bution, is unique to reserve forests. These findings suggest that the good old tradition of informal management of forests, such as sacred groves, has not only conserved useful species, but also that people have tended to 'discover' medicinal values more often among plants unique to sacred groves than those found in other landscapes. Perhaps, this typifies one preliminary step in medicinal-plant domestication.

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Spatial patterns of tree and shrub species diversity in Savanadurga State Forest, Karnataka

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A study conducted in Savanadurga State Forest in Karnataka indicates that the spatial variation of trees was high and similarity among the species in the adjacent plots was low, suggesting that the spatial heterogeneity is influencing the pattern of diversity of tree species. The degraded forest, which is considered as shrub and tree savanna of the *Anogeissus–Chloroxylon–Acacia* series is highly diverse, recording over 59 tree and 119 shrub species. Tree species similarity index among quadrats in the forest is less than 0.02, indicating high diversity in tree species within a limited area of the sample. Conversely, the shrub species are far more similar than the tree species when the two plots are compared. The number of stems > 1 cm DBH observed in the sampled plot (7844/ha) is high, further reinforcing that the area is rich in species and stems. Correlation between species diversity of mean and standard deviations of adjacent plots of the focal plot was high, indicating that the species-rich patches in the forests are likely to associate with other species-rich patches. The study is based on 30 quadrats of 25 m × 25 m laid at 1 km interval over the state forest.

SPATIAL variation in species diversity has been documented at a global level, with an observed gradient of increasing diversity from the poles to the equator[1–3]. Further, it is observed that the diversity usually decreases as we move up the slopes of a mountain from the base[4,5]. A number of hypotheses have been invoked to explain the observed patterns in the distribution of biological species diversity. Proponents of the theory of spatial heterogeneity claim that there might be a general increase in environmental complexity as one proceeds towards the tropics. A recent study[6] explains the influence of tectonic activity on biological diversity. In the tropics, it is considered that spatial heterogeneity is high, and therefore species accommodate themselves in a myriad of niches available to them.

Competitive exclusion theory claims that competitions exclude the real niche of the species and therefore more species could be accommodated in a small space[7]. This theory predicts that tropical species will be more highly

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evolved and possess finer adaptations than those of temperate species, due to their more directed mortality and the increased importance of competitive interactions. The entire biota in the temperate regions has been repeatedly destroyed because of glaciation and other catastrophic climatic events. There has thus been relatively little time for communities to evolve in the higher latitudes. This may be the reason for their poor diversity. In contrast, communities have been evolving in the tropics for a very long time and without serious catastrophic interruptions. This may be the reason for their species richness or diversity[1,8]. It has also been suggested that increased productivity would increase species diversity[9]. Combined with the factor of climatic stability and increased habitat heterogeneity, increased productivity might conceivably support a greater diversity. Studies of deciduous forests in Eastern North America show a clear increase in tree species diversity with succession[10]. It is also possible that succession is associated with changes in other environmental factors such as soil moisture and calcium levels, which in turn affect species diversity. The climatic stability and the absence of catastrophic changes such as those caused by glaciation have been suggested as being responsible for the higher levels of diversity in the tropics; an intermediate level of disturbance might actually promote diversity. Though there are many theories explaining co-existence of species in the tropics, the debate regarding the relative importance of various factors is not really resolved[11–17]. The present study envisages documenting plant species diversity, variation in species diversity and changing species association over space in Savanadurga forest.

