

ISSN 0973-354X  
eISSN 2582-4899

# JOURNAL OF HORTICULTURAL SCIENCES

Volume 15

December 2020

Number 2



Conserving Honey Bees with Forage Plant Mexican Creeper - *Antigonon leptopus*



**Society for Promotion of Horticulture**  
ICAR - Indian Institute of Horticultural Research, Bengaluru - 560 089



# JOURNAL OF HORTICULTURAL SCIENCES

(Founded in 2005 by the Society for Promotion of Horticulture, Bengaluru, India)

Email : [chiefeditor.jhs@gmail.com](mailto:chiefeditor.jhs@gmail.com) Webpage : <https://jhs.iihr.res.in/index.php/jhs>

## Editor-in-Chief

Dr. S. Sriram

## Editors

Dr. K. Himabindu

Dr. G. Senthilkumaran

Dr. Tejaswini Prakash

Dr. M. Manamohan

Dr. Anil Kumar Nair

Dr. J. Satisha

Dr. P. Venkata Rami Reddy

Dr. I.M. Doreyappa Gowda

Dr. R.H. Laxman

Dr. G.C. Sathisha

## Editorial Advisory Board

### International Editorial Advisory Board

Dr. Nanthi S. Bolan, Australia

Dr. Rod Drew, Australia

Dr. J. Mithila, USA

Dr. Claus Helmut Franz Orth, South Africa

Dr. Ilan Paran, Israel

Dr. Gi-Cheol Song, Republic of Korea

Dr. Jill Stanley, New Zealand

Dr. Palitha Weerakkody, Sri Lanka

### National Editorial Advisory Board

Dr. S. D. Shikhamany

Dr. V. A. Parthasarathy

Dr. K. V. Peter

Dr. Sisir K. Mitra

Dr. S.K. Tikoo

Dr. Seetharam Annadana

Dr. A. Krishnamoorthy

Dr. Leela Sahijram

## SOCIETY FOR PROMOTION OF HORTICULTURE (REGD.)

Email : [sphihr2005@gmail.com](mailto:sphihr2005@gmail.com) Website : [www.sphindia.org](http://www.sphindia.org)

### Executive Council - 2020

**President** : Dr. M.R. Dinesh

**Vice Presidents** : Dr. G. S. Prakash  
Dr. T.N. Shivananda

**General Secretary** : Dr. C. Aswath

**Editor-in- Chief** : Dr. S. Sriram

**Treasurer** : Dr. D.V. Sudhakar Rao

**Joint Secretaries** : Dr. P.C. Tripathi  
Dr. T.H. Singh

**Members** : Dr. T.S. Aghora  
Dr. K.S. Shivashankara  
Dr. Prakash Patil  
Dr. H. S. Oberoi  
Dr. C.K. Narayana  
Dr. B. Narayanaswamy  
Dr. B. Hemla Naik  
Dr. L.N. Mahawer  
Dr. Sanjay Kumar Singh  
Dr. S.K. Mitra  
Dr. S. Hazarika  
Dr. Gobind Acharya

**This Journal is abstracted in CABI, Current Contents, AGRIS, Indian Science Abstracts, Scopus, DOAJ and Redalyc. It is a participant of AmeliCA.**

Request for membership subscriptions along with cheque/DD drawn in favour of **Society for Promotion of Horticulture, Bengaluru** may be sent to General Secretary, Society for Promotion of Horticulture, Indian Institute of Horticultural Research, Hessaraghatta Lake Post, Bengaluru - 560 089, India. All members except student members and subscribers get all publications of SPH free of cost. Any correspondence other than editorial may be addressed to General Secretary, Society for Promotion of Horticulture, Indian Institute of Horticultural Research, Hessaraghatta Lake Post, Bengaluru - 560 089, India.

Advertising space in the journal is available. For information and rates, please contact General Secretary, SPH, IIHR, Bengaluru - 560 089, India. Advertising material should cater to the interest of researchers, subscribers, etc. who are involved in promotion of horticulture. Publication of advertisement is not an endorsement or approval, expressed or implied by the SPH or the editors of any service, product or claim made by the manufacturer.

Coverpage Courtesy : **Rami Reddy P.V.**, P.No. 225

### SUBSCRIPTION RATES

|                     |  |
|---------------------|--|
| Patron              | ₹ 20,000   |
| Life member         | ₹ 5,000  |
| Annual Member       | ₹ 1,000 / US \$ 100 (US \$ 50 for SAARC countries)                       |
| Student Member      | ₹ 500  |
| Student Life Member | ₹ 3,000  |
| Annual Subscription | ₹ 1,500 / US \$ 100 (US \$ 60 for SAARC countries)<br>(for institutions) |
| Enrolment Fee       | ₹ 200 / US \$ 5 (Additional for all types of Membership)                 |

**NAAS rating of this journal is 3.43. JHS is now available online.  
Authors have to submit manuscripts using the link : <https://jhs.iihr.res.in/index.php/jhs>**

*Technical Assistance : Dr. Sridhar Gutam, Thippeswamy S. and Pramida A.*

# JOURNAL OF HORTICULTURAL SCIENCES

Volume 15

Number 2

December 2020

## CONTENTS

### ***In this Issue***

i-ii

### ***Review***

- Biodiversity of tropical fruits and their conservation in India** 107-126  
Sankaran M. and Dinesh M.R.
- An overview of canopy management in cashew (*Anacardium occidentale* L.)** 127-135  
Adiga D.J., Veena G.L., Thondaiman V. and Babli M.

### ***Original Research in Papers***

- Phenotypic variability for horticultural and fruit quality attributes in plastic house grown tomato** 136-146  
Adeniji O.T., Tenebe A.V., Ishaka A., Jandong E., Adamu J.T., Adekoya M., Zamzam M.A. and Aremu C.A
- Development and evaluation of novel gladiolus hybrid selections IHRG-7 (IC620379) and IHRG-11 (IC620380) for flower quality and *Fusarium* wilt resistance** 147-152  
Rao T.M., Janakiram T., Negi S.S., Aswath C., Dhananjaya M.V., Kumar R. and Ramachandran N.
- Evaluation of potassium salt of phosphonic acid in Nagpur mandarin with special reference to *Phytophthora* management** 153-160  
Ingle Y.V., Paithankar D.H., Sadawarte A.K. and Bhonde S.R.
- Genetic analysis in mango (*Mangifera indica* L.) based on fruit characteristics of 400 genotypes** 161-172  
Sankaran M., Dinesh M.R., Gowda D.C.S. and Venugopalan R.
- Standardization of nitrogen application for potted *Chrysanthemum morifolium* cv. kikiobiory** 173-176  
Tanya Thakur
- Influence of inorganic nutrients on growth, flowering and quality of *Dendrobium* cv. Singapore white** 177-182  
Sujatha A. Nair, Sankar V., Muralidhara, B.M., Awcharae C.M. and Singh D.R.
- Palynological investigations in *Jasminum* spp.** 183-190  
Ganga M., Lakshmi J., Manivannan N. and Rajamani K.



