

**A genome-wide assessment of the genetic diversity, evolution and relationships with allied species of the clonally propagated crop
Vanilla planifolia.**

Genetic Resources and Crop Evolution

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Supporting Information Table S1. List of 88 *Vanilla planifolia* accessions used in this study, sampled from the *ex situ* collection of BRC Vatel (Cirad, Reunion Island, France).

Identifier	Material type	Reproduction mode	Parents (female x male)	Variety name	Place of origin	Ploidy level ⁽¹⁾	AFLP group ⁽²⁾	Missing data (%) ⁽¹⁾	Heterozygous SNPs (%) ⁽¹⁾	Structure cluster ⁽³⁾
CR0001	Traditional cultivar	Vegetative propagation	-	bleue	Reunion Island, France	2C	AFLP1	15.68	71.85	cluster 4
CR0010	Traditional cultivar	Vegetative propagation	-	-	Costa Rica	2C	AFLP1	17.01	82.28	cluster 4
CR0019	Plant breeding material	Selfed-progeny	Unknown	-	BRC Vatel, CIRAD, France	nd	AFLP2	11.43	28.00	cluster 4
CR0020	Plant breeding material	Selfed-progeny	Unknown	-	BRC Vatel, CIRAD, France	2C	AFLP2	28.43	60.89	cluster 3
CR0021	Plant breeding material	Selfed-progeny	Unknown	-	BRC Vatel, CIRAD, France	2C	AFLP2	11.69	53.56	cluster 2
CR0022	Plant breeding material	Selfed-progeny	Unknown	-	BRC Vatel, CIRAD, France	2C	AFLP2	8.50	30.88	cluster 3
CR0023	Plant breeding material	Selfed-progeny	Unknown	-	BRC Vatel, CIRAD, France	2C	AFLP2	10.27	42.74	cluster 2
CR0024	Plant breeding material	Selfed-progeny	Unknown	-	BRC Vatel, CIRAD, France	2C	AFLP2	7.62	42.95	cluster 3
CR0025	Plant breeding material	Selfed-progeny	Unknown	-	BRC Vatel, CIRAD, France	2C	AFLP2	10.63	24.28	cluster 4
CR0026	Plant breeding material	Selfed-progeny	Unknown	-	BRC Vatel, CIRAD, France	nd	AFLP2	nd	nd	nd
CR0027	Plant breeding material	Selfed-progeny	Unknown	-	BRC Vatel, CIRAD, France	nd	AFLP2	19.93	15.82	admixed
CR0034	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	12.05	78.95	cluster 3
CR0035	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	18.42	61.24	admixed
CR0036	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	2C	AFLP1	9.74	80.37	admixed
CR0038	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	2C	AFLP1	11.60	86.97	cluster 3
CR0040	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	11.25	77.94	admixed
CR0041	Traditional cultivar	Vegetative propagation	-	-	Madagascar	nd	AFLP1	14.53	82.07	admixed
CR0151	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	nd	nd	nd
CR0196	Improved cultivar	Unknown	-	-	Reunion Island, France	nd	AFLP1	28.79	88.43	admixed
CR0510	Improved cultivar	Unknown	-	-	Reunion Island, France	nd	nd	12.13	25.10	cluster 4
CR0622	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	21.43	62.46	cluster 3
CR0623	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	12.75	74.82	admixed
CR0626	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	13.37	68.51	cluster 4
CR0628	Traditional cultivar	Unknown	-	Aiguille	Reunion Island, France	2C	AFLP2	6.02	46.75	cluster 3
CR0630	Traditional cultivar	Vegetative propagation	-	Sterile	Reunion Island, France	3C	AFLP1	18.25	54.06	cluster 4
CR0631	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	2C	AFLP1	22.41	57.42	cluster 4