The Savanadurga State Forest is situated in Bangalore rural district between latitudes 12.847° and 12.945°N, and longitudes 77.275° and 77.326°E, covering an area of 27 km^2. A temple is situated on an enormous mass of granite, which stands on a base about 12 km in circumference and raised to a height of 1226 m above mean sea level. The Savanadurga State Forest forms a part of the Deccan plateau and is covered by peninsular gneiss, granites, basic dykes and laterites. Soil of this area consists of red gravelly sandy loam to red sandy loam and is shallow in nature, usually underlined by rock strata. In some parts of the state forest alluvial soil was found in the downstream portion of the tanks and tank beds. The area covered by silty soil in Arkavathi and Kanva rivers forms the irrigated region[18]. The Savanadurga State Forest area does not have extreme climate. The climate is classified as seasonally dry tropical savanna, with four main seasons. The cold weather season from December to February; the hot weather season from March to May with low humidity; the southwest monsoon from June to September is a moist, cloudy and rainy period; and the northeast monsoon season from October to December. The mean annual rainfall for the past thirty years was 777 mm recorded in Magadi, which is about 8 km from Savanadurga. The maximum and minimum temperature range varies from 22 to 27°C. There are 15 villages surrounding this reserve. The only settlement found inside the state forest is in the area nearby a temple, with pilgrims from the city visiting the area. Recently, the Forest Department has started a wildlife park here. The communities were once pastoralists and are now settled agriculturists, but also collect non-timber forest products (NTFPs) such as shigekai (*Acacia sinuata*), byala (*Catunariga rugulosa*), wild honey, tamarind (*Tamarindus indica*), medicinal plants such as *Terminalia chebula*, *Emblica officinalis* and *Terminalia bellerica*. The principal dry crops are ragi, jowar, millet, pulses, oil seeds, the irrigated crops are paddy, vegetables, fruits, and in some areas farmers grow mulberry and plantation crops like mango, banana and coconut. Some of the villagers also rear cattle and goats that are grazed in the reserve forests.

The Savanadurga State Forest, just about 60 km from Bangalore, is one of the remnants of the vast stretches of forest that once covered Bangalore. The Savanadurga Reserve Forest is classified as shrub and tree savanna type of *Anogeissus latifolia–Chloroxylon sweitenia–Albizzia amara* series[19], covering an area of 27 km^2. Over 200 plant species have been identified from the forest. A major threat to this forest is increasing expansion of Bangalore city and the addition of Bangalore rural district under the Bangalore Metropolitan region. The other major threats include tourism, because of the presence of the temple that draws a large number of pilgrims and the towering hillock that attracts rock-climbing amateurs to this place. This has created additional pressure on the reserve forest.

The entire Savanadurga State Forest, covering an area of 27 km^2, was divided into 30 grids of 1 km^2 each. Latitude and longitude were recorded for each grid and quadrats measuring 25 m × 25 m at the midpoint of each grid were laid. The sampled area thus constitutes only 0.06% of the forest. All the trees measuring > 10 cm DBH were measured and the species name was recorded. For the shrubs, stems (ranging from 1 to 10 cm DBH) belonging to each species were counted. Height of stems belonging to > 10 cm DBH was measured and recorded. For the present analysis, three grids (two with boulders and one grid falling in the agricultural area) were removed. Names of the species were confirmed using local flora and field guide[20,21] through consultation with the herbarium at the Centre for Ecological Sciences, Indian Institute of Science, Bangalore.

Using stem density, species number, species diversity, average height and basal area of shrubs and trees, a correlation matrix (Pearson's correlation coefficient), as given by Zar[22], was computed to understand the relation between each of these parameters. In order to understand the variation in spatial heterogeneity, the average and standard deviation of diversity values of adjacent grids were computed. For example, grid number 7 has 4, 3, 6, 10, 11 and 12 as neighbouring grids. The diversity and species number of the 3rd, 4th, 6th, 10th, 11th and 12th grids were used to compute average and standard deviation of diversity and species number. Correlation between diversity of a plot and average diversity of the neighbouring grids was computed. Shannon–Weiner's species diversity index and Morishita–Horn's species similarity index sampled were computed for all plots, as given by Magurran[23]. Similarity in species composition of shrubs, tree seedlings and the total stems of the plot with its neighbours was also computed.

Among the 30 possible grids in the area, the grids 10, 15 and 26 were either barren land, boulder or agriculture plot, and therefore were not considered for analysis. In the remaining 27 quadrats, a total of 59 tree species (stems belonging to > 10 cm DBH), 66 shrub species and 53 trees species with < 10 cm DBH were found (Table 1). Details of the species found in the forest are given in Appendix 1. In the sampled area of 1.6875 ha, 13,178 stems were found. Among these, the number of stems of trees > 10 cm DBH was 787, shrub species were 12,175 and trees with < 10 cm DBH numbered 975. Overall species diversity index, including shrubs and trees, was 3.054. The species diversity index for trees > 10 cm DBH, 3.359, for trees that are < 10 cm DBH, 3.268 and for shrubs 2.509 (Table 1). Results in the present study also indicate that many species co-exist in a short space. The Savanadurga forest, which occupies nearly 2700 ha, has evidenced over 59 tree species and 119 shrub species indicating the richness, despite its small area and the disturbance it has been experiencing. The number of stems with > 1 cm DBH observed in the sampled plot (7844/ha) is high, indicating that the area is rich in species and stems. In a study in Mudumalai wildlife sanctuary[24], the recorded stems with > 1 cm DBH were just over 540/ha, while in a similar study in Biligiri Ran-