- Effect of putrescine and benzyl adenine on growth, flowering and post-harvest keeping quality parameters in chrysanthemum (*Chrysanthemum morifolium ramat*)** 191-196  
Taranjit Singh and Madhu Bala
- Studies on bioavailability of iron from fe-fortified commercial edible mushroom *Hypsizygusulmarius* and standardization of its delivery system for human nutrition** 197-206  
Pandey M., Gowda N.K.S., Satisha G.C., Azeez S., Chandrashekara C., Zamil M. and Roy T.K.
- Amino acid profile of eighteen isolate of different edible macrofungal species** 207-220  
Azeez S., Pandey M., Jasmin M.R., Rachitha R., Satisha G.C., Roy T.K.  
Chandrashekara C. and Shivashankara K.S.

### **Short Communications**

- A promising new tamarind selection-lakshamana : Linking biodiversity with livelihood** 221-224  
Kanupriya C., Karunakaran G. and Singh P.
- Mexican creeper, *Antigonon leptopus* Hook. and Arn : An effective bee forage plant to conserve honey bee** 225-228  
Rami Reddy P.V.
- First report on honeydew excretion by the melon thrips, *Thrips palmi* karny (Thysanoptera : Thripidae) and its biochemical analysis** 229-232  
Aravintharaj R., Asokan R. and Roy T.K.
- Influence of potting mixture on growth and economics of stone graft of mango cv. alphonso** 233-237  
Lad O.A., Kulkarni M.M., Ragaji S.G., Gavankar M.S., Burondkar M.M., Gokhale N.B.  
Pawar C.D., Khandekar R.G., Kshirsagar P.J. and Desai V.S.

## ***In this issue...***

### ***Hearty New Year Greetings from our Editorial Team to all the readers of JHS!***

*As the world is slowly coming out of glitches of pandemic, there is no other better way than celebrating 2021 as Year of Fruits and Vegetables as announced by United Nations Assembly to welcome the new year and recognize the importance of nutrition for better health. Fruits and Vegetables ensure the Nutritional Security to humankind. They play key role in addressing the malnutrition that is a major concern. We are proud that JHS creatins awareness of importance of fruits and vegetables by publishing the recent developments in research with respect to these crops.*

*Diversity of fruit crops and genetic resources available with respect to fruit crops are important for developing better fruit crop varieties. **Sankaran and Dinesh** have reviewed the “Biodiveristy of Fruit Crops in India” in a very comprehensive way. There is diversity in Jasmine species. **Ganga et al.** carried out the palynological investigations and recorded the variability in pollen morphology in different species of Jasmine by documenting images using scanning electron microscope. Biodiversity can be linked to livelihood also. One such success story with tamarind selection ‘Lakhamna’ is being reported by **Kanupriya et al.** This tamarind selection has been identified from participatory breeding programme. It has a better pod characters and more preferred by consumers.*

*Protected cultivation has seen greater momentum in last two decades. **Adeniji et al.** identified the best varieties of tomato for polyhouse cultivation in Nigeria. **Rao et al.** selected two gladiolus hybrid selections IIHRG-7 and IIHRG-11 with red purple and red coloured flowers respectively. These hybrids have resistance to Fusarium wilt and suitable for cut flower and flower arrangement purposes. **Sankaran et al.** analysed the variance for 6 quantitative and 30 qualitative traits in mango in 400 genotypes and identified 18 clusters. Selected genotypes from specific clusters can be used in hybridization programme.*

*The production aspects are important in perennial crops. It is crop management that needs to be prioritized for enhanced yield. **Adiga et al.** have reviewed the research work carried in “Canopy Management in Cashew”, providing the wholistic view of cultural operations to have a better crop. Use of soilless medium in nursery industry is gaining importance. Best suited potting mixture for mango stone graft of cv. Alphonso has been identified by **Lad et al.** They found that cocopeat + leaf manure + compost (1:1:2) as pot mixture provided better plant growth.*

*Growing Chrysanthemum in pots is practiced in home and terrace gardens. The cultivar Kikiobiory is well suited for this purpose. **Thakur** has studied the nitrogen requirement for this cultivar and has come out with the recommendation of 300 mg of N per pot applied*



twice in September and October in Punjab for best results. In another study, **Singh and Bala** confirmed that use of benzyl adenine at 200 ppm helped in extended vase life of *Chrysanthemum morifolium* flowers. **Nair et al.** recorded that foliar spray of 30:20:20 NPK at weekly interval recorded more number of flowers of *Dendrobium* cv. Singapore White with significantly longer spikes.

Crop production is directly influenced by pollinators. Decline in honey bee population is a serious concern and to conserve the pollinators community approach through ecosystem services is required. **Rami Reddy** reports the benefits of having ornamental plant Mexican Creeper (*Antigonon leptopus*) as forage plant. This creeper attracted all the four species of honey bees studied. This creeper can be used as bioindicator of honey bee population.

**Aravindaraj et al.** have reported the honey dew secretion by *Thrips palmi* and analysed the composition of it. They had identified different sugars present in the honey dew secretion of *Thrips*. *Thrips* not only cause direct damage but act as vectors of many plant viruses. Management of diseases in perennial crops is a challenge. *Phytophthora* incited root infection in citrus needs concerted efforts. **Ingle et al.** have demonstrated that use of potassium salt of phosphonic acid could help in management of *Phytophthora* root rot in Nagpur Mandarin.

Mushrooms can fill the gaps in nutritional security as they are rich in nutritive value. Iron deficiency is important issue to be addressed. Iron fortified oyster mushroom products have been developed by **Pandey et al.** The bioavailability of iron from Arka Mushroom Fe-Fortified Rasam Powder has been confirmed. In another study, the amino acid profile of 18 isolates of oyster mushroom species belonging to 4 species have been documented by **Azeez et al.** Quantification of essential and non-essential amino acids has been reported. Nutritionally superior isolates can be selected from these isolates.

The editorial team of JHS expresses the sincere efforts of reviewers who really complement the publication processes. All scientists and scholars can utilize the open access of JHS. Recently FAO has made JHS available through AGRIS. It is indexed by Redalyc, CABI\_Hort and Scopus. All subscribers, scientists and scholars are requested to continue their support in publishing quality information in **Journal of Horticultural Sciences**.

**S. Sriram**  
Editor in Chief

**Short Communication**

**Influence of potting mixture on growth and economics of stone graft of mango cv. alphonso**

**Lad O.A., Kulkarni M.M. \*, Ragaji S.G., Gavankar M.S., Burondkar M.M., Gokhale N.B., Pawar C.D., Khandekar R.G., Kshirsagar P.J. and Desai V.S.**

Department of Horticulture, College of Agriculture, Dr. B. S. K. K. V. Dapoli,  
Dist. Ratnagiri, Maharashtra, India.

