaonema, Sansevieria, Aspidestra, Philodendron, Zebrina pendula, Scindapsus* and *Tradescantia fluminensis*, which require comparatively less sunshine are useful for planters or other structures in indoor.
- The trailing plants like Scindapsus, Philodendron, Ficus pumilaetc can be trained on trellis or screens as natural space or room dividers.

Culture of house plants

- A proper environment is essential for the healthy growth of plants, and it varies with different house plants.
- The environment of plant comprises several physical factors like light, temperature, humidity, water, soil, and nutrition as well as biological factors like pathogenic organisms (fungi, bacteria, and viruses), insects, weeds, and gardeners. These factors are described as follows:

Light:

Plants require light for their growth. However, the intensity of light needed is not the same.

- A few plants like *Aspidestra, Aglaonema, Diffenbachiapicta, Philodendron, Syngonium* and *Sansevieria* require little light as compared to rubber plant and croton.

- Coleus and many flowering plants like *Geraniums, Poinsettia, Kalanchoe, Begoniaetc* need full sunlight for best results/growth.
- Usually, green foliage plants require less sunlight than those with variegated or colored leaves like *Croton, Coleus, and Caladium.*
- Manage opening and closing of curtain, north-south, and east-west installment of the plant.)
- Western light meter: photograph exposure: 9-10 hrs –shade loving (15-25f candle)
  12-14hrs – most foliage plants (15-25 f candle)
  14-16 (require plenty of light for 50-100 f candles)
- The plants which require high intensity of light grown in low light intensity will show symptoms of etiolating, weak growth, pale leaves, and lanky growth.
- Older leaves will die and drop off and the new ones will be smaller in size.
- When grown in bright sun, the foliage of the partial shade loving or shade loving plants such as Dracaena, Dieffenbachia and Philodendron will get scorched or sunburn and later becoming brown and might dry up eventually.

Temperature

Most of the house plants grow best at day temperatures ranging from 18-240C and night temperatures about 100C lower.

Humidity

Relative humidity of 40-60% is the best for plant growth. Humidity is maintained by sponging, spraying, placing the pot in moist during dry summer.

Ventilation

Fresh air is required by the plants for survival. Natural gas from stoves or furnaces is harmful to house plants (become yellow and pale and drop foliage.)

Watering

- Successful growth or failure of a house plant depends largely on watering.
- One of the main causes for the injury or death of house plants is improper watering, particularly inadequate or over watering.
- The requirement of water varies with different house plants: cactus and succulents need less watering. Umbrella plant (*Cyperus spp*) and Calla need wet condition.
- Watering will also depend on the stage of plant growth (flowering stage need more), size of the plants in relation to its pot, soil, light, temperature, and humidity (according to season).
- Insufficient as well as saturated soil because wilting and plant removed from a dark corner to sunny situation may also show sign of wilting.
- Knock on the side of the pot with a wooden hammer or sharp rap produces a metallic or hollow sound instead of dull thud indicate lack of moisture (or pocking finger to the soil is one method for judging soil moisture/or turn the plant out)

Soil

- The soil for house plants should contain coarse soil particles to ensure drainage, adequate aeration

to the roots and sufficient organic matter.

- A good soil moisture for house plants consists of 2 parts soil (top soil) and 1 part each of OM and sand or 1:1 (soil : OM mostly foliage) and add 1 TSP of bone meal + super phosphate for 15cm pot.

Feeding

TSP, complete fertilizer once every two months when the plant is actively growing.

Potting

Do not pot small plant to the large pot (nutrient leach) (follow potting process).

Repotting

- When plant become pot bound or roots get matted around the outside of its earth ball needs repotting.
- Cactus, succulents and Aspidestraare slow growing and do not need frequent repotting (2yrs) where as fast growing plants like *Geranium* and *Begonia* require shifting to a larger pot at lastonce a year.
- Repotted during rainy season.
- Use same mixture of potting during repotting.

Pinching and pruning

- In pinching, the apical shoots or tips are removed to encourage side growth.
- Pinching is commonly practiced in *Coleus, Geranium, Fuschia, Chrysanthemum, Tagetesspp* etc.
- Pruning is done to control the shape of the plant or stimulate new growth.
- Rose: once a year
- *Bougainvillea, Fuschia, Pellargonium*: after flowering
- Chrysanthemum: headed back about 10-15 cm above the ground after flowering which help to grow new shoots.
- *Zebrina pendula, Scindapsus* (trailing plants) - light pruning is needed.

Training

- Climbers by moss stick and tree in desired shape.
- Some tall plants like *Opuntia* are trained and supported by bamboo stakes.

Cleaning

- Foliage of house plants must be cleaned regularly by sponging with water, preferably with luke warm water to remove dirt, dust and grease.
- A small amount of milk or few drops of vinegar may be added to the washing water to improve the appearance of leaves.
- The hairy leaves of African violet and Rex Begonia may be gently brush with a soft paint brush.
- Spray of water (mist) is useful during summer.

Place of house plants

Dark corner

Araucaria, Aspidestra, Maranta, Philodendron, Sansevieria, Monstera, Scindapsus, Tradescantia, Zebrina pendula.

For north window

Aglaomema, Araucaria, Aspidestra, Begonia rex, Bromeliads, Chlorophytum, Diffenbachia, Ferns, Hedera, Impatiens, Monstera, Paparomia, Philodendron, Scandens, Sansevieria, Scindapsus, Tradescantia fluminensis, Zebrina pendula

For south window

Acalypha, Amaryllis, Bromeliads, Cacti, Chrysanthemum, Lantana, Muscari, Daffodils, Pelargonia, Poinsetia, rose, Miniature rose, Coleus, Euphorbia, Hyacinths, Succulents, Tulip, Zyphyranthus.

For east and west

Anthurium, Araucaria, Begonia, Bromeliads, Caladium, Diffenbachia, Dracaena, Ferns, Ficus spp, Fuchsia, Grevillea robusta, Hedera, Impatiens, Palms, Pandanus, Azalea, Tradescantia, Zebrina pendula.

References:

Davis, J. B. (2006). Indoor Gardening the Organic Way: How to Create a Natural and Sustaining Environment for Your Houseplants. Taylor Trade Publishing.

Paz, M., Fisher, P. R., & Gómez, C. (2019). Minimum light requirements for indoor gardening of lettuce. Urban Agriculture & Regional Food Systems, 4(1), 1-10.

Ruppel, S. (2020). Houseplants and the invention of indoor gardening. In The Routledge History of the Domestic Sphere in Europe (pp. 509-523). Routledge.

Tse, M. M. Y. (2010). Therapeutic effects of an indoor gardening programme for older people living in nursing homes. Journal of clinical nursing, 19(7-8), 949-958.

Tseng, W. S. W., Ma, Y. C., Wong, W. K., Yeh, Y. T., Wang, W. I., & Cheng, S. H. (2020). An indoor gardening planting table game design to improve the cognitive performance of the elderly with mild and moderate dementia. International journal of environmental research and public health, 17(5), 1483.

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गुलाफ खेतीमा आईपर्ने मुख्य रोग कीरा र तिनको ब्यवस्थापन

देवराज अधिकारी, बरिष्ठ बाली संरक्षण अधिकृत
प्लान्ट क्वारेन्टाईन तथा बिषादी ब्यवस्थापन केन्द्र, हरिहरभवन, ललितपुर र
सुधिर श्रेष्ठ, प्रमुख, पुष्प विकास केन्द्र, गोदावरी, ललितपुर

गुलाफ फूल विश्व पुष्प ब्यवसायमा एक प्रमुख पुष्प बाली हो। नेपालमा गुलाफलाई कट फ्लावर, माला, आलंकारिक विस्वा साथै विभिन्न प्रकारका पुष्प सजावटका लागि प्रयोग गरिदै आईएको छ । यसको ब्यवसायिक खेतीका लागि अबलम्वन गरिदै आएको प्रबिधि सँगै यसमा आईपर्ने रोग कीराहरुको पहिचान र ब्यवस्थापनमा समेत ध्यान दिनु पर्दछ । यसको खेतीका लागि दिनको तापक्रम २५-३०° से. र रातको तापक्रम १५-१८° से. हुने पारिलो, पिएच मान ५.५-६.५, प्रशस्त मात्रामा प्रांगारिक पदार्थ भएको दोमट माटो भएको जमिन उपयुक्त हुन्छ । ६०-६५% सापेक्षिक आद्रता यसको ब्यवसायिक खेतीको लागि उपयुक्त हुन्छ । ब्यवसायिक स्तमा नियमित तथा बढी फूल उत्पादनका लागि संरक्षित संरचनाहरू भित्र यसको खेती गर्नु उपयुक्त हुन्छ । अन्य बालीनालीहरुमा जस्तै गुलाफ खेतीमा बिभिन्न रोग कीराहरुले आक्रमण गरेको पाईन्छ। पाउडरी मिल्ड्यू, डाउनी मिल्ड्यू, बोट्राईटिस, कालो थोप्ले, थ्रिप्स, लाही, सुलसुले आदी नेपालमा गुलाफ खेतीमा देखा परेका मुख्य रोगकीराहरु हुन् । यस लेखमा गुलाफ खेतीमा आईपर्ने मुख्य रोग कीराहरुको पहिचान र तिनको ब्यवस्थापन सम्बन्धि जानकारी प्रस्तुत गरिएको छ ।

१. कालो थोप्ले (Black Spot)