Table 1. Descriptive statistics of different habit layers found in 27 grids of Savanadurga State Forest

	Trees (> 10 cm DBH)	Trees (< 10 cm DBH)	Shrubs	Total shrub-layer stems	Total stems (> 1 cm DBH)
Number of stems	787	975	11,200	12,175	13,178
Number of species	59	53	66	119	133
Species diversity	3.359	3.268	2.509	2.874	3.054

Table 2. Species diversity, height and basal area for different plots in Savanadurga State Forest

Grid no.	Basal area	Average height	Shrub species	Shrub diversity	Shrub density	Tree species	Tree diversity	Tree density	Total species	Total diversity	Total density
1	326.27	12.50	30	2.47	516	2	0.69	2	31	2.49	518
2	5125.22	11.71	30	2.69	338	10	1.9	32	55	2.79	370
3	7933.79	13.26	25	2.19	638	10	1.96	33	50	2.31	671
4	4612.71	12.72	30	2.89	460	9	2.04	25	48	2.96	485
5	58666.02	22.83	26	2.83	402	19	2.66	36	55	3.02	438
6	31472.41	15.97	20	2.34	284	14	2.4	33	55	2.56	317
7	19603.17	15.68	25	2.6	417	16	2.38	56	76	2.87	493
8	25925.62	19.35	24	2.49	469	27	3.05	57	75	2.84	526
9	5019.83	17.52	14	2.09	249	8	2.86	23	35	2.32	272
11	30471.75	21.25	12	2.18	66	9	1.23	56	66	2.41	126
12	17220.80	19.08	24	2.62	283	12	2.38	27	47	2.86	331
13	43210.09	18.91	24	2.16	742	20	2.58	53	84	2.47	806
14	7064.01	14.00	14	1.61	347	4	1.19	14	27	1.75	361
16	14460.34	20.38	9	1.89	142	7	1.59	21	32	2.24	163
17	37974.71	17.53	21	1.94	356	14	2.11	52	69	2.28	412
18	5867.57	27.17	26	2.1	752	5	1.58	9	38	2.16	761
19	5498.80	25.91	35	2.34	846	11	2.4	11	46	2.45	872
20	11667.17	19.33	30	2.19	801	9	1.98	30	61	2.34	831
21	11851.07	24.00	24	2.38	453	8	1.98	12	37	2.49	465
22	10132.20	10.65	12	1.23	191	9	1.87	18	27	1.63	224
23	4832.34	14.89	26	2.43	590	4	0.97	18	44	2.52	608
24	12117.58	20.39	17	1.52	588	8	1.74	23	36	1.83	729
25	8112.92	13.00	14	1.67	963	7	1.4	21	35	1.76	984
27	3831.18	25.00	30	2.34	477	6	1.38	15	45	2.45	492
28	9432.16	12.64	23	2.23	210	5	1.27	27	47	2.4	237
29	8817.74	13.24	19	2.17	346	12	2.14	25	40	2.4	379
30	8390.09	10.38	26	2.6	249	7	1.59	58	78	2.72	307

gaswamy Temple Wildlife Sanctuary[25], they were 1947/ha. The number of trees in the sampled area of 625 m^2 showed a high degree of variance. The species number varied between 2 and 27 (Table 2). Similarly, the species diversity index varied from 0.69 to 3.05, tree density ranged from 2 to 84, overall species number varied from 31 to 84, overall stem number varied from 126 to 984 and total species diversity varied from 1.63 to 2.96.

Table 3. Correlation of tree species, shrub species, density and diversity of a grid with mean and standard deviation of the adjacent grid

	Correlation with	
	Mean	Standard deviation
Tree species	0.388*	0.366
Shrub species	0.252	0.024
Total species	0.068	0.213
Tree density	0.534**	0.362
Shrub density	0.168	0.003
Tree diversity	0.570***	0.044
Shrub diversity	0.388*	– 0.185
Total diversity	0.293	– 0.125

*Values significant at $P < 0.05$; **Values significant at $P < 0.005$; ***Values significant at $P < 0.002$.