\*Corresponding author Email : maheshmkulkarni@rediffmail.com

**ABSTRACT**

Konkan is considered as an important mango belt of India. This belt is not only famous for production of king of mango 'Alphonso' but also for supply of quality planting material throughout the country. Soil is the basic medium used in nursery. Availability of quality soil for nursery is getting scared and it is need of the hour to find out light-weight, well aerated media for reducing transport cost and mortality. Hence field experiment was carried out to find the response of mango cv. Alphonso stone grafts in different potting mixture. The treatment cocopeat + leaf manure + compost (1:1:2) was recorded significant increase in plant height (129.40%), girth of grafts (38.08%), highest number of shoot (1.50), number of leaf (22.70), highest absolute growth rate (0.1483 cm/day) and relative growth rate (0.0237 cm/cm/day). Whereas, maximum leaf area (617.03 cm<sup>2</sup>) was obtained in soil + leaf manure (1:1) followed by leaf manure + cocopeat (1:3) (610.17 cm<sup>2</sup>) leaf manure + cocopeat (1:3). Maximum root length (21.97 cm) and dry weight of root (7.23g) was obtained in treatment cocopeat + leaf manure + compost (1:1:1). Economics involved for different treatments showed that cocopeat + leaf manure + compost (1:1:2) was recorded with highest B:C (1.39) followed by Soil + Cocopeat (1:1) in stone grafting. From the above investigation, it is concluded that potting mixture had significant effect on growth performance and economics of mango grafts. For raising of mango grafts, the media containing cocopeat along with leaf manure and compost was the ideal soilless media.

**Key words:** Alphonso, B:C ratio, Growth parameters, Mango and Soilless media

Mango (*Mangifera indica* L.) is highly demanded fruit of all class and masses occupy a unique place among the fruits in world. Due to rise in demand from all parts of world for mango and mango based products, area is increasing. Demand for quality planting material of mango has increased in recent years due to adoption of high density planting by farmers. Media play major role in quality production of grafts. Konkan region is not only supplying mango grafts but also supplying other fruits and spices grafts to various parts of India. Demand for basic media i.e. soil is very high in this region. The area is also blessed with large forest and coconut plantation through which leaf manure and cocopeat can be prepared which can be used as light weight media. Considering future opportunity for soilless nursery, the present study was

undertaken to understand influence of different potting mixture on survival, growth performance and economics of mango stone grafts.

The present study on influence of different potting media on growth and economics of mango stone graft was carried out at Department of Horticulture, College of Agriculture Dr. B. S. K. K. V. Dapoli, Dist. Ratnagiri (M. S.), India. The experiment was conducted in randomized block design with ten treatments and three replications. The 10 treatments consist of control ( Soil + FYM 3:1), Soil + Single Super Phosphate + Rice husk + Organic manure (55:15:15:15), leaf manure (100%), cocopeat (100%), Soil + Leaf manure (1:1), Soil +Cocopeat (1:1), Leaf manure + Cocopeat (1:1), Leaf manure + Cocopeat (1:3), Cocopeat + Leaf manure + Compost (1:1:1) and



Cocopeat + Leaf manure + Compost (1:1:2). In this experiment morphological parameters such as plant height (cm), girth of graft (mm), number of shoots, number of nodes, number of leaves, leaf area (cm<sup>2</sup>), absolute growth rate on height basis (cm/day), relative growth rate on height basis (cm/cm/day), root length (cm) and dry weight of root (g) were recorded, influenced by different potting media. Statistical analysis of the data was carried out by standard method of analysis of variance as given by Panse and Sukhatme (1995). On the basis of survival and final sale of grafts at the end of experiment, net profit and B:C were calculated.

At the end of experiment the per cent increase in plant height was found higher in treatment T<sub>10</sub>: cocopeat + leaf manure + compost 1:1:2 (129.40%), at par with T<sub>9</sub>: cocopeat + leaf manure + compost 1:1:2 (120.64%) which found superior over rest of the treatments. The lower per cent increase in plant height was recorded in treatment T<sub>1</sub> control: soil + FYM 1:3 (105.03%). Similar findings were reported by Parasana *et al.* (2013) in growing media containing soil + sand + FYM (2:1:1) for khirni, Kurava (2015) in soil, FYM and fertilizer media in mango and Ragaji (2017) in media containing soil + cocopeat (1:1) followed by soil + leaf manure + cocopeat (1:1:1). Similarly, significantly highest per cent increase in plant girth was found in treatment T<sub>10</sub> (38.08%) which was at par with T<sub>6</sub>: soil + cocopeat 1:1 (37.19%). The lowest per cent increase in plant girth was found in treatment T<sub>5</sub>: soil + leaf manure 1:1 (23.83%). Grafts containing media mixture with proper aeration, moisture and substantial amount of nutrients, facilitate root absorption for formation of photosynthesis. It helped in cell division, cell elongation and adequate water supply resulted in increase in per cent of girth of grafted plants. Similar findings were reported by Bachubhai (2005) for mango seedling in soil (40%): sand (40%): FYM (20%) and Ragaji (2017) in soil + cocopeat (1:1) for mango.

At 180 days after grafting (DAG), the statistically maximum number of shoot was recorded in treatment cocopeat + leaf manure + compost 1:1:2 (1.50). The minimum number of shoot was recorded in cocopeat 100% (1.27). This was due to availability of moisture and nutrient through media (Ikram *et al.* 2012) resulted in increasing morphological characters like height, girth and number of shoots. The treatment cocopeat + leaf manure + compost 1:1:1 was

recorded maximum number of nodes (2.20) which was found superior over rest of the treatments at the end of experiment. The minimum number of nodes was recorded in treatment T<sub>1</sub> (soil + FYM 3:1) (1.45). Similarly, the leaf area was recorded maximum in treatment soil + FYM 1:1 (617.03 cm<sup>2</sup>) the minimum leaf area recorded in treatment soil + FYM 3:1 (538.55 cm<sup>2</sup>). Soilless media is light in weight and porous (Wilson, 1983) with low salt content, good water holding capacity and ion exchange capacity with optimum pH produced maximum number of nodes. Similar findings were reported by Kurava (2015) in media containing soil, FYM and fertilizer for mango and Kelkar (2016) in top soil + FYM + Vermiphos media for mango cv. Alphonso. At the end of experiment, highest number of leaves was observed in treatment T<sub>10</sub> which consists of cocopeat + leaf manure + compost (1:1:2) (22.70) while the lowest number of leaves was observed in control treatment Soil + FYM (1:3) (15.22) followed by T<sub>8</sub> (16.17). Similar findings were also reported by Waseem *et al.* (2013) in soil + leaf mold + coconut husk (33:33:33) and Ragaji (2017) in media containing leaf manure.

At 180 DAG, absolute growth rate (AGR) on height basis was highest in treatment (T<sub>10</sub>). cocopeat + leaf manure + compost 1:1:2 (0.1483 cm/day) while lowest AGR was recorded in treatment (T<sub>9</sub>) cocopeat + leaf manure + compost 1:1:1 (0.0048 cm/day). The highest relative growth rate (RGR) on height basis was obtained in treatment (T<sub>10</sub>) cocopeat + leaf manure + compost 1:1:2 (0.0237 cm/cm/day) whereas lowest RGR was obtained in treatment (T<sub>1</sub>) soil + FYM (0.0208 cm/cm/day). Similar finding was reported by Kelkar (2016) in top soil + FYM + Vermiphos media for mango and Ragaji (2017) for mango stone grafting in soil + leaf manure (1:1).