ढुसीजन्य यो रोगको लक्षण पहेलिएका पातहरुको दुबै सतहमा गोलाकार कालो थोप्लाहरु देखा पर्दछन् । रोगग्रस्त डाँठमा पनि राता टाटाहरु देख्न सकिन्छ । थोप्लाको आकार मसिनो देखि एक सेन्टिमिटरसम्मको हुन्छ । पछि साना साना थोप्लाहरू जोडिएर ठूलो धब्बा बन्दछ र झण्डै पुरै पात ढाक्दछ । यो रोग तापक्रम बृद्धि भएको तथा ओसिलो अवस्थामा ज्यादा देखा पर्दछ । पानीको माध्यमबाट यस रोगको जीवाणु एक ठाउँबाट अर्को ठाउँमा फैलन्छ । कलिला पातहरूमा भने यस रोगको लक्षण देखिदैन । रोगी बोटहरुबाट फूल उत्पादनको गुणस्तर र परिमाण दुबैमा नोक्सानी पुर्याउदछ ।

ब्यवस्थापनः रोग संक्रमित पातहरु नष्ट गर्ने, सरसफाई गर्ने। क्लोरोथालोनिल ७५ डब्लु पि २ ग्राम प्रति लिटर वा हेक्जाकोनाजोल ५% ईसि २ मि.लि. प्रति लिटर पानीमा मिसाई छर्ने ।

२. पाउडरी मिल्ड्यू

यो पनि ढुसीजन्य रोग हो । यसको लक्षण नयाँ पात, पालुवा, डाँठको सतहमा खरानी जस्तो सेतो धुलो देखिन्छ । कलिला पातहरू माथि तर्फ बटारिन्छन् र पातको तल्लो सतहमा सेतो पाउडर जस्तो ढुसी देखिन्छ । यस रोगको कारण कोपिला फक्रन नसक्ने, फूल सानो फूल्दछ साथै चाडै सुकेर जान्छ ।

ब्यवस्थापनः रोग संक्रमित पातहरु र झारहरु नष्ट गर्ने, सरसफाईमा ध्यान दिने । डिनोकाप (काराथेन) १-२ मि.लि. प्रति लिटर पानीमा वा थायोफेनेट मिथायल १-२ ग्राम प्रति लिटर पानीमा मिसाई पातहरु राम्ररी भिज्ने गरी छर्ने । रोगको प्रकोप

ज्यादा भएमा अर्को पटक बिषादी छर्दा पहिले छरेको बिषादी नछरी सल्फर ८० डब्लुपी १ ग्राम प्रति लिटर वा म्याग्नेशियम सल्फेट ३ ग्राम प्रति लिटर पानीमा मिसाई छर्ने । वा एजोअक्सिस्ट्रोबिन २३ % एससि १ मि.लि. प्रति लिटर वा ट्राईफ्लोक्सिस्ट्रोबिन + टेबुकोनाजोल ७५ डब्लुजी १ ग्राम प्रति लिटर पानीमा मिसाई छर्ने ।

३. डाउनी मिल्ड्यू

ढुसीजन्य यो रोगले जमिन भन्दा माथिल्लो सबै भाग डाँठ र पातहरुमा असर पुर्याउदछ। पातको तल्लो सतहमा रातो, कैलो, बैजनी वा खैरो रङ्गको धब्बाहरू देखिन्छ । रोगको लक्षण शुरूमा बोटको माथिल्लो भागमा देखिन्छ र पछि सबैतिर फैलन्छ । रोग लागेका पातहरू छिटै पहेलिएर झर्दछन् । रोगको प्रकोप बढी भएमा पुरै बोट सुकेर मर्न सक्दछ ।

व्यवस्थापनः रोग संक्रमित पातहरु नष्ट गर्ने, सरसफाईमा ध्यान दिने । ढुसीनाशक बिषादी म्यान्कोजेव ७५ % डब्लु पि २ ग्राम प्रति लिटर वा क्लोरोथालोनिल ७५ डब्लु पि २ ग्राम प्रति लिटर पानीमा मिसाई छर्ने ।

४. बोट्राईटिस ब्लाईट

यो रोग पनि ढुसीले गर्दा लाग्दछ । कोपिला तथा फूलको पुष्पदलहरुमा खरानी खैरो भुवादार बृद्धि भएको खैरो धब्बाहरु देखिन्छन् । जसले गर्दा कोपिलाहरु फक्रन पाउदैनन् पछि सबैतिर फैलिएर फूल नष्ट हुन्छ । उच्च आर्द्रता भएको मौसममा रोगको प्रकोप बढ्दछ ।

व्यवस्थापनः प्लाष्टिक घर भित्र ज्यादा आर्द्रता हुन नदिने, प्लाष्टिक घर भित्र उचित भेन्टिलेशनको प्रबन्ध मिलाउने । सिंचाई गर्दा बोट, पात पानीले भिज्न नदिने, थोपा सिंचाई गर्ने सरसफाईमा ध्यान दिने, मरेका र सुकेका हांगाविगा, पातहरु वोट र खेती वरपरबाट हटाउने। म्यान्कोजेव ७५ % डब्लु पि २ ग्राम प्रति लिटर पानीमा मिसाई छर्न सिफारिस गरिएको छ ।

५. निमाटोड (Nematodes)

निमाटोडले गुलाफको बोटको जरामा आक्रमण गर्दछ । निमाटोड लागेको बोट उखेलेर हेर्दा जरामा गाँठाहरू बनेको देखिन्छ । यसको प्रकोपले बोटको बृद्धि विकास साथै फूल उत्पादनमा प्रतिकुल असर पुर्याउदछ ।

व्यवस्थापनः २० केजी निमको पिनामा स्यूडोमोनास र ट्राईकोडर्मा युक्त जैवीक बिषादी २०० लिटर पानीमा मिसाई माटोमा ड्रेन्चिङ्ग गर्नु पर्दछ । यसको प्रयोग थोपा सिंचाई मार्फत पनि गर्न सकिन्छ। निमाटोड नाशक बिषादी फोस्थिएजेट १०% जि आर प्रयोग गर्ने ।

६. थ्रिप्स (Thrips)

थ्रिप्स कीराको बयस्क तथा बच्चा दुबैले गुलाफको पात, कोपिला तथा फूलबाट रस चुस्दछ । यसले आक्रमण गरेको फूलको आकार प्रकार बिगार्ने खैरो रंगको धर्का देखा पर्ने हुन्छ । यसको प्रकोप सुख्खा याममा बढी ज्यादा पाईएको छ । संरक्षित संरचनाहरूमा यसको प्रकोप निकै बढी हुने गर्दछ ।

व्यवस्थापनः कीरा लागेका फूलहरु छनौट गरि नष्ट गर्ने। कीराको बैकल्पिक

वासस्थान दिनसक्ने झारपात हटाउने । एकपटक बाली लिइसके पछि अर्को पटक बाली लगाउनु अघि ग्रिनहाउस कम्तीमा पनि १५ दिनको लागि खाली राख्ने र ग्रिनहाउस भित्र कुनैपनि बनस्पति रहन नदिने र ठाउँ ठाउँमा टाँसिने पासो झुण्ड्याइ दिनु पर्दछ । यसो गरेमा त्यहाँ रहेका थ्रिप्सहरूले आश्रय स्थल पाउँदैनन् र पासोमा टाँसिएर मर्दछन् । बाँकी रहेका फूलहरूबाट पनि बच्चा निस्कन्छ र पासामा टाँसिएर मर्दछ । कीटनाशक बिषादी प्रयोग गर्दा कोपिला भित्र थ्रिप्स नपस्दै फिप्रोनिल ५ % एससि १.५ मि.लि. प्रति लिटर वा ईमिडाक्लोप्रिड १७.८ % एसएल १ मि.लि. प्रति ३ देखि लिटर पानीमा मिसाई छर्न सिफारिस गरिएको छ ।

७. कोपिलाको गबारो (Bud borer)

पोथी बयस्क पुतलीले फूलको कोपिलामा क्रीम रङ्गको अण्डाहरू पार्दछ । फूलबाट निस्केका लार्भहरूले कोपिलाहरूमा प्वाल पार्दछ र पुष्पदल खान थाल्दछ । अलि हुर्केका लार्भहरूले फक्रेको फूलमा समेत क्षति पुर्याउँदछ ।

ब्यवस्थापनः लार्भहरुको संख्या कम भएमा हातैले संकलन गरि नष्ट गर्ने, स्थानीय स्तरमा उपलब्ध हुने गहुँत पानी, सुर्तीको झोल, झोलमल, आदि प्रयोग गर्न सकिन्छ । पासोको प्रयोग गरि कीराको अनुगमन साथै ब्यवस्थापन गर्न सकिन्छ । यो कीराको बिषादी पचाउने क्षमता अत्याधिक हुने भएकोले कीराको प्रकोप अधिक भएमा एकपटक प्रयोग गरेको बिषादी अर्को पटक दोहोर्याउनु हुँदैन र साथै लार्भको कलिलो अवस्थामा बिषादी प्रयोग गर्न सकेमा मात्र यसले काम गर्दछ । जैविक नियन्त्रणको लागि ब्यासिल्लस थुरेन्जेन्सिस (बि.टि.) १ ग्राम प्रति लिटर पानीमा तथा एन.पी.भि. १ मि.लि. प्रति लिटर पानीमा मिसाएर छर्न सकिन्छ । निमजन्य बिषादी एजाडिरिक्टिन ३ देखि ५ मि.लि. प्रति लिटर वा क्लोरोपाइरिफस ५० % + साईपरमेथ्रीन ५ % ईसि १-२ मि.लि. प्रति लिटर पानीमा वा ईबामेक्टिन बेन्जोएट ५ % एस जि १ मि.लि. प्रति ३ देखि लिटर पानीमा मिसाई छर्न सिफारिस गरिएको छ ।