CR0632	Traditional cultivar	Vegetative propagation	-	Petite Mexique	Reunion Island, France	2C	AFLP2	8.50	46.56	cluster 3
CR0640	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	24.62	42.19	cluster 4
CR0641	Traditional cultivar	Vegetative propagation	-	Grosse vanille	Reunion Island, France	4C	AFLP1	17.63	71.40	cluster 4
CR0642	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	2C	AFLP1	9.30	79.49	cluster 4
CR0645	Traditional cultivar	Vegetative propagation	-	Sterile	Reunion Island, France	3C	AFLP1	12.05	52.87	cluster 4
CR0654	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	8.86	79.98	cluster 3
CR0656	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	2C	AFLP1	33.13	39.47	cluster 4
CR0659	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	10.01	69.69	cluster 4
CR0661	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	26.04	44.19	cluster 4
CR0673	Traditional cultivar	Vegetative propagation	-	-	Samoa	2C	AFLP1	13.82	78.42	admixed
CR0674	Traditional cultivar	Vegetative propagation	-	-	Fiji	nd	AFLP1	10.54	76.24	admixed
CR0676	Traditional cultivar	Vegetative propagation	-	-	Fiji	nd	AFLP1	25.95	54.67	admixed
CR0684	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	11.96	64.49	cluster 3
CR0695	Traditional cultivar	Vegetative propagation	-	-	Guadeloupe, France	nd	AFLP1	17.18	62.57	cluster 3
CR0717	Traditional cultivar	Vegetative propagation	-	-	Reunion Island, France	nd	AFLP1	36.49	40.45	cluster 4
CR0763	Traditional cultivar	Vegetative propagation	-	-	India	nd	AFLP1	14.61	70.12	cluster 4
CR0802	Traditional cultivar	Vegetative propagation	-	Grosse vanille	Reunion Island, France	4C	nd	13.46	62.23	admixed
CR0844	Traditional cultivar	Vegetative propagation	-	Grosse vanille	Mayotte Island, France	nd	AFLP1	nd	nd	nd
CR0885	Traditional cultivar	Vegetative propagation	-	-	Comoros	nd	nd	15.50	57.55	cluster 4
CR0925	Plant breeding material	Selfed-progeny	CR0041 x CR0041	-	BRC Vatel, CIRAD, France	nd	nd	8.68	29.87	cluster 3
CR0974	Plant breeding material	Selfed-progeny	CR0066 x CR0066	-	BRC Vatel, CIRAD, France	nd	nd	9.57	35.85	cluster 3
CR1004	Plant breeding material	Selfed-progeny	CR0051 x CR0051	-	BRC Vatel, CIRAD, France	nd	nd	18.51	28.70	cluster 4
CR1048	Traditional cultivar	Vegetative propagation	-	-	Mauritius	nd	nd	11.51	71.07	cluster 3
CR1068	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	6.20	23.32	cluster 3
CR1076	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	6.73	31.62	cluster 4
CR1097	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	5.93	25.99	cluster 2
CR1098	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	13.46	28.66	cluster 4
CR1123	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	14.53	35.03	cluster 4
CR1126	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	4.78	19.81	cluster 3
CR1129	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	8.24	29.34	cluster 3