At the end of the sixth month, the root length was significantly influenced by the different treatments. The highest root length was recorded in the treatment T<sub>9</sub> (21.97) cocopeat + leaf manure + compost 1:1:1 which was at par with T<sub>2</sub> (20.20 cm) soil + SSP + rice husk + cocopeat (55:15:15:15). The lowest root length was recorded in T<sub>5</sub> (14.57) soil + leaf manure (1:1) which was at par with T<sub>8</sub> (16.37) i.e. leaf manure + cocopeat (1:3). Similar findings were reported by Khot (2017) for bullock's heart in soil + FYM (2:1) and Ragaji (2017) for mango stone grafting in soil + cocopeat (1:1) and leaf manure + cocopeat (1:3) media.





Table No.1: Effect of different potting mixture on morphological characters and B:C

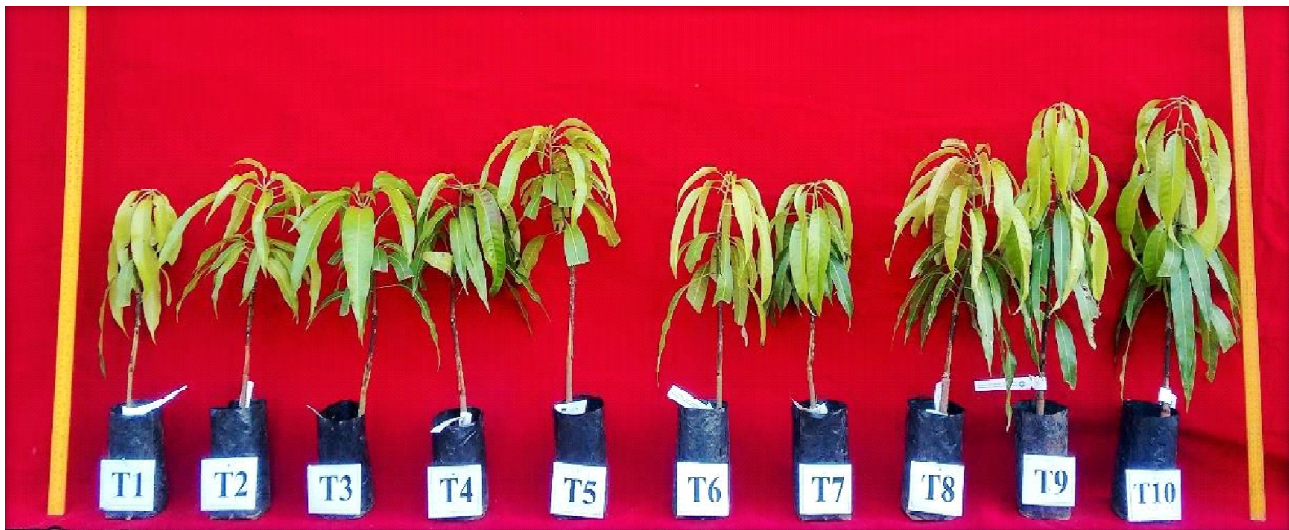
| Treat-ments       | Plant height (cm) | Girth of graft (mm) | Number of shoot | Number of Node | Number of leaves | Leaf area (cm <sup>2</sup> ) | Absolute growth rate (cm/day) | Relative growth rate (cm/day) | Root length (cm) | Dry weight of root (g) | Survival (%)     | Net profit (Rs) | B:C  |
|-------------------|-------------------|---------------------|-----------------|----------------|------------------|------------------------------|-------------------------------|-------------------------------|------------------|------------------------|------------------|-----------------|------|
| T <sub>1</sub>    | 25.68<br>(105.03) | 7.90<br>(29.78)     | 1.45            | 1.45           | 15.52            | 538.55                       | 0.0496                        | 0.0208                        | 18.20            | 4.73                   | 37.33<br>(37.66) | 3.5             | 1.00 |
| T <sub>2</sub>    | 26.38<br>(115.90) | 8.46<br>(32.37)     | 1.33            | 1.70           | 18.07            | 585.58                       | 0.0648                        | 0.0223                        | 20.20            | 6.12                   | 50.67<br>(45.38) | 334.8           | 1.17 |
| T <sub>3</sub>    | 27.43<br>(106.08) | 7.69<br>(26.07)     | 1.30            | 1.78           | 16.92            | 565.62                       | 0.1089                        | 0.0209                        | 16.80            | 2.69                   | 36.00<br>(36.87) | 225.5           | 1.16 |
| T <sub>4</sub>    | 26.61<br>(107.46) | 7.73<br>(27.14)     | 1.27            | 1.67           | 17.33            | 564.02                       | 0.0849                        | 0.0212                        | 19.20            | 3.74                   | 49.33<br>(44.62) | 278.7           | 1.14 |
| T <sub>5</sub>    | 28.25<br>(115.90) | 8.27<br>(23.83)     | 1.37            | 1.60           | 18.32            | 617.03                       | 0.1383                        | 0.0223                        | 14.57            | 5.68                   | 46.67<br>(43.09) | 388.5           | 1.23 |
| T <sub>6</sub>    | 26.39<br>(116.48) | 7.88<br>(37.19)     | 1.47            | 1.73           | 18.13            | 570.03                       | 0.0658                        | 0.0225                        | 18.53            | 5.69                   | 52.00<br>(46.15) | 509.8           | 1.28 |
| T <sub>7</sub>    | 25.95<br>(111.03) | 8.09<br>(26.61)     | 1.42            | 1.53           | 16.53            | 608.58                       | 0.0082                        | 0.0216                        | 18.03            | 5.17                   | 37.33<br>(37.66) | 47.3            | 1.03 |
| T <sub>8</sub>    | 27.89<br>(116.86) | 8.57<br>(33.38)     | 1.48            | 2.02           | 16.17            | 610.17                       | 0.1253                        | 0.0222                        | 16.37            | 4.69                   | 41.33<br>(40.01) | 48.6            | 1.03 |
| T <sub>9</sub>    | 28.15<br>(120.64) | 8.23<br>(29.29)     | 1.38            | 2.20           | 17.98            | 576.59                       | 0.0048                        | 0.0228                        | 21.97            | 7.23                   | 42.67<br>(40.78) | 273.5           | 1.17 |
| T <sub>10</sub>   | 29.77<br>(129.40) | 8.69<br>(38.08)     | 1.50            | 1.95           | 22.70            | 595.61                       | 0.1483                        | 0.0237                        | 19.53            | 6.85                   | 50.67<br>(45.38) | 634.7           | 1.39 |
| <b>Mean</b>       | <b>114.58</b>     | <b>30.38</b>        | <b>1.390</b>    | <b>1.763</b>   | <b>17.77</b>     | <b>583.18</b>                | <b>0.0799</b>                 | <b>0.0220</b>                 | <b>18.34</b>     | <b>5.29</b>            | <b>44.40</b>     | -               | -    |
| <b>S.E.±</b>      | <b>3.33</b>       | <b>1.28</b>         | <b>0.011</b>    | <b>0.024</b>   | <b>0.20</b>      | <b>12.31</b>                 | <b>0.00</b>                   | <b>0.00</b>                   | <b>0.64</b>      | <b>0.42</b>            | <b>0.68</b>      | -               | -    |
| <b>C.D. at 5%</b> | <b>9.89</b>       | <b>3.81</b>         | <b>0.034</b>    | <b>0.072</b>   | <b>0.59</b>      | <b>36.57</b>                 | <b>0.00</b>                   | <b>0.00</b>                   | <b>1.92</b>      | <b>1.25</b>            | <b>2.04</b>      | -               | -    |

(Value in parenthesis indicates per cent increase in plant height and girth and arcsine in survival)

The maximum dry weight of root was obtained in the treatment T<sub>9</sub> (7.23) cocopeat + leaf manure + compost (1:1:1) which was at par with T<sub>10</sub> (6.85) cocopeat + leaf manure + compost (1:1:2) and T<sub>2</sub> (6.12) soil + SSP + rice husk + cocopeat (55:15:15:15). The lowest root length was obtained in T<sub>3</sub> (2.69) leaf manure 100% which was at par with T<sub>4</sub> (3.74) cocopeat 100%. Similar findings were reported by Panchal *et al.* (2014) for khirmi seedlings in soil + cocopeat + FYM (1:1:1) and Ragaji (2017) for mango graft in soil + cocopeat (1:1) media.

