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Evaluation of Local Weed Flora of South Gujarat for Dry Flower Products

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Abstract

An investigation was carried out to explore and evaluate the weed flora to obtain dried ornamentals for making of dry flower products. Nine species of weeds *viz*., *Dinebra arabica, Argyreia speciosa, Setaria verticillata, Dactyloctenium aegyptium, Cyperus rotundus, Celosia argentea, Digitaria sanguinalis, Echinochloa colonum* and *Eragrostis pilosa* growing locally in the south Gujarat region were evaluated for the study. Either inflorescence or leaves of the weeds employing press drying method were evaluated for their dried ornamental value in the year 2015-2017. Among different weeds, maximum percent loss in weight after drying was observed in the leaves of *Argyreia speciosa* followed by the inflorescence of *Echinochloa colonum* after drying. No shattering was observed in the dried leaves of *Argyreia speciosa* and dried inflorescence of *Celosia argentea* and *Cyperus rotundus* while maximum shattering in the inflorescence was observed in the dried inflorescence of *Echinochloa colonum*. Maximum time taken for drying (5.87-6.1 days) was required in A*rgyreia speciosa* (leaves) followed by inflorescence of *Celosia argentea* (4.3- 4.41 days) and *Setaria verticillata* (4.3-4.37 days) in both the years and pooled data. Maximum shelf life after drying (more than 170 days) was observed in the dried leaves of *Argyreia speciosa* which was at par with dried inflorescence of *Celosia argentea*. Ornamental value was found to be the best in the dried leaves of *Argyreia speciosa* and dried inflorescence of *Celosia argentea* and *Setaria verticillata* with highest visual score of (5), followed by *Echinochloa colonum* and *Eragrostis pilosa* with 4 as visual score as observed in both the years.

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Introduction

Dry flowers and foliage have a great potential as a substitute of fresh flowers owing to their natural appearance with added benefit of long lasting nature as well as for a variety of other aesthetic and commercial uses. Dry flower products are vivid such as long lasting pictures, frames, festive decorations, candles, bouquets and wreaths, sweet-smelling potpourris etc. and have a good demand both in domestic and international markets[1,2,3]. The Netherlands ranks first in export of dried flowers to the American market followed by Columbia, Mexico, India and Israel[4]. Dry flowers, foliage and their products constitute more than half of the total floricultural exports from the India. The demand for dry flowers is increasing at an impressive rate of 8-10% and therefore there is a great scope for the Indian entrepreneurs. In the last decade, around 70 to 75% export in floriculture has been through dry flowers and dry plant parts.

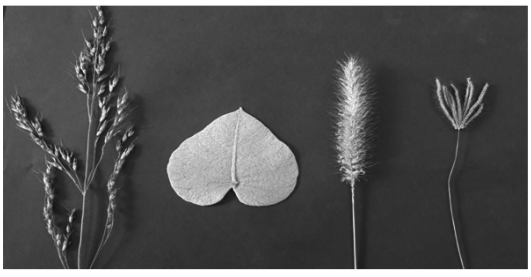
Although, India is rich in its biodiversity in native ornamentals, at present the industry is not properly established and depends on plant material available in forests with no systematic growing of specialized flowers for drying exists anywhere in the country. In India, West Bengal and Tamil Nadu have emerged as major hubs of dry flowers industries in recent times[5]. However, the flora from Gujarat has not been explored for dry flowers. There are many wild and weed species which needs to be explored and exploited for value addition through drying. Hence, this experiment has been planned to explore local weeds for making of dry flower products and thus to obtain value addition in local flora (weeds).

Materials and Methods

The present experiment was carried out in Value Addition Laboratory, Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture and Forestry, Navsari Agricultural University, Navsari. Experiment was laid in complete randomized design with three repetitions in the month of April 2015 and again repeated in the same month in the year 2017. Treatment consisted of nine weed species *viz., Dinebra arabica, Argyreia speciosa, Setaria verticillata, Dactyloctenium aegyptium, Cyperus rotundus, Celosia argentea, Digitaria sanguinalis, Echinochloa colonum* and *Eragrostis pilosa*. Leaf or inflorescence of all the species as per the suitability were subjected to press drying and observations on percent loss in fresh weight, shattering percentage and shelf life in days were recorded and the data of both the years as well as pooled data was subjected to analysis as per the statistical method[6] (Table 1 and 2). Ornamental value of the dried weed flora was recorded based on visual score (Figure 1, Table 3).

Results and Discussion

Weed species showed significant effect on percent weight loss after drying, Table 1. Among different weed species, maximum loss in percent fresh weight (73.5 to 73.87%) was observed in the leaves of *Argyreia speciosa* (T2) followed by inflorescence of *Echinochloa colonum* (T8, 64.4 to 65.67%) after drying. Further, no shattering was observed in the dried leaves of *Argyreia speciosa* (T2) and dried inflorescence of *Cyperus rotundus* (T5) and *Celosia argentea* (T6), followed by *Digitaria sanguinalis* and *Setaria verticillata* that showed 5.17 to 6. 17 %



Dinebra Arabica (T1) | *Argyreia speciosa* (T2) | *Setaria verticillata* (T3) | *Dactyloctenium aegyptium* (T4)

Cyperus rotundus (T5) | *Celosia argentea* (T6) | *Digitaria sanguinalis* (T7) | *Echinochloa colonum* (T8) | *Eragrostis pilosa* (T9)

Fig. 1: Different weed flora after drying

Table 1: Influence of different weeds on change in fresh weight (% loss in FW) and shattering percentage after drying