CR1140	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	7.62	42.47	cluster 3
CR1157	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	21.26	39.60	admixed
CR1161	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	9.21	47.02	cluster 3
CR1426	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	7.00	34.48	cluster 3
CR1433	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	3.37	22.91	admixed
CR1434	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	10.19	17.26	cluster 4
CR1701	Plant breeding material	Selfed-progeny	CR0041 x CR0041	-	BRC Vatel, CIRAD, France	nd	nd	9.30	37.11	cluster 3
CR1712	Plant breeding material	Selfed-progeny	CR0136 x CR0136	-	BRC Vatel, CIRAD, France	nd	nd	12.13	37.40	cluster 4
CR1900	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	9.30	38.18	cluster 3
CR1901	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	8.33	37.29	cluster 3
CR1917	Plant breeding material	Selfed-progeny	CR0041 x CR0041	-	BRC Vatel, CIRAD, France	nd	nd	11.34	53.55	cluster 1
CR1972	Plant breeding material	Intra-specific hybrid	CR0802 x CR0631	-	BRC Vatel, CIRAD, France	3C	nd	16.30	63.92	cluster 4
CR2030	Plant breeding material	Selfed-progeny	CR0802 x CR0802	-	BRC Vatel, CIRAD, France	4C	nd	32.60	64.91	cluster 4
CR2093	Improved cultivar	Unknown	-	-	Reunion Island, France	nd	nd	12.31	73.13	cluster 4
CR2100	Improved cultivar	Unknown	-	-	Reunion Island, France	nd	nd	15.94	61.85	admixed
CR2102	Improved cultivar	Unknown	-	-	Reunion Island, France	nd	nd	12.93	78.43	cluster 4
CR2526	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	9.39	39.98	cluster 4
CR2527	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	9.74	36.51	cluster 4
CR2528	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	11.60	33.47	cluster 1
CR2529	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	16.12	32.63	cluster 3
CR2560	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	27.10	36.57	cluster 1
CR2561	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	23.65	59.98	cluster 1
CR2562	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	16.83	42.92	cluster 3
CR2564	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	nd	nd	nd
CR2567	Plant breeding material	Selfed-progeny	CR0040 x CR0040	-	BRC Vatel, CIRAD, France	nd	nd	26.66	42.87	admixed
CR2687	Traditional cultivar	Unknown	-	Colibri	Mexico	nd	nd	15.59	70.30	cluster 4
CR2699	Traditional cultivar	Vegetative propagation	-	MaryseM1	Reunion Island, France	nd	nd	30.29	51.46	admixed
CR2844	Traditional cultivar	Vegetative propagation	-	MaryseM2	Reunion Island, France	nd	nd	22.14	63.59	cluster 4
CR3601	Traditional cultivar	Vegetative propagation	-	-	Mauritius	nd	nd	39.77	39.71	cluster 4
CR3602	Traditional cultivar	Vegetative propagation	-	-	Mauritius	nd	nd	22.41	58.90	cluster 3

CR3603	Traditional cultivar	Vegetative propagation	-	-	Mauritius	nd	nd	15.68	65.65	cluster 4
CR3604	Traditional cultivar	Vegetative propagation	-	-	Mauritius	nd	nd	18.16	60.28	cluster 4

(1) From Bory (2008); *nd*: no data.

(2) From Bory et al. (2008); *nd*: no data.

(3) This study, from dataset with 1,129 SNPs and 84 samples. *Missing data*: percentage of absent SNP data per accession; *Heterozygous SNPs*: percentage of heterozygous SNPs per accession; *nd*: no data.

Supporting Information Table S2. List of 7 *Vanilla × tahitensis* accessions used in this study, sampled from the *ex situ* collection of BRC Vatel (Cirad, Reunion Island, France).

Identifier	Material type	Reproduction mode	Parents (female x male)	Variety name	Place of origin	Missing data (%) ⁽¹⁾	Heterozygous SNPs (%) ⁽¹⁾
CR0017	Traditional cultivar	Vegetative propagation	-	Haapape	French Polynesia	29.69	32.79
CR1415	Plant breeding material	Selfed-progeny	CR0017 x CR0017	-	BRC Vatel, CIRAD, France	23.45	16.69
CR3605	Traditional cultivar	Vegetative propagation	-	Tahiti H5-27	French Polynesia	33.88	31.47
CR3606	Traditional cultivar	Vegetative propagation	-	Haapape OFE2	French Polynesia	28.74	28.78
CR3607	Traditional cultivar	Vegetative propagation	-	T4-49	French Polynesia	32.19	31.57
CR3608	Traditional cultivar	Vegetative propagation	-	H5-66	French Polynesia	30.69	30.02
CR3609	Traditional cultivar	Vegetative propagation	-	S70	French Polynesia	38.17	27.68

⁽¹⁾ This study, from dataset with 2,004 SNPs and 133 samples. *Missing data*: percentage of absent SNP data per accession; *Heterozygous SNPs*: percentage of heterozygous SNPs per accession.

Supporting Information Table S3. List of 23 *Vanilla* wild relatives accessions used in this study, sampled from the *ex situ* collection of BRC Vatel (Cirad, Reunion Island, France).