The benefit cost ratio (B:C) for mango stone grafts raised in different potting media was shown in Table No. 1. Net profit was calculated on the basis of expenditure incurred and income received from total number of mango grafts survived and sold at the end

of experiment. Media mixture Soil: cocopeat (1:1) recorded significantly maximum 52 % survival with 1.29 B:C with net profit of Rs. 509.80 followed by 50.67 % survival in T<sub>10</sub> (cocopeat + leaf manure+compost 1:1:2) and T<sub>2</sub> (soil + SSP + rice husk + organic mill (55:15:15:15)). The highest B:C (1.39) was recorded in T<sub>10</sub> in which net profit received after selling of mango graft was Rs.634.70. Treatment which was used as regular nursery practice T<sub>2</sub> (soil + SSP + rice husk + organic mill (55:15:15:15)) recorded net profit of Rs. 334.80 and B:C 1.17. Lowest B: C (1.00) was reported in T<sub>1</sub> control i.e. Soil + FYM 3:1 with net profit of Rs. 3.50 followed by T<sub>7</sub> Leaf manure + Cocopeat (1:1) and T<sub>8</sub> Leaf manure + Cocopeat (1:03) with net profit of Rs. 47.30 and Rs. 48.60, respectively.



**Fig. 1. Comparison of mango stone grafts raised in different potting media at 180 DAG**

## Conclusion

From the above investigation, it was concluded that potting media had significant effect on growth performance and B:C of mango grafts. Locally available leaf manure, cocopeat, compost can be used as media which serves as alternative to soil in near future. Grafts filled with soilless media reduced weight of bag and helps in easy transportation. The

media containing cocopeat along with leaf manure and compost (1:1:2) was the ideal soilless media for raising mango grafts.

## ACKNOWLEDGEMENT

We thank Head, Department of Horticulture and staff of College of Agriculture, Dr. B. S. K. K. Vidyapeeth, Dapoli (M. S. India) for providing valuable insight and expertise that greatly assisted the research.

## REFERENCES

- Bachubhai, V. M. 2005. Influence of media and container on growth of mango (*Mangifera indica* L) seedling. (M.Sc. (Agri.) Thesis submitted to Junagadh Agricultural University, Junagadh.
- Ikram, S., Habib, U. and Khalid, N. 2012. Effect of different potting media combinations on growth and vase life of tuberose (*Polianthus tuberosa* L.). *Pak. J. Agri. Sci.*, **49** (2):121-125.
- Kelkar, K. D. 2016. Effect of different agro-chemicals on morpho-physiological attributes of mango grafts (*Mangifera indica* L.) cv. Alphonso under rainy season of Konkan agro-climatic conditions' M.Sc. (Agri.) Thesis submitted to Dr. B. S. Konkan Krishi Vidyapeeth, Dapoli, Maharashtra.
- Khot, A. A. 2017. Effect of different potting media on success and growth of bullock's heart (*Annona reticulata* L.). M.Sc. (Agri.) Thesis Submitted to Dr. B. S. Konkan KrishiVidyapeeth, Dapoli, Maharashtra.
- Kurava, M., 2015. Effect of polyamines and tricontannol on morphological behavior of mango cv. Alphonso under rainy season of Konkan agro-climatic condition. M.Sc. (Agri.) Thesis submitted to Dr. B. S. Konkan KrishiVidyapeeth, Dapoli, Maharashtra.
- Panchal, G. P., Parasana, J. S., Patel, S.R. and Patel, M. V. 2014. Effect of different growing media and levels of IBA on growth and development of khirni (*Manilkara hexandra* Roxb) seedlings cv. Local. *Global J. Biosci. and Biotech.*, **3** (4):379-383.
- Panse V. G. and Sukhatme, P. V. 1995. Statistical methods for agricultural workers. ICAR Rev. Ed. p. 97-156.
- Parasana, J. S., Leua, H. N. and Ray, N. R. 2013. Effect of different growing media mixture on germination and seedlings growth of mango (*Mangifera indica* L.) cultivars under net house conditions. *The Bioscan, Intern. Quarterly J. Life Sci.*, **8** (3):897-900.
- Ragaji, S. G. 2017. Effect of different potting media on survival and growth of mango (*Mangifera indica* L.) stone grafts cv. Alphonso. M.Sc. (Agri.) Thesis submitted to Dr. B. S. Konkan KrishiVidyapeeth, Dapoli, Maharashtra.
- Waseem, K., Hameed, A., Jilani, M. S., Kiran, M., Rasheed, M. U., Ghazanfarullah, Javeria, S. and Jilani, T. A. 2013. Effect of different growing media on the growth and flowering of stock (*Matthiola incana*) under the agro climatic condition of Dera Ismail Khan. *Pak. J. Agri. Sci.*, **50** (3):523-527.
- Wilson, G. C. S. 1983. The physico-chemical and physical properties of some horticultural substrates. *Acta Horti.*, 150: 19-32.

(Received on and 26.09.2020 Accepted on 22.12.2020)

# INFORMATION TO CONTRIBUTORS

*Journal of Horticultural Sciences*, an international journal, is the official publication of **Society for Promotion of Horticulture (SPH)**. It covers basic and applied aspect of original research on all branches of horticulture and other cognate disciplines, which promotes horticulture in its broadest sense. Its goals are to apprise horticultural scientists and others interested in horticulture of scientific and industrial developments and extension findings. The area of research include evaluation of germplasm, breeding, agronomic practices, physiology, biochemistry, biotechnology, soils and plant nutrition, plant protection, weed control, pesticide residue, post harvest technology, economics, extension, farm machinery and mechanization, etc. which facilitate in the growth and expansion of horticulture. The journal is published twice a year, in June and December.