Table 4. Similarity of species composition for sampled plots with adjacent grids

Grid number	Total species	Shrubs	Tree seedlings	Trees
1	0.8011	0.8298	0.129	0.0901
2	0.7967	0.8325	0.2461	0.4658
3	0.82	0.7621	0.3264	0.4592
4	0.8708	0.9093	0.5683	0.5498
5	0.5597	0.5889	0.4409	0.5627
6	0.5489	0.5484	0.5573	0.4885
7	0.6002	0.6034	0.5209	0.6389
8	0.4834	0.4866	0.277	0.3334
9	0.7375	0.7581	0.1641	0.3562
11	0.0599	0.0286	0.5401	0.2377
12	0.8998	0.9168	0.6441	0.3368
13	0.7713	0.7712	0	0.281
14	0.414	0.4229	0.0852	0.3007
16	0.7969	0.7995	0.1699	0.2531
17	0.7149	0.6989	0.3042	0.2048
18	0.8974	0.8998	0.0207	0.0366
19	0.8733	0.8757	0.0856	0.3966
20	0.931	0.9312	0	0.3863
21	0.7033	0.7014	0	0.3032
22	0.7476	0.7163	0.2447	0.3179
23	0.9467	0.9445	0	0.3933
24	0.7288	0.7258	0.5389	0.3389
25	0.9209	0.9239	0.2556	0.6981
27	0.5859	0.5832	0.1089	0.552
28	0.8839	0.8932	0.727	0.4932
29	0.8671	0.8723	0.3614	0.2568
30	0.8251	0.8545	0.2138	0.072
Mean	0.73282	0.73625	0.27889	0.3631
Variance	0.03871	0.04113	0.04854	0.02701
Tree seedlings and trees			$t = 1.59$	NS
Trees and shrubs			$t = 7.42$	$P < 0.0000006$
Tree seedlings and shrubs			$t = 7.93$	$P < 0.0000008$

An analysis of correlation between mean and standard deviations of adjacent grids of the focal grid (Table 3) indicates that the tree species numbers have significant correlation with species mean of adjacent plots. Similarly, tree diversity and shrub diversity have significant and positive correlation with mean diversity of adjacent plots. Spatial heterogeneity is considered to be one of the factors that explains richness of species in tropical environments[7,26]. Spatial heterogeneity induces niche diversification for species to occupy different niches so as to coexist in such environments. The present study indicates that patches of forests with high species number are associated with other patches of forest with high species number; though such relations are not strong, there is a trend indicating such a pattern. On the other hand, though the species numbers are more in these species-rich patches, similarity among tree species is less. On an average, the species similarity among plots in the forest is less than 0.02, indicating that though the patches are species rich, they are dissimilar with respect to their species. Thus there is high diversity in tree species within a limited area of the sample, reinforcing the theory that spatial heterogeneity-induced niche differentiation has resulted in rich diversity in Savanadurga. Conversely, the shrub species are far similar than the tree species, when two plots are compared. The similarity index is more than 0.70 for any two plots for shrub species. The tree seedlings show similar results as those of mature trees with a similarity of 0.27 among its neighbours, while the trees show an average similarity of 0.36 with their neighbours.

Analysis of similarity among grids for shrub species and tree species indicates that the similarity among plots for tree species is less compared to shrub species. The average similarity of trees between any two plots is 0.016, while for the shrub species it was 0.5854 ($P < 0.0000003$), indicating that though in terms of species numbers, the average of adjacent plots is high, the species that exist between two plots are dissimilar. Another analysis involving the similarity of species composition of sampled plots along with their neighbours (Table 4) indicates that the average similarity for shrub layers is high (0.73), while that for the trees (0.36) and tree seedlings (0.2789) is low. The differences in similarity of sampled plots with neighbours for trees and shrubs are significantly different, indicating that the dynamics of species composition and recruitment for these habits are different. However, the pattern of similarity for large trees (> 10 cm DBH) and for tree saplings (stems < 10 cm DBH) is not significantly different, indicating further that the recruitment pattern of trees and shrubs is different. The spatial dynamics of tree layer is different from that of shrubs and spatial niche differentiation patterns for trees and shrubs are different. Spatially, species