Identifier	Species	Place of origin	Missing data (%) ⁽¹⁾	Heterozygous SNPs (%) ⁽¹⁾
CR0072	<i>V. bahiana</i>	Brazil	28.59	0.28
CR2074	<i>V. bahiana</i>	BRC Vatel, CIRAD, France	25.15	0.40
CR0109	<i>V. cribbiana</i>	French Guyana	34.93	0.38
CR2897	<i>V. cribbiana</i>	Ecuador	40.47	0.17
CR2899	<i>V. cribbiana</i>	Ecuador	39.62	0.25
CR2901	<i>V. cribbiana</i>	Private collection, France	29.99	0.00
CR3614	<i>V. helleri</i>	Costa Rica	25.60	0.27
CR2688	<i>V. insignis</i> cf.	Mexico	26.00	0.00
CR0087	<i>V. insignis</i> cf.	MNHN, France	34.08	5.30
CR2685	<i>V. odorata</i>	Mexico	34.28	0.08
CR2902	<i>V. odorata</i>	Private collection, France	38.62	0.00
CR2908	<i>V. odorata</i>	Private collection, France	40.92	0.76
CR3611	<i>V. odorata</i>	Brazil	26.65	0.07
CR3612	<i>V. odorata</i>	Brazil	26.75	0.07
CR0116	<i>V. odorata</i>	French Guyana	33.48	0.83
CR2686	<i>V. odorata</i>	Mexico	26.00	0.20
CR2894	<i>V. odorata</i>	Ecuador	23.85	0.13
CR0018	<i>V. pompona</i>	French Polynesia	38.52	0.24
CR0033	<i>V. pompona</i>	Reunion Island, France	40.92	0.51
CR0068	<i>V. sotoarenasii</i>	Costa Rica	14.02	5.11
CR3615	<i>V. sotoarenasii</i>	Costa Rica	13.37	4.49
CR3616	<i>V. sotoarenasii</i>	Costa Rica	23.90	4.00
CR2903	<i>V. sotoarenasii</i> cf.	Private collection, France	14.17	0.12

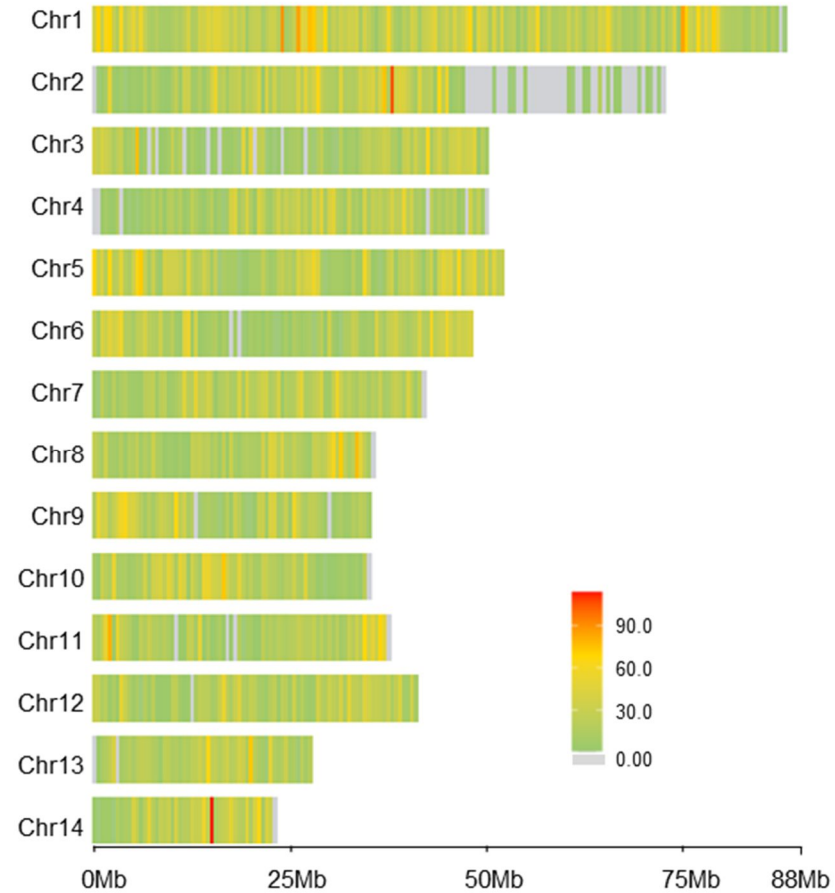
⁽¹⁾ This study, from dataset with 2,004 SNPs and 133 samples. *Missing data*: percentage of absent SNP data per accession; *Heterozygous SNPs*: percentage of heterozygous SNPs per accession.