८. लाही कीरा (Aphid)

लाही कीराले विरुवाको विभिन्न भागहरुवाट रस चुस्दछ । अन्य बालीहरुमा जस्तै लाही कीराको माउ र बच्चा दुबैले गुलाफ खेतीमा समेत आक्रमण गर्दछ । सैयौंको संख्यामा यसले बोटको कमलो भाग जस्तै बढ्दै गरेको मुना, कोपिला, पात, डाठ आदीमा अधिक लाग्दछ। कार्तिक देखि बैशाख महिनासम्म यसको प्रकोप बढी हुन्छ । यसले गुलियो दिसा गर्दछ जसमा कालो ढुसीको विकास हुन्छ फलस्वरूप पातहरू काला देखिन्छन् ।

ब्यवस्थापनः विभिन्न प्रकारका प्राकृतिक शत्रुहरुले लाही कीरालाई नाश गर्दछन् जस्तैः लेडि बर्ड बिटल । यस्ता प्राकृतिक शत्रुहरूको संरक्षण गर्ने, स्थानीय स्तरमा उपलब्ध हुने गहुँत पानी, सुर्तीको झोल, झोलमल, खरानी र मट्टितेल आदि प्रयोग गर्न सकिन्छ । निमजन्य बिसादी ३ मि.लि. प्रति लिटर वा एसिटामिप्रिड २० एसपि ०.२५ ग्राम प्रति लिटर वा ईमिडाक्लोप्रिड १७.८ एसएल ०.५ मि.लि. प्रति लिटर पानीमा मिसाई छर्न सिफारिस गरिएको छ ।

९. सेतो झिँगा (Whitefly)

बिरूवाको माथिल्लो भागमा सेतो पुतली जस्तो देखिने मसिना कीराहरू बसेको देखिन्छ र बिरूवालाई चलाउँदा भुर्र उड्दछन् । यस कीराको बच्चा र वयस्क दुबैले गुलाफको बोटको बिभिन्न भागहरु मुख्यतः कमलो भागहरुबाट रस चुसेर नोक्सानी पुर्याउदछ । पातहरू पहेंलो हुने र झर्ने लक्षण देखिन्छ । यसले पनि गुलियो दिसा गर्ने भएकोले अधिक प्रकोप भएमा कालो ढुसीले गर्दा पातहरू काला देखिन्छन् फलस्वरूप बिरूवा रोगी भई फूल पनि सानो फूल्छ ।

व्यवस्थापनः स्थानीय स्तरमा उपलब्ध हुने गहुँत पानी, सुर्तीको झोल, झोलमल, खरानी र मट्टितेल आदि प्रयोग गर्न सकिन्छ । कीराको प्रकोप कम गर्न ग्रिनहाउसको ठाउँ ठाउँमा पहेंलो टाँसिने पासो झुण्ड्याउने तथा ग्रिनहाउसमा कीरा छेक्ने जालीको प्रयोग गर्नु पर्दछ । निमजन्य बिषादी ३ मि.लि. प्रति लिटर वा थायोमेथोक्जाम २५ डब्लुजि ०.५ ग्राम प्रति लिटर वा स्पिरोमेसिफेन २४० एससि १ मि.लि. प्रति लिटर वा फ्लोनिक्यामिड ५० डब्लुजि ०.५ ग्राम प्रति लिटर पानीमा मिसाई छर्न सिफारिस गरिएको छ ।

१०. सुलसुले (Mites)

सुलसुले आक्रमणको सुरुवातमा पातको पछाडीपट्टी देख्न सकिन्छ । यो खास गरि सुख्खा र धुले अवस्थामा सहजै फैलन्छ । यसले पातमा चुसेर पातलाई सेतो, गुजुमुजु र सुख्खा बनाई झारि दिन्छ । यसले आफ्नो सुरक्षाको लागि माकुराले जस्तै जालो बनाउँछ ।

व्यवस्थापनः गुलाफ खेती भएको स्थानमा सुख्खापना कम गर्न बोटको माथीबाट सिंचाईको ब्यवस्थापन गर्ने । सुख्खायाममा ग्रिनहाउसभित्र फोगर चलाएर पनि धेरै हदसम्म यसको नियन्त्रण गर्न सकिन्छ । प्रकोप अधिक भई बिषादीको प्रयोग गर्नु परेमा सुलसुलेको प्राकृतिक शत्रुहरुको सन्तुलनमा ख्याल गर्नु पर्दछ । सुलसुलेनाशक बिषादी प्रोपार्जाईट ५७ % ईसि १ मि.लि. प्रति लिटर पानीमा वा बिफेनाजेट ५० % डब्लु पि १ ग्राम प्रति लिटर पानीमा वा फेनपाईरोक्जिमेट ५ % ईसि १ मि.लि. प्रति लिटर पानीमा मिसाई छर्न सिफारिस गरिएको छ ।

यसका अलवा गुलाफ फूल खेतीमा क्राउन गल, डाई ब्याक, मोज्याईक रोग (भाईरसजन्य) आदी रोगहरु साथै बिभिन्न कीराहरुले बोटको बृद्धि विकास र उत्पादनमा असर पुर्याईरहेको पाईन्छ । तीनको ब्यवस्थापनका लागि रोग मुक्त बिरुवा रोपण गर्ने, रोगी भाग, बोट हटाउने, काँटछाँट गरे पश्चात् कपरजन्य ढुसिनाशक बिषादीको पेष्ट लगाउने, भाईरस सार्ने चुस्ने कीराहरुको ब्यवस्थापन गर्नुका साथै रोग लाग्ने अनुकुल अवस्थालाई खलल पुर्याउने आदी कार्यहरु गर्न सकिन्छ । साथै रोग कीरा ब्यवस्थापन गर्दा रसायनिक बिषादीहरुको प्रयोग गर्नु परेमा सुरक्षित तवरले गर्नु पर्दछ ।

सन्दर्भ सामाग्रीहरुः

https://biobee.co.za/pests/greenhouse-whitefly/

https://pnwhandbooks.org/plantdisease/host-disease/rose-rosa-spp-hybrids-botrytis-bud-twig-blight

https://www.nurserymag.com/article/rose-downy-mildew-disease-control/

https://www.rose.org/single-post/nematodes-underground-root-destroyers

IIHR. (2021). Arka Flower Varieties and Production Technology (Eds) Tejaswini, P., Usha Bharathi, T., & Sujatha, A. N. Published by ICAR-Indian Institute of Horticulture Research, Bengaluru, India. e-book No. EB-2/2021 https://iihr.res.in/arka-ebook/

Pun, U. K. (2016). Rose Flower Cultivation Technology. Floriculture Association Nepal, Kathmandu.

हावा शुद्ध पार्ने ईन्डोर बोट बिरूवाहरू

दिलिप बादे
(पुष्प व्यवसायी) जय किसान नर्सरी

पृष्ठभुमी

आज भोलि तपाई हामी जब घरबाट बाहिर निस्कन्छौ । धेरै जसो ठाउँहरुमा प्रदूषण महसुस हुन्छ । सास फेर्दा पनि दूषित हावा हाम्रो वरिपरि भएको महशुस हुन थालेको छ । विशेषत शहरी क्षेत्रको वातावरणमा बढ्दो प्रदूषणको कारणले खुला हावामा सास फेर्न गाह्रो बन्दै गैरहेको महसुस हुन थालेको छ । दूषित हावाका कारण मुटु र श्वास प्रश्वासका बिरामीहरुका साथै वृद्धहरु र बच्चाहरु को लागि समस्या हुदै गएको छ । अतह यसको दुषित प्रभावबाट जोगिन साथै वातावरणलाई केहिहदसम्म शुद्ध पार्न, केहि बोटबिरुवाहरु घर भित्र र बाहिर रोप्न सकिन्छ, जसले हावा शुद्ध पार्न सहयोग गर्दछ । तपाई हामीले घर बाहिरको स्थितिलाई धेरै नियन्त्रण गर्न सक्दैनौ तर निश्चित रुपमा घर भित्रको हावालाई शुद्ध पार्न सकिन्छ । हो, तपाईं हाम्रो घर भित्रको वायुशोधन गर्न सकिन्छ र यसको लागि तपाईं हामीले बोट बिरुवाहरु लगाउनु पर्छ जुन प्राकृतिक वायु शुद्धीकरणकर्ता पनि हुन । वातावरण र आफूलाई सुरक्षित गर्न, त्यस्ता बोटबिरुवाहरु घर र कार्यालयका कोठाहरुमा राख्न सकिन्छ ।

अब हामी तपाईंलाई नासाले अध्ययन पछि सिफारिस गरेका त्यस्ता हावा शुद्ध गर्ने केहि उत्कृष्ट बोट बिरुवाहरुको बारेमा बताउनेछौ, जुन बिरुवाहरु यदि घरमा रोप्दछौ भने तपाईंको घरको हावा शुद्ध हुन्छ । यी बोटविरुवाहरुका समान गुणहरुको कारण, तिनीहरुलाई प्राकृतिक वायु शुद्धीकरण बिरुवा पनि भनिन्छ । साथै यी बोट बिरुवाहरुलाई तपाई हाम्रो घर भित्र, बैठक कोठा, सुत्ने कोठा, शयनकक्ष, बराण्डमा आदि ठाउहरुमा राखी वायु शुद्धिकरण गर्न सकिन्छ ।

