

# Propensity of endemic *Exacum* spp. (Binara) as an Ornamental Plant: A Case Study among Agricultural undergraduates, University of Ruhuna, Sri Lanka

PCD Perera\*, AJMCM Sriwardana, and N Dahanayake

Department of Agricultural Biology, Faculty of Agriculture, University of Ruhuna, Mapalana,  
Kamburupitiya, Sri Lanka

\*Co-responding author: [chathuradineth2@gmail.com](mailto:chathuradineth2@gmail.com)

## **Abstract**

*Introduction of new plants is critical to the survival and profitability of the floricultural industries. These provide a marketing edge and can offer real benefits to fulfill special floriculture needs. Present survey was conducted to observe the potential of endemic Exacum spp. (Binara) as an ornamental plant among younger generation. The sample was selected from undergraduate students (n=125), Faculty of Agriculture, University of Ruhuna, Sri Lanka. Semi-structured interviews were carried out among the undergraduates representing all districts of Sri Lanka using a pre-tested questionnaire and showing a specimen of Binara plant. Group discussions were conducted with randomly selected students; 5 students/ group. Data were analyzed descriptively and presented with appropriate descriptive tools. The survey revealed that lack of awareness about Binara plant among the university students (66%) in most of the Districts of Sri Lanka. The results showed those respondents around 78% like to natural colour (blue-purple), actual flower size (50%), natural texture of flower petal (60%) and the height of the plant (70%) of the Binara flower. The respondents of 36% have not clear idea about vase-life of Binara flower. The respondents were more like to use Binara plant as potted plant (60%) than cut flower (40%). When considering the propagation of Binara, 58% respondents accept with propagation by seeds (58%) rather than asexual propagation (42%). However seed propagation of Exacum is hard in home level as its seeds are very small (110-140µm). Among vegetative propagation techniques, 68% respondents suggested to develop cutting than layering (42%). Most of the respondents liked to use Binara plant as an ornamental plant and it was shown that the ornamental value of Binara flower will help to develop the floriculture industry.*

**Keywords:** *Exacum* spp., ornamental, propagation, vase-life

## **Introduction**

Ornamental plants play a fundamental part in the way humans interact with and modify the environment. Flower based production can be divided in to several forms cut flowers, cut foliage, pot plants (including pot-flower and pot-greens) and bedding/garden plants (Xia et al., 2006). These products are used for different decorative purposes such as floral arrangement, landscape gardening, indoor and outdoor decoration etc. Cut flowers are the dominant products in world floriculture industry. In floral arrangements may be composed of only flowers and or foliage or in combination with vegetables and fruits.

The floriculture is a dynamic sector where a wide range of products are considered. To stand the global competitiveness it is mandatory to introduce novelties into the market. Therefore, introduction of new ornamental crops into commercial production and mastering their production technology is an essential requirement for development of commercial

horticulture. As a result of above reasons nowadays, thousands of varieties of cut-flowers, pot plants, hanging plants, bedding plants, shrubs, lawn and turf, ornamental tree and aquatic plants are available to the public. Scientific evidence show commercial production of native ornamental plants can represent a way of ex-situ conservation of endangered plant species (Karlović, 2007).

Genetic engineering is providing a valuable means of expanding the floriculture gene pool by promoting the generation of new commercial varieties (Tanaka *et al.*, 2005). Plant transformation technology (hereafter abbreviated to GM, or genetic modification) has been used to develop many varieties of crop plants, but only a few varieties of ornamental plants. These techniques are used for the color modification of flowers, fragrance modification, development of abiotic stress resistance plants, pest and disease resistance and to increase vase life. These techniques can also be used to manipulate form and architecture of plants and / or flowers (Chandler and Sanchez, 2012).

In the National Red List of Sri Lanka (2012), the *Exacum pedunculatum* is listed as critically endangered. Out of the eight species of *Exacum* found in Sri Lanka, four have been recognized as endangered and five as endemic (Risidra, 2015). The value of *Exacum* with colourful flowers in landscaping and in floriculture has not yet been recognized in Sri Lanka. As it is believed, the time has come to open up eyes to protect this valuable endemic plant species which is seriously threatened. So, this study was conducted to study the propensity towards endemic *Binara* as ornamental plant among younger generation.

## **Methodology**

A survey was carried out among the 125 undergraduate students in Faculty of Agriculture, University of Ruhuna, Sri Lanka, between in February and March in 2017. Focus-group discussions were carried out as groups, with purposely random sampled undergraduates representing all districts of Sri Lanka using a pre-tested structured questionnaire with specimen of *Binara* plant. Groups with five students for each 25 districts were gained. Data were analyzed descriptively and presented with appropriate descriptive tools.

## **Results and Discussion**

The survey showed that around 66% students were not aware about *Exacum* (*Binara*) species which were similarly observed by Perera *et al.* (2016) among Sri Lankans. Respondents, who knew about *Binara* plant said that, in the past, *Binara* plants were observed frequently but now, they are rare to see (Perera *et al.*, 2016). The survey was found that the respondents from Kilinochchi, Batticaloa and Vavuniya Districts are not familiar with the *Exacum* species because there are no cited evidences and their living areas are not the natural habitats of *Binara* being located in the dry zones in Sri Lanka. Respondents who live in Matale, Rathnapura, Monaragala, NuwaraEliya, Gampaha and Kalutara districts have some idea about *Binara* more than (20%), among above respondents in Matale district was the most (60%).