Supporting Information Table S4. List of 19 interspecific hybrids accessions used in this study, sampled from the *ex situ* collection of BRC Vatel (Cirad, Reunion Island, France).

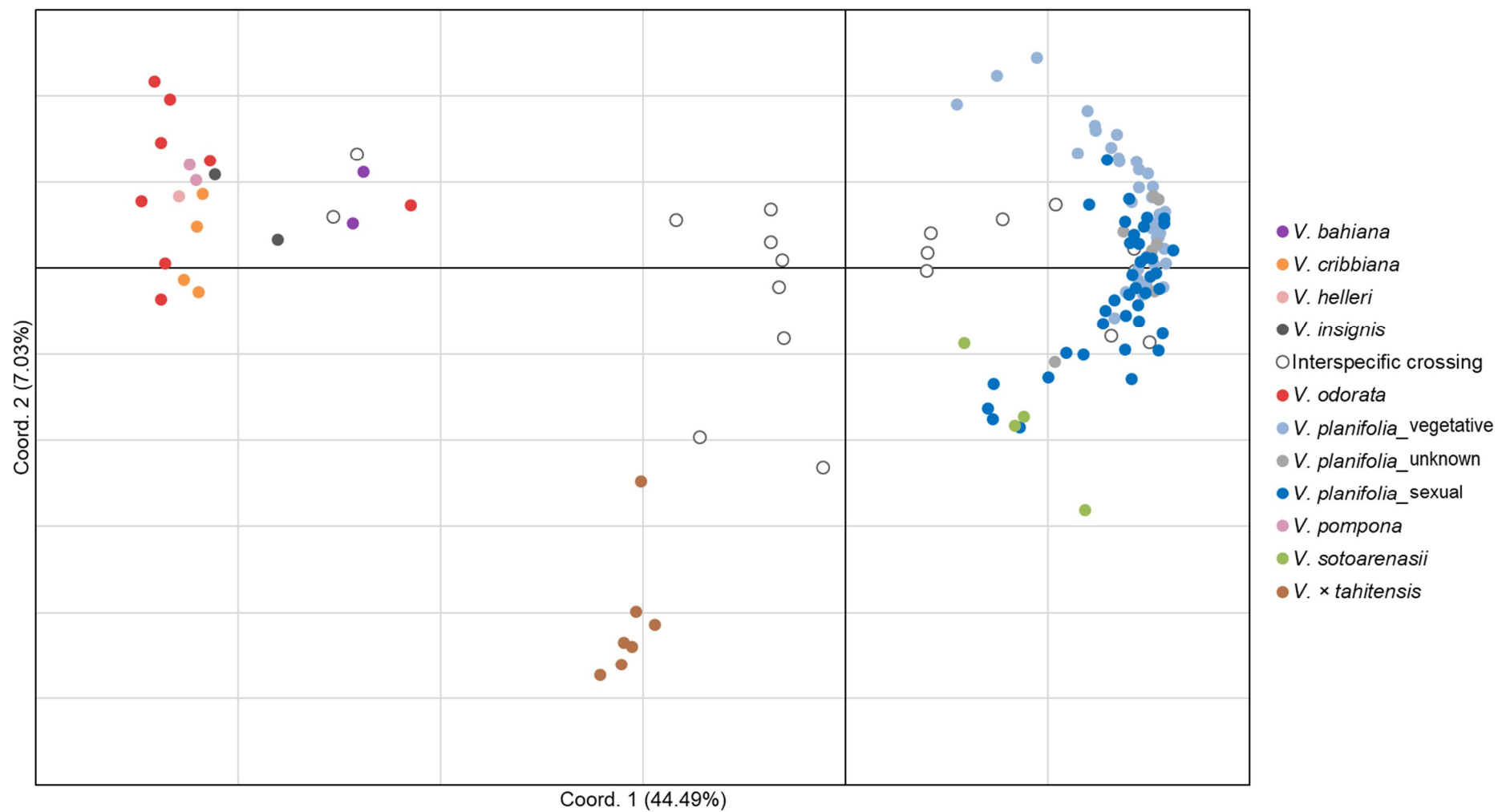
Identifier	Parents (female x male)	Place of origin	Missing data (%) ⁽¹⁾	Heterozygous SNPs (%) ⁽¹⁾
CR0003	<i>V. planifolia</i> x <i>V. × tahitensis</i> *	FOFIFA, Madagascar	32.88	60.07
CR0139	<i>V. pompona</i> x <i>V. planifolia</i> *	FOFIFA, Madagascar	41.92	39.00
CR0166	<i>V. planifolia</i> x <i>V. phaeantha</i>	BRC Vatel, CIRAD, France	28.69	23.16
CR0757	[(<i>V. planifolia</i> x <i>V. pompona</i>) x <i>V. planifolia</i>] cf x [(<i>V. planifolia</i> x <i>V. pompona</i>) x <i>V. planifolia</i>]*	Madagascar	8.63	16.11
CR1156	<i>V. sotoarenasii</i> x <i>V. pompona</i>	BRC Vatel, CIRAD, France	27.99	18.99
CR1531	(<i>V. planifolia</i> x <i>V. pompona</i>) x (<i>V. planifolia</i> x <i>V. × tahitensis</i>)*	FOFIFA, Madagascar	7.88	24.65
CR1540	<i>V. planifolia</i> x (<i>V. planifolia</i> x <i>V. pompona</i>)*	FOFIFA, Madagascar	8.23	16.37
CR1725	<i>V. planifolia</i> x <i>V. pompona</i>	BRC Vatel, CIRAD, France	32.49	19.22
