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Comparison of hips and achenes among rose varieties

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Abstract
Weight of single hip, number of achenes per hips and pericarp weight was highest in mature hips in all the three genotypes ('Care Free Beauty', 'Crifty Duty' and 'Berry N' Cream'). Weight of achenes per hips was highest in mature hips of 'Care Free Beauty' and 'Crifty Duty', while in 'Berry N' Cream'. Weight of floater per hips was highest in mature hips in both 'Crifty Duty' and 'Berry N' Cream', while 'Care Free Beauty' shows highest weight of floater per hips in immature hips. Weight of sinkers per hips was highest in mature hips of both 'Care Free Beauty' and 'Crifty Duty'. 'Berry N' Cream' recorded highest weight of sinkers per hips in immature hips. Percentage of floater per hips was highest in mature hips of both 'Crifty Duty' and 'Berry N Cream', while in 'Care Free Beauty', highest percentage of floater per hips was recorded in immature hips. Percentage of sinkers was highest in immature hips of both 'Crifty Duty' and 'Berry N' Cream'; while in 'Care Free Beauty' highest percentage of sinkers per hips was recorded in mature hips.

Keywords: rose, varieties, hips, achenes

Introduction
Rosa hybrida L. belonging to the family Rosaceae is one of the nature's beautiful creations and is universally acclaimed as "Queen of Flowers". It is native to temperate regions of northern hemisphere. The basic chromosome number is n=7. No other flower is a better symbol of love, adoration, innocence, peace, friendship, affection, passion and other virtues than the rose since thousands of years. It has wide range of bright, vivid and clear colours and are great plants for adding colours to any garden to create festive and elegant display. These spectacular eye catching flowers are complement to any kind of flower arrangements. The genus *Rosa* consists of about 200 species in which more than 150 species have been catalogued. Eight rose species are mainly cultivated *viz., Rosachinensis, Rosa damascena, Rosa foetida, Rosa gallica, Rosa gigantea, Rosa moschata, Rosa multiflora* and *Rosa wichuriana* (Pal, 1972) [1] in India. A total of 25 species in the genus *Rosa* have been reported to grow in the wild. Distribution of all *Rosa* species available in India was mapped and utility and potential of these species was compiled to facilitate collection, conservation and utilization. Rose is grown for various purposes such as garden flowers, aesthetic value, cut flowers for decoration and loose flowers for garlands and also for making various products such as rose oil, rose water, gulch and etc. Dry petals of roses are also used for making incense sticks and flavouring sweets. Therapeutic value has been reported for hips of *R. centifolia* and *R. chinesis* (Tejaswini and Prakash, 2005) [2].

Materials and Methods
The present investigation entitled comparison of hips and achenes among rose varieties was carried out at ICAR-Indian Institute of Horticultural Research (IIHR), Hesaraghatta Lake Post, Bengaluru, situated at an altitude of 890 meter above mean sea level and latitude12^0 58´ north latitude, 78^0 45´ east longitudes respectively. The experiment was laid out in Factorial Complete Randomized Design with six treatments and six replications.

Mature hips: Hips that have fully matured and colour turning from green to red are considered as mature hips and were collected from different genotypes.

Immature hips: Hips that were in the stage of maturing and of about 35-40 days after pollination were considered as immature hips and were collected from different genotypes.

Results
Significant variation was noticed between genotypes as well as between maturity of hips in weight of single hip. Interaction effect between genotypes and maturity of hips was also found to be significant (Table 1). Between the mature and immature hips, maximum weight (3.27 g) was observed in the mature hips and minimum weight (2.05 g) was observed in immature hips. Significant difference was recorded among genotypes for weight of single hip. Among the different genotypes, maximum weight of single hip (3.33 g) was observed in the 'Crifty Duty' and minimum weight of single hip (1.99 g) was observed in 'Berry N' Cream'. Number of achenes per hip was shows there is no significant variation was noticed between maturity of hips. Between the mature and immature hips, maximum number of achenes per hip (12.09) was observed in the mature hips and minimum number achene per hip (11.38) was observed in immature hips. Significant difference was recorded among genotypes for number of achenes per hip. Among the mature and immature hips, maximum number of achenes per hip (16.53) was observed in the 'Berry N' Cream' and minimum number of achenes per hip (7.83) was observed in