१. पिस लिलि (Peace Lily)

सेतो फूलफूल्ने तथा हरियो लामो पात हुने पिस लिली एक अत्यन्त आकर्षक तथा लोकप्रिय इन्डोर पट प्लान्ट हो । हेरचाह गर्न अत्यन्त सजिलो, थोरै सूर्यको प्रकाश भए पुग्ने, हप्तामा एक पटक पानी दिए हुने तथा महिनामा एक पटक थोरै मल हाले पुग्ने यो बिरुवा बेडरुमको लागि उपयुक्त रोजाई हो । अमेरिकी संस्था नासाको अध्ययन अनुसार पिस लिली एक उच्च कोटिको वायु शोधक अर्थात हावा शुद्ध गर्ने बिरुवा हो । यसले कोठाको आद्रता (Humididy) ५ प्रतिशत सम्म वढाउने गर्दछ । कोठामा आद्रता रहनाले राति निन्द्रा राम्रो लाग्दछ । कम ह्युमिडिटिको कारणले श्वासप्रश्वास सम्बन्धि रोगहरु बढाउने, छाला तथा कपाल शुक्खा गराउने र हानीकारक भाइरस तथा किटाणुहरु बढाउन सहायक हुने गर्दछ ।

२. स्नेक प्लान्ट (Snake Plant)

झट्ट हेर्दा सर्प यानि स्नेक जस्तो देखिने यो विरुवा पनि एक उच्च स्तरीय प्राकृतिक वायु शोधक अर्थात हावा शुद्ध पार्ने बिरुवा हो । यो विरुवाले रातमा समेत अक्सिजन उत्सर्जन गर्ने गर्दछ । त्यसैले यो विरुवा वेडरुममा राख्दा रातमा गहिरो तथा राम्रो निन्द्रा लाग्ने गर्दछ । साथै यो विरुवाले हावामा रहेका श्वासप्रश्वास सम्वन्धि

रोगहरु बढाउने केहि हानिकारक रसायनहरु जस्तै जाइलिन, ट्रइक्लो-रेथिलिन, टोल्युइन, बेंजिन र फर्मल्डिहाइडलाई हटाउने कार्य गर्दछ । त्यसैले स्नेक प्लान्ट बेडरुममा राख्नका लागि एक अत्यन्त लोक प्रिय विरुवा हो । कम हेरचाह गरे हुने, कम प्रकाश भए पुग्ने, कमै पानी दिए हुने तथा कम मात्र मल हाले पुग्ने स्नेक प्लान्ट आफनो बेडरुममा राखी हावा सुद्धिकरण गर्न सकिन्छ ।

३. एलोभेरा अर्थात ध्यू कुमारी (Aloe Vera)

यो एक सकुलेन्ट प्रजातीको विरुवा हो । जसलाई अत्यन्त कम मात्र पानीको आवश्यकता पर्दछ किनकी यसको पातमा प्राकृतिक रुपमा नै प्रशस्त पानीको जेल रहेको हुन्छ । जुन जेलको प्रयोग घरायसी रुपमा हुने सानो तिनो आगोको पोलाई, धारिलो हतियारको कटाई, किराको टोकाई तथा छाला र कपालमा हुने सुख्खापनको उपचार गर्न समेत प्रयोग गर्न सकिन्छ । साथै यो बिरुवाले रातमा पनि अक्सिजन उत्पादन गर्ने गर्दछ जसले गर्दा रातमा गहिरो तथा राम्रो निन्द्रा लाग्दछ । त्यसै गरी यो विरुवाले कोठा भित्रको हावामा रहेका हानीकारक रसायनहरुको शुद्धिकरण गरी हावाको गुणस्तर बढाउने कार्य गर्दछ । अतह एलोभेरा औषधीय गुणहरुले भरिपुर्ण एक बहु आयामिक घरमा राख्नु पर्ने विरुवा हो । त्यसैले कोठामा कम पानी र कमै हेरचाह गरे पुग्ने एलोभेराको विरुवा राख्न सकिन्छ ।

४. मनि प्लान्ट (Money Plant)

हरियो, पहेलो, सेतो साथै विभिन्न छिर्के मिर्के रंगहरुमा हुने, मुटु आकारको पात हुने, लहरा पठाए नि हुने, झ्याङ्ग बनाइए नि हुने, यो घरमा राख्ने अत्यन्त लोकप्रिय विरुवा हो । यो विरुवाले कोठामा रहेका हानिकारक विषाक्त पदार्थहरुलाई शुद्धिकरण गर्नुका साथै सकारात्मक उर्जाको निर्माणमा सहायता गर्दछ । यसलाई पानीमा मात्र राखेर पनि हुर्काउन सकिन्छ । कम पानी, कम प्रकाश, कम मल तथा कमै हेरचाहमा पनि मज्जाले हुर्किने यो विरुवा कोठामा राख्नाले सौन्दर्य, शुद्धता तथा शान्ति खोज्न अन्त कतै जानु पर्दैन । त्यसैले सौन्दर्य, शुद्धता तथा शान्तिका लागि कोठामा मनि प्लान्ट राख्न सकिन्छ ।

५. स्पाइडर प्लान्ट (Spider Plant)

स्पाइडर यानी माकुरा जस्तै गरि यो बिरुवाको मुख्य भागबाट अरु सहायक हांगाहरु निस्कि थप साना साना अरु विरुवाहरु झुण्डिने गर्दछ । यसरी हावामा साना साना बच्चा विरुवाहरु झुण्डिने भएकाले यसलाई एरोप्लेन

प्लान्ट पनि भन्ने चलन छ । यसरी हावामा निस्केर झुण्डिने साना बच्चा विरुवाहरु नै यसको मुख्य आकषर्ण तथा विशेषता हो । हेर्दा अत्यन्त मनमोहक र जोगाउन अत्यन्त सजिलो यो विरुवा एक प्रकारको वायु शोधक अर्थात हावा शुद्ध गर्ने विरुवा पनि हो । घरको कोठा भित्र विभिन्न कारणले उत्पन्न हुने हानिकारक फर्मल्डिहाइड नामक रसायनलाई यसले फिल्टर गर्ने गर्दछ । यति धेरै विशेषताहरु हुदाहुदै पनि थोरै प्रकाश भएनि हुने, धेरै प्रकाशमा पनि बाच्न सक्ने, घर भित्र राखेनि हुने, घर बाहिर पनि मज्जाले हुने अर्थात जस्तो सुकै परिस्थितिमा पनि आफुलाई बचाई राख्न सक्ने बिरुवा हो स्पाइडर प्लान्ट । कोठामा स्पाइडर प्लान्ट राखि शुद्ध हावा र मनमोहक सौन्दर्यको आनन्द लिन सकिन्छ ।

अन्तमा, इन्डोर बिरुवाहरू केवल सजावटी वस्तुमात्र होइनन्, कोठाहरुको लागि विशेषत बेडरूमको लागि आवश्यक हावाको गुणस्तर सुधार गर्ने देखि लिएर मानसिक तनाव कम गर्न र आरामलाई बढावा दिने कार्य समेत गर्दछ । साथै बोट विरुवाहरूले त्यहाँ बस्ने, सुत्ने मानिसहरूको समग्र स्वास्थ्यमा सकारात्मक सुधार समेत प्रदान गर्दछ ।

Reference

BC Wolverton; wl Douglas: K Bounds (September 1989). Interior landscape plants for indoor air pollution abatement (Report). NASA. NASA-TM-1017766

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नोटः बगैचा सम्बन्धी सम्पूर्ण काम गरिन्छ ।

पुष्प व्यवसायमा सम्भावना : नेपाली शोभनीय वनस्पति पाषाणभेद

दिपक लामिछाने
वरिष्ठ उद्यान अधिकृत, राष्ट्रिय वनस्पति उद्यान, गोदावरी, ललितपुर

हालैका वर्षहरूमा शोभनीय फूलको व्यापार र गमला सजावटीय कार्य पर्यावरणीय र मानव स्वास्थ्यका लागि दिन प्रतिदिन वढ्दै गई रहेको छ । जङ्गली बोटबिरुवाहरू सजावटको रूपमा प्रयोग गर्न सकिने असिमित सम्भावनाहरु रहेका छन् । फलस्वरूप, नयाँ सजावटी बिरुवाहरूको लागि आगामी अवसरहरू प्राप्त गर्न पुष्प व्यवसायी र वैज्ञानिकहरू जङ्गली बोटबिरुवाहरूको पछि लागि परेका छन् । प्राकृतिक वा अर्ध-प्राकृतिक पारिस्थितिक प्रणालीमा हुर्केका र प्रत्यक्ष मानव कार्यबाट स्वतन्त्र रूपमा अस्तित्वमा रहन सकेका वनस्पति नै जंङ्गली वनस्पति हुन् (Wild plant species refers to those that grow spontaneously in self-maintaining populations in natural or semi-natural ecosystems and can exist independently of direct human action) । यद्यपि जंगली वनस्पति प्रजातिहरुको व्यावसायिक विकासको सन्दर्भमा प्रायः बेवास्ता गरिएको भए तापनि जङ्गली वनस्पति प्रजातिहरूले फूलखेती र पुष्प व्यवसायमा महत्वपूर्ण भूमिका खेल्न सक्छन् ।