CR1773	<i>V. planifolia</i> x (<i>V. planifolia</i> x <i>V. phaeantha</i>)	BRC Vatel, CIRAD, France	21.16	25.70
CR1810	<i>V. planifolia</i> x <i>V. bahiana</i>	BRC Vatel, CIRAD, France	26.35	0.34
CR1936	(<i>V. planifolia</i> x <i>V. phaeantha</i>) x <i>V. planifolia</i>	BRC Vatel, CIRAD, France	15.92	38.46
CR1943	<i>V. planifolia</i> x (<i>V. planifolia</i> x <i>V. phaeantha</i>)	BRC Vatel, CIRAD, France	20.51	27.87
CR1947	<i>V. insignis</i> x <i>V. bahiana</i>	BRC Vatel, CIRAD, France	31.99	2.86
CR2354	(<i>V. planifolia</i> x <i>V. phaeantha</i>) x (<i>V. planifolia</i> x <i>V. phaeantha</i>)	BRC Vatel, CIRAD, France	21.61	13.49
CR2711	<i>V. chamissonis</i> x <i>V. planifolia</i>	BRC Vatel, CIRAD, France	26.70	23.76
CR2715	<i>V. planifolia</i> x <i>V. chamissonis</i>	BRC Vatel, CIRAD, France	27.50	24.02
CR2717	(<i>V. planifolia</i> x <i>V. pompona</i>) x <i>V. planifolia</i>	Costa Rica	28.04	44.31
CR2718	(<i>V. planifolia</i> x <i>V. pompona</i>) x <i>V. planifolia</i>	Costa Rica	31.39	43.05
CR2731	<i>V. planifolia</i> X <i>V. madagasacariensis</i> cf.	BRC Vatel, CIRAD, France	13.97	28.65