'Crifty Duty'. Significant variation was noticed between genotypes as well as between maturity of hips in weight of achenes per hip. Interaction effect between genotypes and maturity of hips was also found to be significant. Between the mature and immature hips, maximum weight of achenes per hip (0.48 g) was observed in the mature hips and minimum weight of achenes per hip (0.41 g) was observed in immature hips. Significant difference was recorded among genotypes for weight of achenes per hip. Among the different genotypes, maximum weight of achenes per hip (0.48 g) was observed in 'Berry N' Cream. Minimum weight of achenes per hip (0.39 g) was observed in 'Crifty Duty'. There was no significant variation noticed between genotypes and maturity of hips, as well as interaction effect between genotypes and maturity of hips in weight of floater per hip Table 2. Between the mature and immature hips, maximum weight of floater per hip (0.06 g) was observed in the mature hips and minimum weight of floater per hip (0.05 g) was observed in immature hips. No significant difference was recorded among genotypes for weight of floater per hip. Among the different genotypes, maximum weight of floater per hip (0.06 g) was observed in 'Berry N' Cream' and minimum weight of floater per hip (0.05 g) was observed in 'Crifty Duty' and 'Care Free Beauty'. Variation was not significant between either maturity of hips or its interaction with genotypes in weight of sinker per hip. Between the mature and immature hips, maximum weight of sinker per hip (0.42 g) was observed in the mature hips. Minimum weight of sinker per hip (0.36 g) was observed in immature hips. Significant difference was recorded among genotypes for weight of sinkers per hips. Among the different genotypes, maximum weight of sinker per hip (0.42 g) was observed in 'Berry N' Cream'. Minimum weight of sinker per hip (0.33 g) was observed in 'Crifty Duty'. Significant variation was noticed between genotypes and maturity of hips, as well as interaction effect between genotypes and maturity of hips in pericarp weight. Between the mature and immature hips, maximum pericarp weight (2.50 g) was observed in the mature hips. Minimum pericarp weight (1.50 g) was observed in immature hips. Significant difference was recorded among genotypes for pericarp weight. Among the different genotypes, maximum pericarp weight (2.74 g) was observed in the 'Crifty Duty'. Minimum weight of sinker per hip (1.38 g) was observed in 'Berry N' Cream'. Significant variation was noticed between genotypes and maturity of hips in percentage of floater achenes per hip. Between the mature and immature hips, maximum percentage of floater achenes per hip (24.46 %) was observed in the mature hips and minimum percentage of floater achenes per hip (15.39%) was observed in immature hips. No significant difference was recorded among genotypes for pericarp weight. Among the different genotypes, maximum percentage of floater achenes per hip (22.22 %) was observed in the 'Berry N' Cream' and minimum percentage of floater achenes per hip (16.19 %) was observed in 'Crifty Duty' and 'Care Free Beauty'. Significant variation was noticed between genotypes and maturity of hips in percentage of sinker achenes per hip. Between the mature and immature hips, maximum percentage of sinker achenes per hip (84.13 %) was observed in the immature hips. Minimum percentage of sinker achenes per hip (75.56 %) was observed in mature hips. There was no significant difference among genotypes was observed for percentage of floater achenes per hip. Among the different genotypes, maximum percentage of sinker achenes per hip (83.86 %) was observed in 'Care Free Beauty'. Minimum per cent floater achenes per hip (77.75 %) were observed in 'Berry N' Cream'.

Table 1(a): Comparison of hips between rose varieties in relation to their stage of maturity

Varieties	Weight of single hip(g)			No. of achenes /hip			Weight of achenes /hip (g)			Pericarp weight (g)		
	Maturity stage of hips			Maturity stage of hips			Maturity stage of hips			Maturing stage of hips		
	Immature	Mature	Mean	Immature	Mature	Mean	Immature	Mature	Mean	Immature	Mature	Mean
Berry N' Cream	1.68	2.31	1.99	15.96	17.10	16.53	0.50	0.47	0.48	1.09	1.66	1.38
Care Free Beauty	1.93	3.40	2.67	10.53	13.60	12.06	0.36	0.57	0.46	1.39	2.46	1.92
Crifty Duty	2.56	4.09	3.33	7.66	8.00	7.83	0.38	0.39	0.39	2.01	3.47	2.74
Mean	2.05	3.27		11.38	12.09		0.41	0.48		1.50	2.53	
	S.Em ±	C.D. @ 5%	C.D. @1%	S.Em ±	C.D. @ 5%	C.D. @1%	S.Em ±	C.D. @ 5%	C.D. @1%	S.Em ±	C.D. @ 5%	C.D. @ 1%
Maturing of hips (M)	0.06	0.14	0.19	NS			0.02	0.04	0.06	0.06	0.14	0.19
Varieties (V)	0.08	0.17	0.24	0.90	1.92	2.59	0.02	0.05	0.07	0.08	0.17	0.24
M X V	0.11	0.25	0.34	1.28	2.71	3.67	0.03	0.08	0.11	0.11	0.25	0.34