जङ्गली बोटबिरुवाहरूको सुन्दरता वगैचा निर्माण र संरक्षणको दृष्टिले अति नै महत्वपूर्ण हुन्छ । यी बोटबिरुवाहरूमा वातावरणीय स्थिरता कायम गर्न सक्ने क्षमता, कम पानीको खपत, कीटनाशक र अन्य रासायनिक पदार्थको मात्रा प्रयोग गर्न नपर्ने, हुर्काउनका लागि कम श्रम लागत भए पनि हुने जस्ता गुणहरु रहेका हुन्छन् ।

यसै सन्दर्भमा यहाँ सौन्दर्यताले भरीपूर्ण जङ्गली वनस्पति पाषाणभेदको चर्चा गरिएको छ ।

पाषाणभेद

बगैचामा पाषाणभेद

पाषाणभेदको वैज्ञानिक नाम बर्जिनिया सिलियटा (*Bergenia ciliata*) र अंग्रेजी नाम रक फोयल (Rock foil) वा Hairy Berginia हो । यो वनस्पति *Saxifragaceae* परिवारमा पर्दछ । यो वनस्पति ढुङ्गा (Rock) को चेपमा सजिलै हुर्कन सक्ने र जराले ढुङ्गालाई समेत टुक्रा टुक्रा (Rock breaker) पार्न सक्ने क्षमता भएको वनस्पति हुनाले यो वनस्पतिलाई पाषाणभेद भनिएको हो । त्यसैले त यो वनस्पतिबाट मृगौलामा पत्थरी (Kidney stone) रोगको उपचारको लागि औषधी वनाउन पनि प्रयोग गरिन्छ ।

पाषाणभेद नेपालमा मात्र नभएर उत्तर पूर्व भारत, अफगानस्तान, भुटान र चिनमा प्राकृतिक रूपमा फैलिएर रहेको छ । नेपालको करीव ९०० देखि ३५०० मि. सम्मको उचाईमा पूर्व देखि पश्चिमसम्म लेकाली भेगमा चट्टान भएको ओसिलो ठाँउमा यो वनस्पति पाईन्छ ।

वानस्पतिक विशेषता

पाषाणभेद काण्ड सिधा नभई जमिनको सतह र सतह भित्र समानान्तर भएर फैलिने वहुवर्षिय झार वर्गको वनस्पति हो । यसको काण्डलाई राईजोम भनिन्छ । राईजोमबाट माथि पलाएको काण्ड २०-३० सेमि अग्लो हुन्छ । पाषानभेदमा पात एकै ठाँउबाट पलाएर आँउछन् जुन साधारण (Simple) खालका हुन्छन् । यसको जमिन माथि वा जमीनसँग समानान्तर भएर फैलिने काण्ड १-२ मिटर सम्म लामो हुन्छ । भिरालो ढुङ्गाको चेपमा उम्रने यो वनस्पति सदावहार (Evergreen) हुन्छ र यसका काण्ड आँख्लै आँख्ला परेको हुन्छ । मुख्य काण्डबाट ३-४ वटा सहायक काण्डहरु छुट्टिएका हुन्छन् । कुनै काण्ड ढुङ्गाको चेपमा पसेको हुन्छ भने कुनै काण्ड सतहमा फैलिएर रहेका हुन्छन् । यद्यपि काण्डका आँख्लाहरूबाट ससाना नली आकारका जराहरु ढुङ्गाका चेप तथा जमेर वसेका माटो वा झ्याउहरूसँग टाँसिएर वसेका हुन्छन् । यसका पातहरु वाटुला वा अण्डाकार प्रकृतिका बाक्ला हुन्छन्, जस्को व्यास ५ देखि १० सेमि सम्म चौडा र १५ देखि ३० सेमि सम्म लामा पातका किनारामा स साना सेता तिखा रौँहरूले घेरेका हुन्छन् । शुरूमा हरिया देखिने पातहरु शरद ऋतुको आगमन संगै राता हुदै जान्छन् ।

पाषाणभेदको फूल २ देखि ३ सेमि व्यास भएका सेतो , गुलावी वा प्याजी रङ्का हुन्छन् । फूलहरु काण्डको टुप्पामा झुप्प परेर रहेका हुन्छन्। प्रत्येक फूलमा ५ , ५ वटा पत्रदल र पुष्पदलहरु रहेका हुन्छन् ।

फूल फूल्ने समय : माघ देखि असार सम्म
फल परिपक्व हुने समय : असोज पछि

हावापानी र माटो

उपोष्ण देखि समशीतोष्ण जलवायु भएको स्थानमा यो वनस्पति राम्रोसँग बढ्छ । बलौटे, थोरै अम्लीय माटोमा उच्च छिद्रता भएको र जैविक पदार्थ मिसिएको माटोमा यसका विरूवाहरु राम्रोसँग हुर्कन्छन् । यद्यपि यो वनस्पति कठोर प्रकृतिको पनि भएकोले मध्यम दोमट देखि जैविक पदार्थ मिसिएको माटोमा समेत राम्रोसँग हुर्कन सक्दछ । यसले हल्का छाँया सहन सक्छ र खुला घमाइलो अवस्थामा पनि राम्रोसँग बढ्छ । तथापी यो वनस्पतिको वृद्धि छाँयामा राम्रो पाइन्छ ।

प्रसारण विधि

पाषाणभेद वीउ र काण्ड कटिङ्गबाट विरूवा उत्पादन गर्न सकिन्छ ।

क) वीउबाट

आश्विन कार्तिक महिनामा वीउ परिपक्व हुन्छ र वीउ संकलन गरी फाल्गुण चैत्र महिनामा नर्सरी राख्नु पर्छ । वीउ एकदमै मसिनो धुलो (१ ग्राम वीउमा करीव ३०,००० वटा वीउ हुन्छन् भने वीउको व्यास करीव १ मिमि हुन्छ) हुने भएकोले नर्सरी व्याड राम्रो मल माटोलाई धुलो र मसिनो पारी तयार पार्नु पर्छ र वालुवा मिसाई वीउ छर्नु पर्छ । वीउ छरेको करीव ३ महिनामा वीउ उम्रन शुरु हुन्छ र २-४ वटा ससाना पातहरु पलाए पछि वेर्नालाई पहिला पोलिट्युव र पछि गमलामा सार्न सकिन्छ ।

पाषाणभेदको वीउ

वीउबाट उमारेको वेर्ना

ख) काण्ड कटिङ्गबाट

कटिङ्गबाट विस्वा उत्पादन गर्दा काण्डलाई २ देखि ३ वटा आँख्ला हुने गरी टुक्रा वनाई तयार पारिएको नर्सरी वेडमा (मल, माटो र वालुवा मिसाईएको) विस्वा उत्पादनका जेष्ठ-अषाढ महिनामा रोप्न सकिन्छ । यसरी रोपिएको कटिङ्गमा जरा पलाए पछि पोलिट्युव वा गमलामा रोप्न सकिन्छ ।

कटिङ्गबाट विस्वा उत्पादन

गमलामा पाषाणभेद

उपयोगिता

पाषाणभेद जडिवुटी जन्य वनस्पती भएतापनि सौन्दर्यताले भरीपूर्ण यो वनस्पतिलाई घरभित्र (Indoor) र घरबाहिर (Outdoor Plant) दुवै स्थमा सजावटको लागि प्रयोग गर्न सकिन्छ । गमलामा रोपी Indoor Plant को स्थमा प्रयोग गर्न सकिन्छ भने ढुङ्गे वगैचा (Rock garden) वा अन्य वगैचाहस्मा रोपी Outdoor Plant को स्थमा समेत सजावट गर्न सकिन्छ । यो वनस्पति झार वर्गको र धेरै ठूलो पनि नहुने भएकोले थोरै जग्गा भएको ठाँउमा रोप्न सकिन्छ ।

निष्कर्ष

फूल व्यापारमा जंगली बोटबिस्वाहरूको योगदानको सन्दर्भमा सर्वप्रथम जंगली प्रजातिहरूको दिगो संरक्षण र उपयोग; नयाँ सजावटको स्रोतको रूपमा उपयोगी जंगली प्रजातिहरूको पहिचान, घरेलुकरणको साथै अनुसन्धान र प्रर्वद्धनमा अनुसन्धानात्मक संस्थाहरू वनस्पती विभाग, विश्वविद्यालय र नर्सरीहरूको भूमिका

महत्वपूर्ण हुन्छ ।

नेपालकै वनपाखामा पाईने पाषाणभेद वहुवर्षिय, सौन्दर्यपरक, वाह्रै महिना हरियो रहने र हिउँद देखि शिशिर ऋतुमा फूल्ने भएकोले यो विस्वालाई गमला र वगैचामा पनि हुर्काउनु पर्छ भन्ने मनसायका साथ फ्लोरिकल्चर एशोसियसन नेपालको प्रकाशन फूल फुल्ने शोभनीय नेपाली विस्वाहरु (२०७४) मा समेत वर्णन गरेको पाईन्छ ।

सन्दर्भ सामाग्रीहरु :

भट्टराई खेम राज र घिमिरे मधुदेवी (२०६३), नेपालका महत्वपूर्ण जडीबुटी तथा गैरकाष्ठ वन पैदावारको सङ्कलन तथा खेती प्रविधी, सम्पदा अन्वेषण तथा विकास मञ्च, नेपाल, पाखनवेद पृ. २३५-२३८