⁽¹⁾ This study, from dataset with 2,004 SNPs and 133 samples. *Missing data*: percentage of absent SNP data per accession; *Heterozygous SNPs*: percentage of heterozygous SNPs per accession.

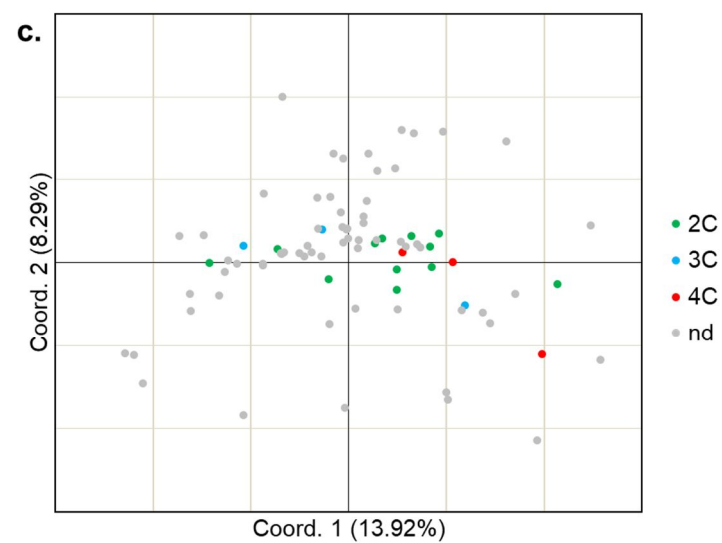
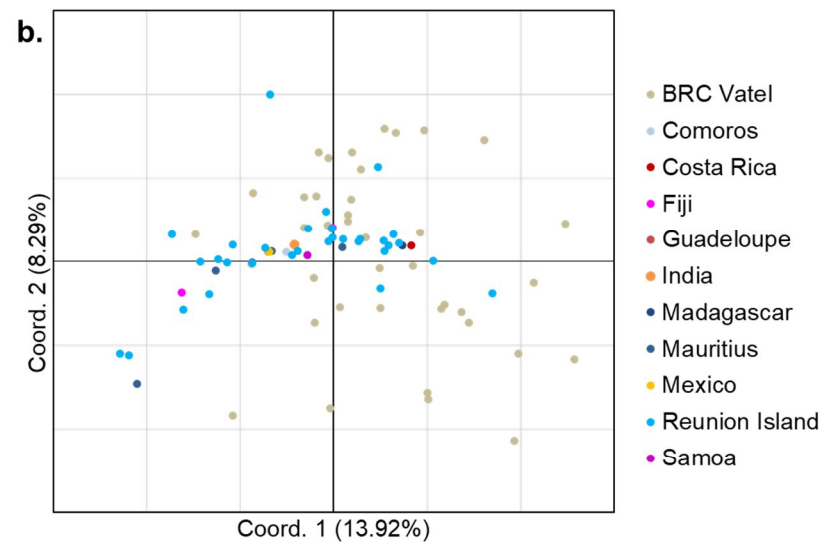
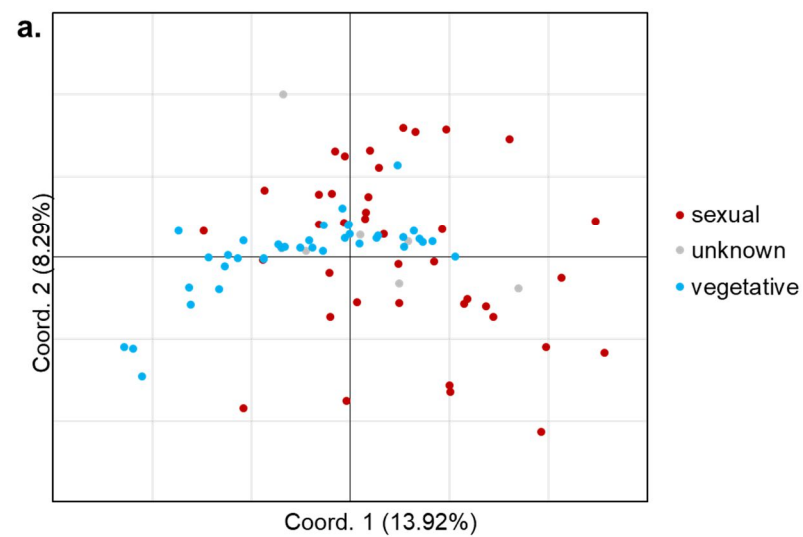
* uncertainty about the parental cross used