	Change in fresh weight %			Shattering Percentage (%)		
Treatment /Species	**1st Year**	**2nd Year**	**Pooled**	**1st Year**	**2nd Year**	**Pooled**
T1-*Dinebra arabica*	64.1	62.8	63.45	11.17	11.5	11.33
T2-*Argyreia speciosa*	73.87	73.5	73.68	0	0	0
T3-*Setaria verticillata*	53.87	55.13	54.5	6.17	5.4	5.78
T4-*Dactyloctenium aegyptium*	56.33	58.3	57.31	18.2	18.2	18.2
T5-*Cyperus rotundus*	56.4	54.87	55.63	0	0	0
T6-*Celosia argentea*	65.47	60.1	62.78	0	0	0
T7-*Digitaria sanguinalis*	54.47	54.2	54.33	5.17	6.16	5.67
T8-*Echinochloa colonum*	64.4	65.67	65.03	24.67	23.83	24.25
T9-*Eragrostis pilosa*	64.23	65.53	64.88	11.67	15.2	13.43
CD	2.39	6	3.1	2.26	3.3	2
CV%	2.26	5.73	4.35	9.91	13.86	12.13

Table 2: Influence of different weeds on time taken for drying and shelf life after drying (days)

	Days taken for drying			Shelf Life after drying(Days)		
Treatment /Species	**1st Year**	**2nd Year**	**Pooled**	**1st Year**	**2nd Year**	**Pooled**
T1-*Dinebra arabica*	3.27	3.4	3.33	84.6	88.13	86.4
T2-*Argyreia speciosa*	5.87	6.33	6.1	171.37	180.5	175.93
T3-*Setaria verticillata*	4.37	4.33	4.35	81.63	81.43	81.53
T4-*Dactyloctenium aegyptium*	3.13	2.8	2.97	83.2	80.1	81.65
T5-*Cyperus rotundus*	3.5	3.63	3.57	113.9	119.8	116.83
T6-*Celosia argentea*	4.3	4.53	4.41	175.4	172.16	173.78
T7-*Digitaria sanguinalis*	3.3	2.93	3.11	72.33	74.16	73.25
T8-*Echinochloa colonum*	4.03	4.27	4.15	64.37	62.43	63.4
T9-*Eragrostis pilosa*	2.33	2.13	2.23	90.9	89.8	90.35
CD	0.3	0.6	0.4	8.4	10.54	6.4
CV%	4.57	10.19	7.92	4.72	5.83	5.31

shattering in the dried inflorescence while maximum shattering in the dried inflorescence was observed in *Echinochloa colonum* (T8, 23.83 to 24.25%), Table 2.

Variation observed in weight loss percentage was a result of drying process of different species. Influence of varieties and plant species on the process of drying has been observed earlier in dry flowers[7,8]. Higher shattering in the inflorescence of *Echinochloa colonum* may be due to decreased sturdiness upon drying and its fragile structure. Vulnerability to breakage after drying in Dianthus flowers was reported9. Petal shattering upon drying was also reported in excessively dried flowers of zinnia[10] and rose[11].

Variation was observed in time taken for drying by different weed species, Table 2. Maximum time taken for drying (5.87-6.1 days)was required in drying of

Table 3: Dried ornamental quality of different dried weeds

Sr. No.	Treatments	Ornamental value	
		1st Year	2nd year
1	T1-*Dinebra arabica*	5	5
2	T2-*Argyreia speciosa*	5	5
3	T3-*Setaria verticillata*	5	5
4	T4-*Dactyloctenium aegyptium*	3	3
5	T5-*Cyperus rotundus*	5	5
6	T6-*Celosia argentea*	5	5
7	T7-*Digitaria sanguinalis*	3	3
9	T8-*Echinochloa colonum*	4	4
10	T9-*Eragrostis pilosa*	4	4

5 point scale (Based on texture and overall appearance on visual basis)

5- Excellent, 4- Very Good, 3-Good,2-Poor,1-Very poor

the leaves of *Argyreia speciosa* (T2) followed by T6-*Celosia argentea* (4.3- 4.41 days) and T3-*Setaria verticillata* (4.3 -4.37 days) in both the years and pooled data. Time taken for drying for ornamental purposes varied owing to the existence of variation in moisture content in different weed species.

Among all nine weed species, maximum shelf life (more than 170 days) was found in the dried leaves of *Argyreia speciosa* (T2) which was at par with *Celosia argentea* (T6) and followed by *Cyperus rotundus* (T5, more than 100 days) while minimum dried flower longevity was observed in *Digitaria sanguinalis* (T7, 72 -74 days) during both the years, Table 2. Dry flower longevity has been dependent upon plant part intactness upon proper drying. Different species show variation in dry flower longevity upon drying as observed earlier in gerbera (4) and foliages (1), rose (7,12), Zinnia (13), annual flowers (8) and *Helichrysum* (14). Further, ornamental value was found to be the best in the dried leaves of *Argyreia speciosa* and dried inflorescence of *Celosia argentea* and *Setaria verticillata* with highest visual score of (5), followed by *Echinochloa colonum* and *Eragrostis pilosa* with 4 as visual score as observed in both the years, Table 3 and Figure 1. Variation is observed in overall visual quality owing to different weed species and their aesthetic value in accordance of the consumers preference. Influence of varieties and species on overall visual quality has been earlier reported in rose[7] and annual flowers[8].

Conclusion

Thus, among local weed flora, leaves of *Argyreia speciosa* and inflorescence of *Celosia argentea* can be dried with press drying method (5-7 days drying time) for ornamental value as there is no shattering and have good shelf life after drying (more than 170 days) and can be well utilized for making of dry flower products. Further, inflorescence of *Setaria verticillata, Cyperus rotundus, Dinebra Arabica* and *Eragrostis pilosa* can also be dried with press drying method (3-5 days drying time) for ornamental value with shelf life of about 80-90 days.

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