मल्ल, कुवेर जंग, लामिछाने, दिपक, काफ्ले द्रोणराज, पुन उमेद र बादे, दिलिप (२०७५),फूल फुल्ने शोभनीय नेपाली विस्वाहरु, फ्लोरीकल्चर एशोसियसन अफ नेपाल

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क्याला लिली फूलको खेती प्रविधि

सुधीर श्रेष्ठ
प्रमुख, पुष्प विकास केन्द्र, गोदावरी

परिचय

Zantedeschia (Calla Lily) एराकेसी परिवारभित्र पर्ने एक महत्वपूर्ण फूल फूल्ने आलङ्कारिक विरूवा हो । यसको उत्पत्ति दक्षिण अफ्रिकाबाट भएको मानिन्छ र हाल यो सबै महादेशहरूमा फैलिसकेको छ । यसको अनौठो प्याला (वाइन ग्लास) जस्तो आकार भएको फूल र त्यसको बिचमा पहेलो औला जस्तो डाँठ र सप्तरङ्गी इन्द्रेणी जस्तो विविध रङ्गले यसलाई अति नै लोकप्रिय बनाएको हो । यसको फूलको रङ्ग निख्खर सेतो देखि गहिरो बैजनी (झण्डै कालो) सम्म हुने गर्छ । यस बिचका सुनौलो, सुन्तला, रातो, गुलाबी, पहेंलो आदि विविध रङ्गमा यो पाइन्छ । Calla Lily को बैज्ञानिक नाम *Zantedeschia* सन् १८२६ मा विख्यात इटालियन बनस्पतिविद् Giovanni Zantedeschia को सम्मानमा राखिएको हो । क्याला लिलीलाई पिग लिली, अरम लिली, केप लिली आदि नामले पनि चिनिन्छ ।

यसले अलि बढी चिसो मनपराउने भएकोले पोखरी वा कुलोको नजिक खुल्ला जमीनमा लगाउन सकिन्छ । आजभोलि यसको गमलामा पनि खेती गर्न शुरु गरिएको छ । यसको भेस लाइफ २ हप्तासम्म हुने भएकोले यसलाई अति उत्तम कटफ्लावरको रूपमा प्रयोग गर्न सकिन्छ । विवाहहरूमा प्रयोग हुने बुकेमा यसको प्रयोग गर्दा निकै आकर्षक देखिन्छ ।

जातहरु

ज्यान्टेडेस्किया जाति (Genus) भित्र मूख्यतयाः ७ प्रजाति (Species) र २ उपजातिहरु (Sub-species) *Z. aethiopica, Z. rehmannii, Z. jucunda, Z. elliottiana, Z. pentlandii, Z. odorata, Z. albomaculata subsp. albomaculata, Z. albomaculata. subsp. macrocarpa* र *Z. albomaculata valida.* आदि रहेका छन् । यी प्रजातिहरु मध्ये aethiopica सदावहार प्रकृतिको हुन्छ र सेतो रङ्गको ठूलो फूल फूल्दछ भने अन्य प्रजातिहरु रङ्गिन फूल फूल्ने र पतझड प्रकृतिको हुन्छ । आजभोलि थुप्रै हाइब्रीड जातहरुको पनि विकास गरिएको छ ।

प्रजाति	पातको आकार	पातमा छिर्के बुट्टा	फूलको रङ्ग	फूल्ने समय
Z. aethiopica	अण्डाकार-हृदयाकार वा भालाकार	दुर्लभ	सेतो-गुलाबी	फागुन-जेठ
Z. odorata	अण्डाकार-हृदयाकार	नहुने	सेतो	फागुन-जेठ
Z. albomaculata subsp. *albomaculata*	लम्बाकार-भालाकार	कम	सेतो-हल्का पहेंलो-गुलाबी	फागुन
Z. albomaculata subsp. *macrocarpa*	त्रिकोणाकार-भालाकार	पातलो	पहेंलो	जेठ-भदौ
Z. valida	अण्डाकार-हृदयाकार-गोलाकार	नहुने	क्रिम	जेठ-भदौ
Z. elliottiana	गोलाकार-अण्डाकार	हुने	सुनौलो	जेठ-भदौ
Z. jucunda	त्रिकोणाकार-भालाकार	बाक्लो	सुनौलो	जेठ-भदौ
Z. pentlandii	गोलाकार-अण्डाकार-लम्बाकार-चक्कुआकार	दुर्लभ	पित्तले पहेंलो	जेठ-भदौ
Z. rehmannii	चक्कुआकार	नहुने	सेतो-गुलाबी-गाढा मरुन	जेठ-भदौ

उत्पादनको अवस्था

संसारमा क्याला लिलीको उत्पादनको अवस्था हेर्दा संयुक्त राज्य अमेरिका पहिलो स्थानमा आउँछ । अमेरिका एक्लैले कूल उत्पादनको ५० प्रतिशत स्थान ओगड्दछ भने न्यूजिल्याण्ड र नेदरल्याण्डले ४५ प्रतिशत हिस्सा लिएको छ । बाँकी ५ प्रतिशत हिस्सा भारत, श्रीलङ्का र मध्य अमेरिकी देशहरुले ओगटेका छन् । अमेरिकामा ९५ प्रतिशत क्याला लिलीको गानोको उत्पादन गमलामा लगाउनको लागि हुन्छ भने युरोपमा ८० प्रतिशत भन्दा बढी क्यालाको खेती कटफ्लावरको रुपमा हुन्छ ।

हावापानी र माटो

क्याला लिलीको खेती गर्न समशितोष्ण हावापानी आवश्यक पर्दछ । १५ देखि २८° से. तापक्रममा यसको खेती राम्रो हुन्छ । नेपालको सन्दर्भमा भन्नुपर्दा तराईमा असोज-कार्तिकमा र पहाडमा माघ-फागुनमा यसको गानो रोप्नु उपयुक्त हुन्छ । यदि माटोको तापक्रम कम्तीमा १३° से. र हावाको तापक्रम बढीमा २५° से. कायम गर्न सकियो भने कुनै पनि समयमा यसको खेती गरेर फूल फूलाउन सकिन्छ । तर तापक्रम १५° से. भन्दा तल गएको अवस्थामा भने क्याला लिली फूल्न सक्दैन । यो फूललाई कम्तीमा ६ घण्टाको प्रकाशको आवश्यकता पर्दछ । माटोको हकमा चिस्यान भएको तर पानी नजम्ने, प्रशस्त प्राङ्गारिक पदार्थ भएको हलुका दोमट माटो यसको खेतीको लागि उपयुक्त हुन्छ । माटोको अम्लीयपना ६ देखि ६.५ उपयुक्त हुन्छ ।

प्रसारण तथा रोपण

क्याला लिलीको प्रसारण बीउबाट पनि गर्न सकिने भएता पनि यस विधिबाट उत्पादन गरिएको विरुवाको गुण माउ बोटको जस्तो नहुने र फूल फूल्न कम्तिमा ३ वर्ष लाग्ने भएको हुँदा जातीय विकास गर्ने प्रयोजनको लागि मात्र यो विधि अपनाइन्छ । ब्यवसायिक खेतीको लागि गानो छुट्याउने विधि अपनाउने गरिन्छ । हिउँद शुरू हुनुभन्दा अगाडी खनेर हिउँदभरी यसलाई भण्डारण गर्ने र हिउँदयाम पश्चात टुसा निस्केका गानोलाई माउबाट छुट्याएर रोप्न सकिन्छ । फूल फुल्न योग्य ४-६ से.मी साइजको गाना उत्पादन गर्नको लागि कम्तीमा पनि ४ महिनाको जीवनचक्र र ३-४ महिनाको सुसुप्तावस्था (Resting period) पूरा गरेको हुनु पर्दछ । गाना रोप्नु अघि जिबेरिलिक एसीड (जी.ए.३) ५०-१०० पी.पी.एम. को घोलमा ३० मिनेट डुबाएर रोप्दा फूल फूल्ने हाँगाको संख्या र हाँगामा फूलको संख्या बृद्धि हुने अध्ययनले देखाएको छ ।

आजभोलि रोगमुक्त विरुवा उत्पादनको लागि टिस्यूकल्चर विधिको प्रयोग पनि गर्न थालिएको छ । यस विधिबाट ठूलो संख्यामा रोगमुक्त विरुवा उत्पादन गर्न सकिन्छ । यस विधिबाट उत्पादन गरिएको विरुवामा फूल फूल्न गानो छुट्याउने विधिमा भन्दा बढी समय लाग्छ ।

गमलामा फूल उत्पादन

गमलामा क्याला लिली लगाउँदा ४ देखि ८ इञ्च साइजको गमलामा रोप्न सकिन्छ । गमलाको साइज अनुसारको गाना रोप्नु पर्दछ । ४ इञ्जको गमला भए प्रति गमला यौटा गाना (४-५ से.मी. साइजको), ६ इञ्चको गमलामा प्रति गमला २ वटा गाना, ८ इञ्चको गमला भए प्रति गमला ३ वटा गाना रोप्न सकिन्छ । गमलाको तल्लो भागमा बढी भएको पानी बगेर जान प्वाल हुनु पर्दछ । पानीको राम्रो निकासको लागि गमलाको पिँधमा गिटी वा कोकोचिप्स राखिदिनु पर्दछ । गमलामा माटोको मिश्रण तयार गर्दा १ भाग माटो, १ भाग राम्ररी पाकेको कम्पोष्ट वा भर्मिकम्पोष्ट र १ भाग कोकोपिट मिसाउद राम्रो हुन्छ ।