**The Journal of Horticultural Sciences (JHS)** publishes critical reviews, research papers and short communications. Three copies of the manuscript and an electronic form (CD, MS Word) should be submitted to the Chief Editor, JHS, SPH, Indian Institute of Horticultural Research, Hessaraghatta Lake Post, Bangalore-560 089. The manuscript should preferably pertain to the research work carried out during the last five years. Author(s) must certify that the manuscript (s) has/have not been sent elsewhere for publication. All the authors have to become the members of SPH when a paper is accepted for publication. All papers will be refereed. Short communications on significant research findings, new record / technology are welcome. Besides invited review papers, scientists with vast experience on a particular field of research can also submit review papers which will be refereed. Decision of the Chief Editor / Editorial board is final. Authors are permitted to photocopy their article for non-commercial and scientific purpose. No reprints shall be provided *gratis*. Acceptance of manuscript for publication in JHS shall automatically mean transfer of copyright to the SPH. The chief editor/ Editorial board assumes no responsibility for the statements, opinion or facts expressed in the journal, which rests entirely with the author(s) thereof. Mention of a pesticide or a commercial or proprietary product does not constitute an endorsement or recommendation for the use.

**Title:** The title of the article should be bold and in running form. Use the font Times New Roman (14 point). Botanical / scientific names should be italicized. Author name(s) should be in running and bold with full address of the first author including e-mail address (it is mandatory as future correspondence will be only through e-mail). The address of other author(s), if different from the first author, should be given as footnotes and indicated by consecutive superscript numbers. A brief running title should be provided on a separate sheet.

**Abstract:** The abstract should not exceed 200 words. It should be suitable for indexing and publication in abstracting journal. Very pertinent keywords may be furnished.

**Text:** The text should be typed in double space on one side of good quality paper (21 x 29 cm) with 3cm margin on all sides **without justifying the text** and in clear and concise English. Use the font Times New Roman (12 point). The paper should be divided into subheadings (placed on the left margin and in upper case) such as Introduction, Material and Methods, Results and Discussion, Acknowledgements, and References. Units and abbreviations should be in metric (SI) system. It is desirable that authors take due care on clarity and brevity of the paper. The length of the paper should not exceed 2500 words.

**Tables/ Illustrations/ Photographs:** Each table should be on a separate sheet with a short title at the end of the paper, numbered in the order in which it appears in the text. The data reported must be subjected to appropriate statistical analysis. The illustrations should be relevant to the research findings and should not be repeating of data presented in the table. Only very good photographs, mounted on hard paper to avoid folding, given on a separate sheet of paper with title, which are reproducible, will be accepted. Data to be presented in graphical form should be sent on quality glossy contrast paper without folding.

**References:** References should be cited in the text in the form of (Anon., 1999; Prakash, 2002; Krishnamoorthy and Mani, 2004). The term *et al* should be used when there are more than two authors. The letters, a,b,c,... should be used following the year, to distinguish between two or more papers by the same author(s) in one year. References at the end of the text should be given in the following form:

Shikhamany, S. D. and Satyanarayana, G. 1973. A study on the association of leaf nutrient contents with poor yields in Anab. E.shahi grape (*Vitis vinifera* L.). *Ind. J. Hort.*, **30**: 376 - 380

Panse, V. G. and Sukhatme, P. V. 1978. Statistical methods for Agricultural workers. ICAR, New Delhi, p 108.

Srinivas, K. 1987. Response of watermelon (*Citrullus lanatus* Thunb. Musf) to drip and furrow irrigation under different nitrogen and plant population levels. Ph.D thesis, UAS, Bangalore

Mehta, N. K. and Sharma, S. D. 1986. Studies on flowering and fruit retention in some cultivars of peach (*Prunus persica* Batch). In: Advances in Research on Temperate Fruits. *Proc. Nat'l. Symp. Temp. Fruits*, Solan (India), Dr. Y. S. Parmar Univ. Hort. and Forestry, pp 37-42

Krishnamoorthy, A. and Mani, M. 2000. Biological Control of Pests of Vegetable Crops.p367-78. In: Biocontrol Potential and its exploitation in sustainable Agriculture. Vol. 2: Insect Pests. Upadhyay, R. K. Mukerji, K. G. and Chamola, B.P. (ed.). Kluwer Academic / Plenum Publishers, New York

Cover photo (s) shall be included at the discretion of Editor. Authors may submit photographs/figures/diagrams for cover page while submitting the manuscript.

## AUTHOR INDEX - VOL. 15 ( 1&2) 2020

| Name               | Page     | Name                | Page |
|--------------------|----------|---------------------|------|
| <b>A</b>           |          |                     |      |
| Adamu, J.T.        | 136      | Gavankar, M. S.     | 233  |
| Adekoya, M.        | 136      | Gokhale, N. B.      | 233  |
| Adeniji, O.T.      | 136      | Gowda D. C. S.      | 161  |
| Aghora T.S.        | 62       | Gowda, N. K. S.     | 197  |
| Ahamed N.          | 17       | I                   |      |
| Aravintharaj, R.   | 229      | Ingle Y. V.         | 153  |
| Aremu, C.A.        | 136      | Ishaka, A.          | 136  |
| Ashok Kumar J.     | 45       | J                   |      |
| Asokan, R.         | 229      | Jadhav S.B.         | 67   |
| Aswath C.          | 93       | Janakiram, T.       | 147  |
| Aswath, C.         | 147      | Jandong, E.         | 136  |
| Awcharae, C. M.    | 177      | Jasmin M. R.        | 207  |
| Azeez, S.          | 197, 207 | Jessy Mol K.K.      | 52   |
| <b>B</b>           |          |                     |      |
| Babli, M.          | 127      | K                   |      |
| Bala, M.           | 191      | Kalaivanan D.       | 9    |
| Bhatt R.M.         | 62       | Kanupriya, C.       | 221  |
| Bhonde, S. R.      | 153      | Karunakaran, G.     | 221  |
| Burondkar, M. M.   | 233      | Katwate S.M.        | 67   |
| <b>C</b>           |          |                     |      |
| Chandran, N. K.    | 81       | Khandekar, R. G.    | 233  |
| Chandrashekara C.  | 197, 207 | Kshirsagar, P. J.   | 233  |
| <b>D</b>           |          |                     |      |
| Desai, V. S.       | 233      | Kulkarni, M. M.     | 233  |
| Dhananjaya, M. V.  | 147      | Kumar D.            | 17   |
| Dinakara Adiga, J. | 127      | Kumar, R.           | 147  |
| Dinesh, M. R.      | 107, 161 | L                   |      |
| <b>G</b>           |          |                     |      |
| GaneshamurthyA.N.  | 9        | Lad, O. A.          | 233  |
| Ganga, M.          | 183      | Lakshmana Reddy D.C | 52   |
|                    |          | Lakshmi, J.         | 183  |
|                    |          | Laxman R.H.         | 35   |
|                    |          | M                   |      |
|                    |          | Madhavi Reddy K     | 52   |
|                    |          | Manivannan, N.      | 183  |
|                    |          | Manjunath B.L.,     | 35   |