Appendix 1. Species found in Savanadurga State Forest

Species	Habit	Species	Habit
Abrus precatorius L.	Liana	*Euphorbia thirukalli* L.	Shrub
Abutilon indicum (L) Sweet.	Shrub	*Feronia elephantum* Corr.	Tree
Acacia aurculiformis A. Cunn. (Ex Benth.)	Tree	*Ficus benghalensis* L.	Tree
Acacia catechu Willd.	Tree	*Ficus religiosa* L.	Tree
Acacia chundra (Roxb.) Willd.	Tree	*Ficus tinctoria* Forst.	Tree
Acacia concina (Willd) DC.	Liana	*Glycosmis pentaphylla* (Roxb.) DC.	Shrub
Acacia farnesiana (L.) Willd.	Tree	*Gmelina arborea* Roxb.	Tree
Acacia ferruginea DC.	Tree	Unidentified 1	Shrub
Acacia leucophloea (Roxb.) Willd.	Tree	*Grewia hirsuta* Vahl.	Shrub
Acacia nilotica (L.) Del.	Tree	*Grewia orientalis* L.	Shrub
Acacia sinuata (Lour.) Merr.	Liana	*Gymnema sylvestre* (Retz.) Schultes.	Shrub
Acacia torta (Roxb.) Bran.	Shrub	*Helicteres isora* L.	Shrub
Adina cordifolia (Roxb.) Bran.	Tree	*Hyptis suaveolens* (L.) Poit.	Shrub
Alangium lamarckii Thw.	Tree	*Holarrhena antidysenterica* (Roth.) DC.	Tree
Alangium salvifolium (L. f.) Wang.	Tree	*Holoptelea integrifolia* (Roxb.) Planch.	Tree
Albizia amara (Roxb.) Boiv.	Tree	*Ipomoea carnea* Jace.	Shrub
Albizia lebbeck (L.) Willd.	Tree	*Ipomoea repens* auct.	Shrub
Albizia odoratissima (L.F.) Benth.	Tree	*Ixora polyantha* Wt.	Shrub
Albizia polycantha	Tree	*Jasminum pubescens* Willd.	Shrub
Annona reticulata L.	Shrub	*Justicia montana* (Nees.) & ess.	Tree
Annona squamosa L.	Shrub	*Kirganelia reticulata* (Pior.) Baill.	Tree
Anogeissus latifolia (Roxb.) Wall.	Tree	*Lantana camara* L.	Shrub
Aristolochia indica Juss.	Shrub	*Leptadenia reticulata* (Retz.) W&A	Shrub
Azadirachta indica Juss.	Tree	*Limonia acidissima* auct.	Tree
Bambusa arundinacea Retz.		*Murraya coinigi*	Tree
Barleria involurata Nees.	Shrub	*Murraya paniculata* (L.) Jack.	Tree
Bauhinia purpurea L.	Tree	Unidentified 2 (*Nagare gida*)	Shrub
Bombax ceiba auct.	Tree	*Ocimum sanctum* L.	Shrub
Boswellia serrata Coleb.	Tree	*Olea dioica* Roxb.	Tree
Bridelia retusa Spreng.	Tree	*Opuntia dellenii* (K.G.) Haw.	Shrub
Buchanania lanzan Sprengel.	Tree	*Paramignya monophylla* Wt.	Tree
Butea frondosa Roxb.	Tree	*Passiflora foetida* L.	Shrub
Cadaba indica Lam.	Tree	*Phyllanthus emblica*	Tree
Caesalpinia bonducella flem.	Shrub	*Plumbago zelyanica* Willd.	Shrub
Calotropis gigantea (L.) *Dryand.*	Shrub	*Plumeria alba* Vent.	Tree
Canthium angustifolium Roxb.	Tree	*Polygonum glabrum* Willd.	Tree
Canthium dicoccum (Gaert.) T&B.	Tree	*Pongamia glabra* Vent.	Tree
Canthium didymum auct.	Tree	*Premna tomentosa* Willd.	Tree
Canthium parviflorum Lam.	Tree	*Pterocarpus marsupium* Roxb.	Tree
Capparis sepiaria L.	Liana	*Prosopis spicigera* L.	Shrub
Careya arborea Roxb.	Tree	*Pterolobium hexapetalum* (Roth.) S&W.	Shrub
Cassia angustifolia	Tree	*Randia dumetorium* (Retz.) Poir.	Tree
Cassia auriculata L.	Shrub	*Santalum album* L.	Tree
Cassia fistula L.	Tree	*Sida cordifolia* L.	Shrub
Cassia montana Roth.	Tree	*Streblus asper* Lour.	Tree
Cassia occidentalis L.	Shrub	*Strychnos potatorum* L.F.	Tree
Cassia siamea Lam.	Tree	*Tamarindus indica* L.	Tree
Cassia surattensis Burm.	Shrub	*Tarenna asiatica* (L.) Schumann.	Shrub
Cassia torta L.	Shrub	*Tecoma stans* (L.) Kumth.	Shrub
Cassine paniculata (W&A) Romam.	Tree	*Tectona grandis* L.F.	Tree
Celastrus paniculata (Willd.)	Shrub	*Terminalia arajuna* (Roxb. ex DC.) W&A.	Tree
Chloroxylon swietenia DC., Prodr.	Tree	*Terminalia bellerica* (Gaertn.) Roxb.	Tree
Chromolaena odoratissima	Shrub	*Terminalia chebula* (Gaertn.) Retz.	Tree
Cocculus villosus DC.	Shrub	*Terminalia paniculata* Roth.	Tree
Cycas religiosa	Tree	*Terminalia tomentosa* (DC.) W&A	Tree
Daemia extensa (Jacq) R,Br.	Shrub	*Tinospora cordifolia*	Tree
Dalbergia latifolia Roxb.	Tree	*Toddalia asiatica* (L.) Lam.	Shrub
Dalbergia sissoo Roxb.	Tree	*Tylophora pauciflora*	Shrub
Dendrocalamus strictus (Roxb.) Nees.		*Vitex altissima* L.F.	Tree
Diospyros montana Roxb.	Tree	*Wrightia tinctoria* R.Br.	Tree
Dodonaea viscose Jacq.	Shrub	*Wrightia tomentosa* R.&S.	Tree
Erythroxylon monogynum Roxb.	Shrub	*Ziziphus jujuba* Lamk.	Tree
Eucalyptus glabulus L.	Tree	*Ziziphus mauritiana* Lamk.	Tree
Eugenia jambolana Lam.	Tree	*ziziphus oenoplia* Miller.	Shrub
Euphorbia antiquorum L.	Shrub	*Ziziphus xylopyrus* Willd.	Tree