गानो रोप्नु भन्दा १ रात अघि माटोलाई नानो सिल्भर हाइड्रोजन पेरोक्साइड ३० मि.लि. प्रति लिटर पानीको घोलले भिजाएर निर्मलिकरण गरेर मात्र रोप्नु पर्दछ । रोप्दा सतह भन्दा ५ से.मी. गहिरो गरी टुसा माथि तर्फ फर्काएर रोप्नु पर्दछ । रोपिसकेपछि गानोलाई ब्याक्टेरिया र ढुसीजन्य रोगबाट बचाउन स्ट्रेप्टोमाइसिन १००-२०० पि.पि.एम., एलाइट १ मि.लि/लि. पानी तथा आइप्रोआयोडिन (चिप्को) ०.५ ग्राम/लिटर पानीको दरले मिश्रण बनाई सिंचाई गरिदिनु पर्दछ । गानो रोपे पछि शुरुको अवस्थामा गमला राखेको ठाउँको आद्रता बढाएर ७०-७५% कायम गर्नु पर्दछ । गानो रोपेको गमलालाई सुक्न नदिन १-२ हप्तासम्म प्लाष्टिकले ढाकिदिनु पर्दछ र तापक्रम २०-२५°से. कायम गर्नु पर्दछ । गानो उम्रेर टुसा बाहिर निस्कन थालेपछि प्लाष्टिक हटाइदिनु पर्दछ ।

गाना रोप्ने बेला गमला जोडेर राखे पनि पछि पातहरुको विकास भएपछि यौटाले अर्को गमलाको पात नछुने गरी दुरी कायम गरिदिनु पर्दछ ।

हर्मोनको प्रयोग

राम्रो फूल उत्पादनको लागि क्याला लिलीमा हर्मोनको प्रयोग गर्नु आवश्यक हुन्छ । टुसा २-४ से.मी. लामो भएपछि हर्मोनको प्रयोग गर्नु पर्दछ । यसको लागि ६० पि.पि.एम. प्याक्लोबुट्राजोलको घोल तयार गरेर प्रति गमला (६ इञ्चको) ५० मि.लि. प्रयोग गर्नु पर्दछ । गमला सो भन्दा सानो वा ठूलो भए सोही अनुसार घोलको मात्र बढी वा कम प्रयोग गर्नु पर्दछ । हर्मोनको प्रयोग गर्दा माटोमा चिस्यान हुनु जरुरी हुन्छ ।

गमलामा क्याला लिली लगाउने चरणहरु


गमलाको छनोट


गमलामा मिश्रण भर्ने


गानो रोपण


गानोलाई मिश्रणले छोपेको


गमलालाई प्लाष्टिकले ढाक्ने


गानो उम्रन थालेको


हर्मोन प्रयोग गर्ने अवस्था


हुर्कदै गरेको अवस्था


तयार अवस्थाको गमला

सिंचाई

गानो रोपेको ३ हप्तासम्म माटोमा चिस्यान बढी हुनु हुँदैन । चिस्यान धेरै भएमा गानो कुहिन सक्छ । जराको विकास नभएसम्म विस्वाले पानी नलिने भएको हुँदा पानी ठिक्क मात्र हुनु पर्दछ । यदि गमलालाई प्लाष्टिक सीटले छोपेको छ भने पानी दिई रहनु पर्दैन । प्लाष्टिकले छोपेको छैन भने गानो सुक्न नपाउने हिसाबले मात्र थोरै थोरै पानी दिनु पर्दछ । गानो उम्रिसके पछि भने माटोको अवस्था हेरी पानी दिनु पर्दछ । गमलामा पानी हाल्ने सही समय विहानीपख हो । यदि घाम नलागेको दिन छ भने सिंचाई पनि कम गर्नु पर्दछ ।

मलखाद

गानो रोपेको ३ हप्तापछि मलखाद दिन शुरु गर्नु पर्दछ । यसको लागि हप्ताको १ पटक एन.पी.के. (१९:१९:१९) १ ग्राम प्रति लिटर पानी, १ पटक क्याल्सियम नाइट्रेट १ ग्राम प्रति लिटर पानी तथा १ पटक

पोटासियम सल्फेट १ ग्राम प्रति लिटर पानीको दरले झोल मलको स्प्रमा प्रयोग गर्नु पर्दछ । त्यसैगरी १५ दिनमा १ पटक मल्टिप्लेक्स १ मि.लि. प्रति लिटर पानीको दरले हाल्नु पर्दछ । झोलमल प्रयोग गर्दा विरुवाको माथि नपर्ने गरी माटोमा हाल्नु पर्दछ ।

कट फ्लावर उत्पादन

क्याला लिलीको खेती कट फ्लावर उत्पादन गर्ने उद्देश्यले समेत गर्न सकिन्छ । यसको लागि हलुका तर चिस्यान रहने किसिमको माटो उपयुक्त हुन्छ । पानी जम्ने जमीन यसको खेतीको लागि राम्रो हुँदैन । यदि माटो चिम्ट्याइलो खालको छ भने अग्लो ड्याङ बनाउनु पर्दछ । माटोको पी.एच. ५-६.५ र ई.सि. १.५ भन्दा कम हुनु पर्दछ । कट फ्लावर खेतीको लागि जमीन तयार गरिसकेपछि माथि गमलाको लागि गरे जस्तै सिल्भर हाइड्रोजन पेरोक्साइडको घोल तयार गरी माटो निर्मलिकरण गर्नु पर्दछ । गानो रोप्दा गानो देखि गानोको दुरी १५ से.मी र लाइन देखि लाइनको दुरी २०-३० से.मी. हुने गरी रोप्नु पर्दछ । गानोको साइज ठूलो छ भने केही टाढा लगाउन सकिन्छ । यसरी रोप्दा १ वर्ग मी. जमीनमा २० देखि ३५ वटा ४-६ से.मी. साइजको गानो आवश्यक पर्दछ ।

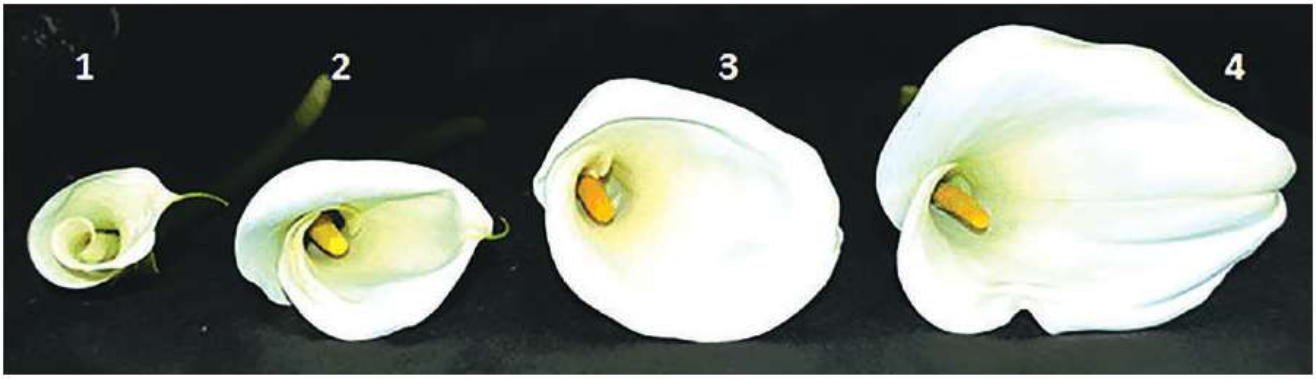
गानो रोपेपछि जमीन राम्ररी भिज्ने गरी सिंचाई गरिदिनु पर्दछ र यदि ग्रीनहाउस भित्र खेती गरिएको हो भने हावाको तापक्रम १५-२५° से. र माटोको तापक्रम २०° से. भन्दा माथि नजाने व्यवस्था गर्नु पर्दछ । हिउँदको बेला घाम प्रशस्त लाग्ने र गर्मीको समयमा सेड नेटको व्यवस्था गर्नु पर्दछ । हावाको आद्रता ६०-७५% कायम गर्नु पर्दछ । ६०% भन्दा कम भएमा फोगर वा मिष्ट चलाउनु पर्दछ भने ७५% भन्दा बढी भएमा सर्कुलेटरी फ्यान चलाउनु पर्दछ ।

मलखाद

क्याला लिलीमा मलखाद प्रयोग गर्दा नाइट्रोजन धेरै प्रयोग गर्नु हुँदैन । यसको लागि नाइट्रोजन भन्दा पोटास बढी महत्वपुर्ण हुन्छ । त्यसकारण मल हाल्दा नाइट्रोजन र पोटासको ब्यालेन्स मिलाउनु पर्दछ । कट फ्लावरको लागि क्याला लिलिको खेती गर्दा जमीन तयार गर्दा प्रशस्त मात्रामा कम्पोष्ट मल हाल्न सकेमा पछि रासायनिक मल नराख्दा पनि हुन्छ । रासायनिक मल प्रयोग गर्ने हो भने गानो रोपेको ३ हप्ता पछि गमलामा जस्तै १९:१९:१९, क्याल्सियम नाइट्रेट र पोटासियम सल्फेट १ ग्राम प्रति लिटर पानीमा मिसाई थोपा सिंचाईबाट दिन सकिन्छ ।