| <b>Name</b>       | <b>Page</b>   | <b>Name</b>           | <b>Page</b> |
|-------------------|---------------|-----------------------|-------------|
| Manoj Y.B.        | 52            | Sankar V              | 177         |
| Meena H.R.        | 72            | Sankaran, M.          | 107, 161    |
| Mohan N.          | 62            | Satisha G.C.          | 197, 207    |
| Muralidhara, B. M | 177           | Shejal A. Porob       | 97          |
| <b>N</b>          |               | Shilpa Pandurangaiah, | 27          |
| Nair A.K.         | 35            | Shivashankar K.S.     | 27          |
| Negi, S. S.       | 147           | Shivashankara, K. S.  | 207         |
| <b>P</b>          |               | Singh D. R.           | 177         |
| Paithankar, D. H. | 153           | Singh S.R.            | 17          |
| Pandey, M.        | 197, 207      | Singh, P.             | 221         |
| Pawar, C. D.      | 233           | Singh, T.             | 191         |
| Priya Devi S      | 45, 97        | Somasundaram J.       | 72          |
| <b>R</b>          |               | Sriram S.             | 81          |
| Rachitha R.       | 207           | Srivastava K.K.       | 17          |
| Radha T.K.        | 72            | Sudhakar Rao D.V.     | 27          |
| Ragaji, S. G.     | 233           | Sujatha A. Nair       | 177         |
| Raghu B.R.        | 1             | Susmita C.            | 62          |
| Raghupathi H.B.   | 9             | <b>T</b>              |             |
| Rajamani, K.      | 183           | Tanya Thakur          | 173         |
| Rajiv Kumar       | 93            | Tejaswini Prakash     | 81          |
| Ramachandran, N.  | 147           | Tenebe, A.V.          | 136         |
| Ramachandrudu K   | 45            | Thangam M             | 45, 97      |
| Rami Reddy, P. V. | 225           | Thondaiman, V.        | 127         |
| Rao, T. M.,       | 147           | <b>V</b>              |             |
| Rashmi I.         | 72            | Veena, G.L.           | 127         |
| Ravishankar K.V   | 27            | Venugopalan, R.       | 161         |
| Roy, T. K.        | 197, 207, 229 | Vichare S.V           | 67          |
| Rupa T.R          | 9             | <b>Y</b>              |             |
| <b>S</b>          |               | Yousuf S.             | 17          |
| Sadashiva A.T.    | 27            | <b>Z</b>              |             |
| Sadawarte, A. K.  | 153           | Zamil, M.             | 207         |
| Safeena S.A.      | 45            | Zamzam, M.A.          | 136         |

## SUBJECT INDEX - VOL. 15 (1&2) 2020

| Name                     | Page     | Name                    | Page   |
|--------------------------|----------|-------------------------|--------|
| <b>A</b>                 |          |                         |        |
| Alphonso                 | 233      | Foot rot                | 152    |
| Amino acid score         | 207      | Free amino acids        | 207    |
| Antigonon                | 225      | Fruit development       | 97     |
| Anti-senescence compound | 191      | Fruit trees             | 9      |
| Apis spp                 | 225      | Fruit quality           | 136    |
| Arka Mushroom Rasam      | 197      | Fruit shape             | 136    |
| <b>B</b>                 |          |                         |        |
| B:C ratio                | 233      | Fruit yield             | 136    |
| Bee flora                | 225      | Fruits                  | 107    |
| Bioavailability          | 197      | Fusarium wilt           | 147    |
| Biplot analysis          | 161      | <b>G</b>                |        |
| Bound amino acids        | 207      | Garden pea              | 62     |
| Breeding                 | 62       | GCV                     | 161    |
| Bulb                     | 67       | Genetic diversity       | 17     |
| <b>C</b>                 |          |                         |        |
| Canopy management        | 127      | Genetic analysis        | 161    |
| Carotene                 | 27       | Genetic divergence      | 45     |
| Carotenoid               | 27       | Genotype by environment | 136    |
| CGMS                     | 52       | Gerbera                 | 93     |
| Character correlation    | 136      | Germplasm               | 1, 107 |
| Chrysanthemum            | 173, 191 | GIS                     | 107    |
| Conservation             | 107      | Gladiolus               | 147    |
| Copper                   | 72       | Goa                     | 97     |
| Correlation coefficient  | 45       | Groundwater depletion   | 9      |
| Curry leaves             | 1        | Growth                  | 67     |
| Cut flower production    | 177      | Growth parameters       | 233    |
| Cut-flower               | 93       | Gummosis                | 152    |
| <b>D</b>                 |          |                         |        |
| Delayed flowering        | 191      | <b>H</b>                |        |
| Dendrobium               | 177      | Heritability            | 161    |
| Distribution             | 1        | High temperature        | 62     |
| Diversity                | 1        | Honey bees              | 225    |
| Drought                  | 9        | Honeydew                | 229    |
| <b>E</b>                 |          |                         |        |
| Early summer             | 62       | Hot pepper              | 52     |
| Evaluation               | 93, 147  | Hybrid                  | 67     |
| Ex situ                  | 107      | Hypsizygus ulmarius     | 197    |
| <b>F</b>                 |          |                         |        |
| Flower                   | 67       | <b>I</b>                |        |
| Flowering                | 147      | In situ                 | 107    |
|                          |          | Iron                    | 72     |
|                          |          | Iron fortified          | 197    |
|                          |          | <b>J</b>                |        |
|                          |          | Jasminum spp            | 183    |
|                          |          | <b>K</b>                |        |
|                          |          | Kikiobiory              | 173    |



| <b>Name</b>                              | <b>Page</b> | <b>Name</b>                     | <b>Page</b> |
|--|-------------|---------------------------------|-------------|
| <b>L</b>                                 |             |                                 |             |
| LC-MS-MS                                 | 229         | Pruning                         | 127         |
| Leaf analysis                            | 72          | Pulp recovery                   | 221         |
| Lycopene                                 | 27          | <b>Q</b>                        |             |
| <b>M</b>                                 |             |                                 |             |
| Manganese                                | 72          | Quality                         | 177         |
| Mango                                    | 161, 233    | Quantitative character          | 45          |
| Marker Assisted Selection                | 52          | <b>R</b>                        |             |
| Micronutrient deficiency                 | 72          | Resistance Gene Analogues (RGA) | 81          |
| Mitochondria                             | 52          | Rootstocks                      | 127         |
| Morphotypes                              | 1           | Rose                            | 81          |
| Mushrooms                                | 197         | <b>S</b>                        |             |
| <b>N</b>                                 |             |                                 |             |
| Nagpur mandarin                          | 152         | Sapota                          | 72          |
| Nitrogen                                 | 173         | Scheduling irrigation           | 35          |
| Novel hybrids                            | 93          | Selection                       | 221         |
| Nucleotide Binding Site-Leucine          | 81          | Single linkage cluster analysis | 17          |
| Rich Repeats (NBS-LRR)                   |             | Single type tuberose            | 67          |
| Nutrients                                | 177         | Soil volume wetting             | 35          |
| Nutrition                                | 207         | Soilless media                  | 233         |
| <b>O</b>                                 |             |                                 |             |
| Onion                                    | 17          | Solanum lycopersicum            | 136         |
| Orchid                                   | 177         | Spacing                         | 35          |
| ORF                                      | 52          | Standardization                 | 173         |
| Ornamental creeper                       | 225         | Stress tolerance                | 62          |
| <b>P</b>                                 |             |                                 |             |
| Palynology                               | 183         | Sugars                          | 229         |
| Papaya yield                             | 35          | <b>T</b>                        |             |
| PBZ                                      | 127         | Tamarind                        | 221         |
| PCV                                      | 161         | Thrips palmi                    | 229         |
| Peak water                               | 9           | Tomato                          | 27          |
| Perennial crops                          | 9           | Training                        | 127         |
| Phytophthora                             | 152         | Tropical                        | 107         |
| Pink types                               | 97          | <b>V</b>                        |             |
| Planting geometry                        | 127         | Variability                     | 136         |
| Podosphaera pannosa                      | 81          | Varieties                       | 107         |
| Policy issue                             | 9           | Vase life                       | 147, 191    |
| Pollen germination                       | 183         | Vegetable cowpea                | 45          |
| Pollen morphology                        | 183         | <b>W</b>                        |             |
| Polyhouse                                | 93, 136     | Water use efficiency            | 35          |
| Potassium salt of phosphonic acid (PSPA) | 152         | Wax apple                       | 97          |
| Potted plants                            | 173         | White types                     | 97          |
| Powdery mildew                           | 81          | Wild species                    | 107         |
| Principal component analysis             | 17          | <b>Y</b>                        |             |
|  |             | Yield                           | 221         |
|  |             | <b>Z</b>                        |             |
|  |             | Zinc                            | 72          |