According to Figure 1 observations, around 78% liked the natural colour (blue-purple) of the *Binara* flower. Of the respondents 36% had no clear idea about vase-life of *Binara* flower and altogether it has neutral idea. More than 50% of respondents liked their actual flower size, When supposing the texture of flower petal, more than 60% of respondents liked its

natural texture of flower petal. The height of the plant also fit to the respondents matching about more than 70%. The results showed that there were no relationship between gender and ornamental characters of Binara which were surveyed.

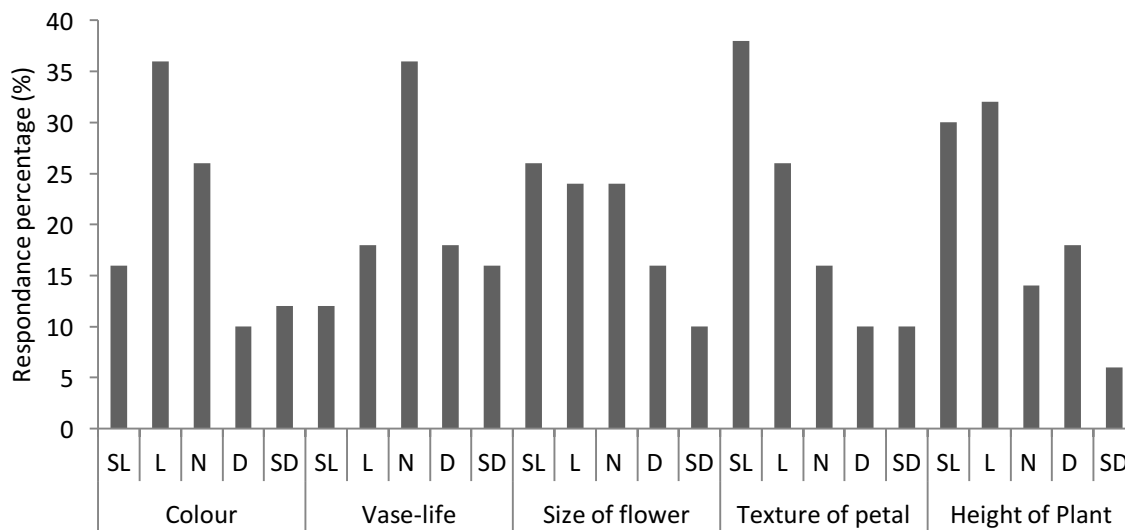


Figure 1: The propensity towards ornamental characters of Binara (*Exacum* spp.) (SL, strongly like; L, like; N, neutral; D, dislike and SD, strongly dislike) (n=125).

*Exacum ritigalensis* and *Exacum trinervium* contain about five to seven flowers per flower bunch. Around 80% of respondents liked having five to seven flowers per flower bunch. When considering about the export features and floriculture industry, respondents were more like to use Binara plant as potted plant (60%) than cut flower (40%). Sri Lankan Binara species has potential to develop as pot plants because the developed variety, such as Persian Violet (*Exacum affine*) which makes an excellent potted plant and a great choice for using as a table centerpiece in the world. The survey showed that 60% among total respondents were not happy to change Binara plant flower colour, vase-life, size, texture of petal and plant height with modifications. For the popularization of the plant, propagation of the plant is very important. When considering the propagation of Binara, 58% respondents accept sexual propagation by seeds rather than asexual propagation (42%). But seed propagation of *Exacum* is difficult in home level because the size of the *Exacum* seeds ranges from 110-140  $\mu\text{m}$  (Robert, 1997). Among vegetative (asexual) propagation techniques, 68% respondents suggested to develop cutting propagation techniques than layering techniques (42%). To enhance the ornamental value of Binara flower, it should be concerned about value added products and flower preservation techniques and to improve simple and easy propagation methods. Binara plant is an annual plant and it causes to reduce its ornamental value because of their short life-span. When considering the above fact, some respondents suggested modifying Binara plant as perennial plant.

## Conclusion

The most of the respondents agreed to accept Binara flower as an ornamental flower. It is revealed that the ornamental potential of Binara flower has an economical value rather than endemic value. In future Binara plant will help the development of the floriculture industry in Sri Lanka.

## References

- Chandler SF and Sanchez C. 2012. Genetic modification; the development of transgenic ornamental plant varieties. *Plant biotechnology journal*, 10: 891-903.
- Karlović K. 2007. Introduction of ornamental native plants into commercial production in Croatia. VI International Symposium on New Floricultural Crops: 107-112.
- MOE 2012. The National Red List 2012 of Sri Lanka; Conservation Status of the Fauna and Flora. Ministry of Environment, Colombo, Sri Lanka: 268-269.
- Perera PCD and Dahanayake N. 2016. Awareness about *Exacum ritigalensis* (Binara/Ginihiriya) among Sri Lankans; A case study in Kurunegala district, Sri Lanka. 13<sup>th</sup> Academic sessions, University of Ruhuna: 83.
- Risidra M. 2015. To save a rare plant, Ceylon today. [Online] <https://www.ceylontoday.lk/64-94898-news-detail-to-save-a-rare-plant.html> [Accessed on 14.04.2017].
- Robert JL. 1997. Pills or pellets containing seeds and inert carrier material and method for their preparation. [Online] <https://www.google.com.au/patents/US5623781> [Accessed on 14.04.2017].
- Tanaka Y, Katsumoto Y, Brugliera F and Mason J. 2005. Genetic engineering in floriculture. *Plant Cell, Tissue and Organ Culture*, 80: 1-24.
- Xia Y, Deng X, Zhou P, Shima K and Da Silva JAT. 2006. The World Floriculture Industry: dynamics of production and markets. *Floriculture, Ornamental and Plant Biotechnology Volume IV*, Global Science Books UK: 201.