फूल टिप्ने

फूलले पूर्ण आकार लिएर केही खुलिसकेपछि तथा राम्ररी रङ्गको विकास भएपछि टिप्नु पर्दछ । तलको चित्रमा फूलको विभिन्न चरणहरु देखाइएकोमा नं ३ मा देखाइएको दुई तिहाई फूल खुलेको अवस्था नै यसको टिपाई गर्ने ठीक अवस्था हो । यो बेला फूलको बीचमा भएको पहेंलो परागकण भएको भाले अङ्ग स्पष्ट देखिएको हुन्छ । टिपाई गर्दा एकाबिहानै गर्नु पर्दछ । बिहान एक पटक हल्का सिंचाई गरेपछि फूल टिप्न सजिलो हुन्छ । फूल टिप्दा फूलको डाँठलाई समाएर हलुकासँग तान्दा सजिलै चुँडिएर आउँछ । फूल टिप्ने बित्तिकै त्यसलाई क्लोरिनयुक्त सफा पानीमा डाँठको टुप्पा डुबाएर राख्नु पर्दछ । त्यसपछि यसलाई ९-१३° से. तापक्रममा केही समय भण्डार गर्नु पर्दछ र लम्बाई एकनास हुने करी डाँठ काटेर मुठा बनाउनु पर्दछ । कट फ्लावरलाई पछिसम्म भण्डार गर्न डाँठलाई क्लोरिनयुक्त पानीमा डुबाएर ६-९° से. मा भण्डार गर्नु पर्दछ । यसरी भण्डार गर्दा १५ दिनसम्म राख्न सकिन्छ । यद्यपी क्याला लिलीलाई लामो समयसम्म राख्दा यसमा हरियोपनाको विकास हुन थाल्दछ ।



फूलका विभिन्न चरणहरु

गानो उत्पादन र भण्डारण

क्याला लिली झण्डै २-३ महिनासम्म फूलिरहन्छ । यो बेलामा आवश्यकता अनुसार सिंचाई गरिरहनु पर्दछ । जब विरुवा पहेंलो भएर सुकेर मर्न थाल्दछ तब पानी दिन बन्द गर्नु पर्दछ । त्यसपछि लगभग १ महिना जति बोटलाई त्यतिकै छाडिदिनु पर्दछ । बिरुवा पुरै सुकेपछि चोटपटक नलाग्ने गरी गाना जमीनबाट निकाल्नु पर्दछ र ३ दिन जति न्यानो र सुख्खा हावा लाग्ने ठाउँमा सुक्नलाई छाडिदिनु पर्दछ । गानो राम्ररी सुकेपछि त्यसलाई अध्यारो स्थानमा १२° से. तापक्रममा भण्डार गर्नु पर्दछ ।

रोगहरु

क्याला लिलीमा Erwinia carotovora नामक ब्याक्टेरियाको कारण लाग्ने सफ्ट रट मूख्य रोगहरु मध्येमा पर्दछ । रोगग्रस्त पात र डाँठ पानीले भिजेको जस्तो देखिन्छ । बोटको फेदमा र गानोमा रोगले बढी आक्रमण गर्दछ । पात र डाँठ गाडा हरियो हुन्छन् र ओइलाउन थाल्दछन् । पछि पहेंलो भएर सुकेर जान्छन् । यस रोगको रोकथाम र नियन्त्रणको लागि रोप्ने गानाहरु चोटपटक नलागेको छनौट गर्ने, निर्मलिकरण गरेको माटोमा मात्र लगाउने र नाइट्रोजनयुक्त मल बढी प्रयोग गर्नु हुँदैन ।

सफ्ट रट रोग लागेको फूल

कीराहरु

यस फूलमा खासै कीराहरूले दु:ख दिएको पाइएको छैन । थ्रीप्स र लाही कीराको समस्या कहिलेकाँही देखिने गर्दछ । यसको लागि बगैंचाको सरसफाई गर्ने नियमित गोडमेल गर्ने र रासायनिक विषादी प्रयोग गर्नु परेमा थ्रीप्सको लागि इमामेक्टिन बेन्जोयट झोल १ मि.लि. वा धुलो ०.५ ग्राम प्रति लिटर पानीमा मिसाई स्प्रे गर्नु पर्दछ । लाहीको लागि इमिडाक्लोप्रिड ०.५ मि.लि. प्रति लिटर पानीमा मिसाई स्प्रे गर्नु पर्दछ ।

सन्दर्भ सामाग्रीहरु

Aitken, A.G., J.P. Kerr, C. Nixon, E.W. Hewett and C.N. Hale. 2023. Calla lilies (Zantedeschia) – a novel export flower crop with a global impact. Growing features case study series. NZ Institute for Economic Research Martech Consulting Group Ltd. Auckland, New Zealand.

Garner, J. 1999. Calla lilies for cut flowers and pots. Southeastern Floriculture. 51-53.

Janowska, B. and R. Andrzejak. 2022. Cytokinins and gibberellins stimulate the flowering and post-harvest longevity of flowers and leaves of Calla Lilies (Zantedeschia Spreng.) with colourful inflorescence spathes. Agronomy. 12:1-15.

Kumar, A., S. Singh, B. Bhargav, R.K. Sharma and R.K. Sud. 2016. Calla lily cultivars. CSIR- Institute of Himalayan Bioresource Technology. Palampur. India.

Schoellhorn, R. 2023. Warm Climate Production Guidelines for Zantedeschia (Calla Lily) hybrids. Commercial Floriculture Update. University of Florida. IFAS. USA.

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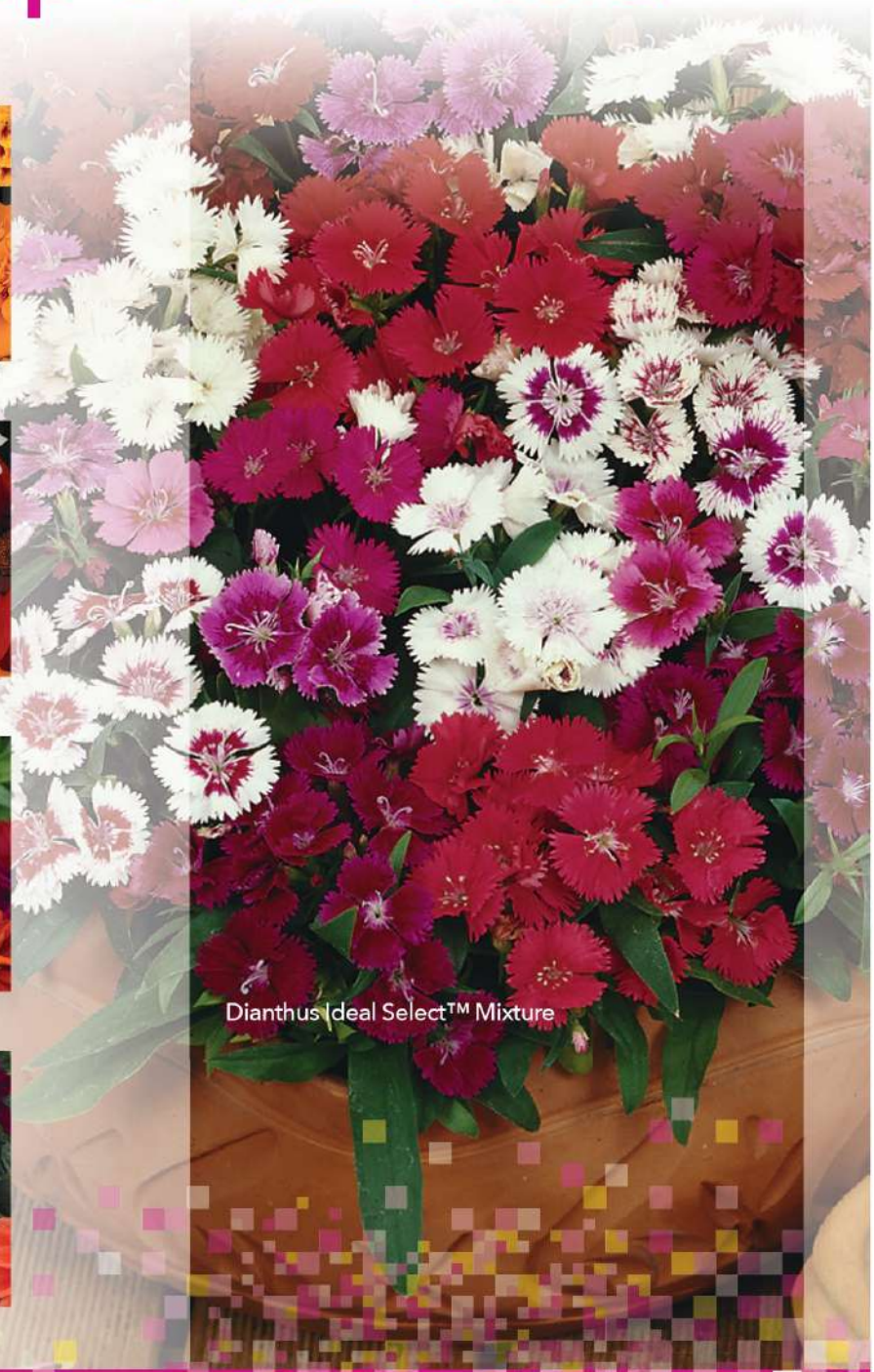

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