**STATEMENT OF OWNERSHIP AND OTHER PARTICULARS ABOUT  
JOURNAL OF HORTICULTURAL SCIENCES**

(Form IV)

Place of Publication : Bengaluru

Periodicity of publication : Half-yearly

Printer's Name : Mr. Ravikumar, B.A.

Nationality : Indian

Address : Resolution Print Media  
#131, 6<sup>th</sup> Main, Meenakshinagar  
Kamakshipalya, Bengaluru - 560 079.

Publisher's Name : Society for Promotion of Horticulture

Address : ICAR-Indian Institute of Horticultural Research  
Hessaraghatta Lake P.O.  
Bengaluru - 560 089

Editor-in-Chief : Dr. S. Sriram

Nationality : Indian

Address : ICAR-Indian Institute of Horticultural Research  
Hessaraghatta Lake P.O.  
Bengaluru - 560 089.

Name and addresses of individuals who own the journal and partners or are shareholders holding more than one per cent of the total capital : Society for Promotion of Horticulture  
ICAR-Indian Institute of Horticultural Research  
Hessaraghatta Lake P.O.  
Bengaluru - 560 089.

I, Dr. S. Sriram, hereby declare that the particulars given above are true to the best of my knowledge and belief.

June 30, 2020

Sd/-  
(S. Sriram)  
Editor-in-Chief



## SOCIETY FOR PROMOTION OF HORTICULTURE

ICAR-Indian Institute of Horticultural Research  
Hessaraghatta Lake Post, Bengaluru-560 089, India  
sphiihr2005@gmail.com / chiefeditor.jhs@gmail.com  
Website : <https://sphindia.org>

### ENROLMENT FORM

Name in full (in block letters) :  
Dr./Mrs./Mr./Ms.

Designation :

Address for communication :

Phone No. :

E-mail ID :

Type of membership : Patron / Life member / Annual member / Student member\*

Payment :

Demand Draft No. / Date :

Bank :

Place :

Date : SIGNATURE

#### Membership fee structure :

| Type of membership      | Membership amount | Enrolment fee | Total membership amount payable by Demand Draft (₹) |
|-------------------------|-------------------|---------------|---|
| Patron                  | 20,000/-          | 200/-         | 20,200/-  |
| Life Member             | 5,000/-           | 200/-         | 5,200/-   |
| Annual Member (India )  | 1,000/-           | 200/-         | 1,200/-   |
| i. For SAARC authors    | US \$ 100         | US \$ 5       | US \$ 105   |
| ii. For SAARC countries | US \$ 50          | US \$ 5       | US \$ 55  |
| Student member*         | 500/-             | 200/-         | 700/-   |

\*The application of student members must be certified by their Head of dept. or equivalent and the student member shall not receive a copy of the journal.

Please send the duly filled-in enrolment form along with Demand Draft drawn in favour of Society for Promotion of Horticulture, by post to General Secretary, Society for Promotion of Horticulture ICAR-Indian Institute of Horticultural Research, Hessaraghatta Lake Post, Bengaluru - 560 089.



## ACKNOWLEDGEMENTS

The editorial team acknowledges the services of the following reviewers

**Dr. Shylesha A.N.**

Principal Scientist, ICAR-NBAIR, Bengaluru

**Dr. Ashwath Narayan**

Associate Professor, UAS, Raichur

**Dr. Mohan C.**

Principal Scientist, ICAR-CTCRI, Trivandrum

**Dr. Chavalli Sarada**

Associate Professor, YSRHU, Guntur

**Dr. Dinesh R.**

Principal Scientist, ICAR-IISR, Calicut

**Dr. Kalaivanan D.**

Scientist, ICAR-IIHR, Bengaluru

**Dr. Sudhakar Rao D.V.**

Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Fakrudin B.**

Professor, College of Horticulture, UHS, Bengaluru

**Dr. Hebbar K.B.**

Principal Scientist, ICAR-CPCRI, Kasaragod

**Dr. Hima Bindu**

Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Satisha J.**

Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Krishnamurthy K.S.**

Principal Scientist, ICAR-CPCRI, Kasaragod

**Dr. Kundan Kishore**

Principal Scientist, CHES (ICAR-IIHR), Bhubaneswar

**Dr. Sankaran M.**

Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Madhu Bala**

Associate Professor, PAU, Ludhiana

**Dr. Nandeesh P.**

Senior Scientist, ICAR-IIHR, Bengaluru



**Dr. Venkatarami Reddy P.**  
Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Prakash Tripathi**  
Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Prasad R.D.**  
Principal Scientist, ICAR-IIOR, Hyderabad

**Dr. Rajashekar P.E.**  
Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Rajiv Kumar**  
Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Ravindran Chandran**  
Horticulturist, TNAU, Coimbatore

**Dr. Ramani S.**  
Former Project Coordinator, AICRP on Honey Bees and Pollinator,  
Bengaluru

**Dr. Veena S.S.**  
Principal Scientist, ICAR-CTCRI, Trivandrum

**Dr. Smaranika Mishra**  
Scientist, ICAR-IIHR, Bengaluru

**Dr. Sujatha A. Nair**  
Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Tejaswini Prakash**  
Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Usha Bharathi T.**  
Scientist, ICAR-IIHR, Bengaluru

**Dr. Sridhar V.**  
Principal Scientist, ICAR-IIHR, Bengaluru

**Dr. Srinivasan V.**  
Principal Scientist, ICAR-IISR, Calicut

Sd/-  
**(S. Sriram)**  
Editor-in-Chief

## New Varieties/ Technologies of ICAR-IIHR



**New Water Melon - Arka Shyama variety**



**Arka Red - New Gerbera variety**



**Leaf curl resistant chilli varieties Arka Tejaswi, Arka Saanvi and Arka Tanvi**



**Arka Abhi**



**Arka Shuba**

## New Varieties/ Technologies of ICAR-IIHR



Arka Herbiwash - Safe way of removing pesticide residues



Arka Bharath - New teasel gourd variety

***Journal of Horticultural Sciences is indexed by the following abstracting and indexing services***



*Article published in Journal of Horticultural Sciences are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author and source are credited.*