Table 1(b): Comparison of hips between rose varieties in relation to their stage of maturity

Varieties	Weight of floater/hip (g)			Weight of sinker/hip (g)			Per cent floater achenes/hip			Per cent sinker achenes/hip		
	Maturity stage of hips			Maturing stage of hips			Maturing stage of hips			Maturing stage of hips		
	Immature	Mature	Mean	Immature	Mature	Mean	Immature	Mature	Mean	Immature	Mature	Mean
Berry N' Cream	0.03	0.09	0.06	0.47	0.38	0.42	11.88 (22.25)	32.57 (31.57)	22.22 (27.06)	88.00 (67.35)	67.50 (58.44)	77.75 (62.89)
Care Free Beauty	0.08	0.02	0.05	0.28	0.54	0.41	17.75 (20.19)	14.44 (23.76)	16.09 (21.97)	82.18 (69.66)	85.54 (66.20)	83.86 (67.93)
Crifty Duty	0.04	0.06	0.05	0.34	0.33	0.33	16.55 (26.66)	26.36 (29.92)	21.45 (28.29)	83.44 (63.29)	73.63 (60.04)	78.54 (61.67)
Mean	0.05	0.06		0.36	0.42		15.39 (23.13)	24.46 (28.42)		84.53 (66.75)	75.56 (61.56)	
	S.Em ±	C.D.@5%	C.D@ 1%	S.Em ±	C.D.@ 5%	C.D.@ 1%	S.Em ±	C.D.@ 5 %	C.D. @1%	S.Em ±	C.D.@ 5%	C.D.@1%
Maturing of hips (M)	NS			NS			2.75	5.84	7.90	2.75	5.84	7.90
Varieties (V)	NS			0.02	0.06	0.08	NS			NS		
M X V	NS			0.04	0.09	0.12	4.78	10.12	13.69	4.78	10.12	13.69

Discussion

Weight of single hip, number of achenes per hips and pericarp weight was highest in mature hips in all the three genotypes (Care Free Beauty', 'Crifty Duty' and 'Berry N' Cream). According to Semeniuk and Stewart (1965) [4], freshly harvested seeds gave maximum germination. Hence, we attempted to seed variation in formation of seeds in rose genotypes at different stages of their maturity. Weight of achenes per hips was highest in mature hips of 'Care Free Beauty' and 'Crifty Duty', while in 'Berry N' Cream', highest weight of achenes per hips was recorded in immature hips. In rose, there were reports of absence of embryo and a practice of separating the bold seeds from the light were practiced by separating them as floaters and sinkers. Semeniuk *et al*. (1963) [5] reported that seeds which do not sink were discarded since such light seeds generally have aborted or degenerated embryos. There were also contradicting reports of shriveled seeds being sinkers (Sandhya 1988) [3]. Weight of floater per hips was highest in mature hips in both 'Crifty Duty' and 'Berry N' Cream', while 'Care Free Beauty' shows highest weight of floater per hips in immature hips. Weight of sinkers per hips was highest in mature hips of both 'Care Free Beauty' and 'Crifty Duty'. 'Berry N' Cream' recorded highest weight of sinkers per hips in immature hips. Percentage of floater per hips was highest in mature hips of both 'Crifty Duty' and 'Berry N Cream', while in 'Care Free Beauty', highest percentage of floater per hips was recorded in immature hips. Percentage of sinkers was highest in immature hips of both 'Crifty Duty' and 'Berry N' Cream'; while in 'Care Free Beauty' highest percentage of sinkers per hips was recorded in mature hips. In 'Berry N' Cream' genotypes recorded highest number of achenes per hip in mature hips while, weight of achenes per hip, weight of sinkers and percentage of sinkers highest in immature hips.

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