packing in terms of number may be similar, but the composition is different indicating highly dynamic spatial variation in species in the Savanadurga forest.

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Salvaging of abortive embryos from mature tetraploid × diploid watermelon fruits through *in vitro* culturing and realization of a triploid seedless watermelon

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Fruits derived from a cross between the autotetraploid and diploid parental lines of watermelon (*Citrullus lanatus* Thunb. [Matsum. & Nakai]) cv. Arka Manik bore three types of seeds which included normal black ones with hard testa, white seeds with soft testa, and abortive ones with papery testa. A small proportion of the latter two types (about 2–4%) which normally fail to germinate and express in the natural course of seed perpetuation could be revived under *in vitro* conditions, revealing the presence of underdeveloped embryo in them. One such line that emanated from an abortive papery seed having a chromosome constitution of $2n = 3x = 33$ was further micropropagated, yielding seedless fruits in the field. This approach holds promise for salvaging undeveloped embryos from mature multi-seeded fruits.

PRESENCE of underdeveloped or chaffy seeds is common in mature, multi-seeded botanical fruits such as vegetable, pulse, ornamental and fruit crops. These may be resulting from embryo abortion at early or intermediate stages of development, or the failure of the supporting tissue to develop properly owing to genetic, physiological or extraneous reasons[1]. It is not known whether such abortive seeds carry embryo, as they do not germinate and express in the next generation. If present, it is possible that such embryos may be distinct genotypes such as haploid, polyploid, aneuploid or other rare types that are non-existent in nature. Rescuing immature embryos from incompatible crosses is an accepted practice by breeders and biotechnologists[2], but no efforts have been made to save such under privileged embryos from mature fruits and analyse them genetically.

Seedless watermelon commands higher consumer acceptance, fetches premium price, possesses relatively tougher rind and longer shelf-life, which makes it a preferred variety over seeded types[3,4]. Seedlessness in watermelon is conferred by triploidy, and a seedless type is produced by crossing a tetraploid ($2n = 4x$) female line with a diploid ($2n = 2x$) pollen parent[4,5]. While attempting to generate an autotriploid watermelon, of a choice

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