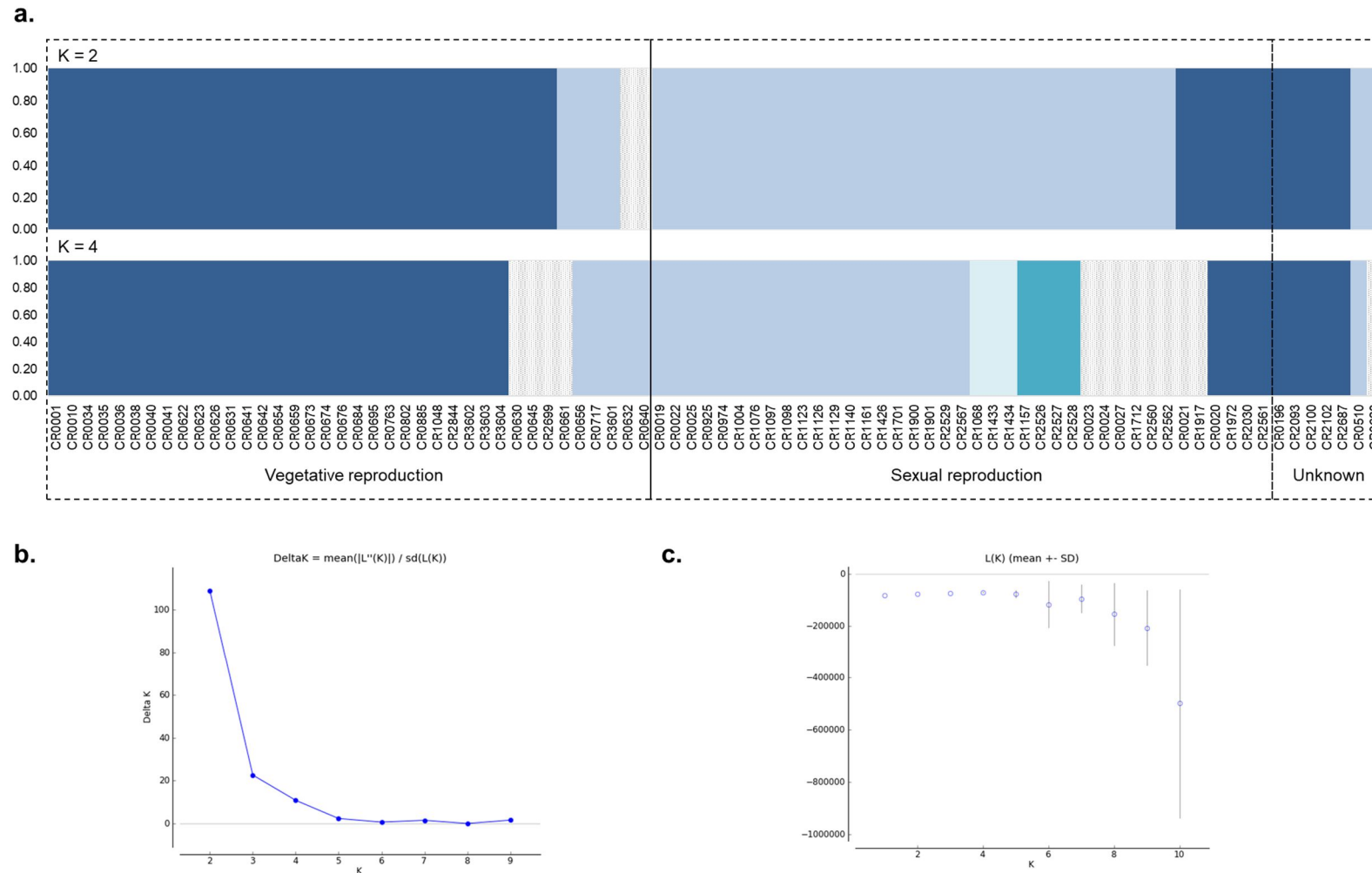
Supporting information Fig. S1 GBS loci distribution and density on *V. planifolia* cv *Daphna* chromosomes from 194,625 unfiltered SNP dataset. Horizontal axis displays the chromosome length. The density scale indicates the number of SNPs within 500 Kb window size. The plot shows the distribution of GBS SNPs across the 14 chromosomes.



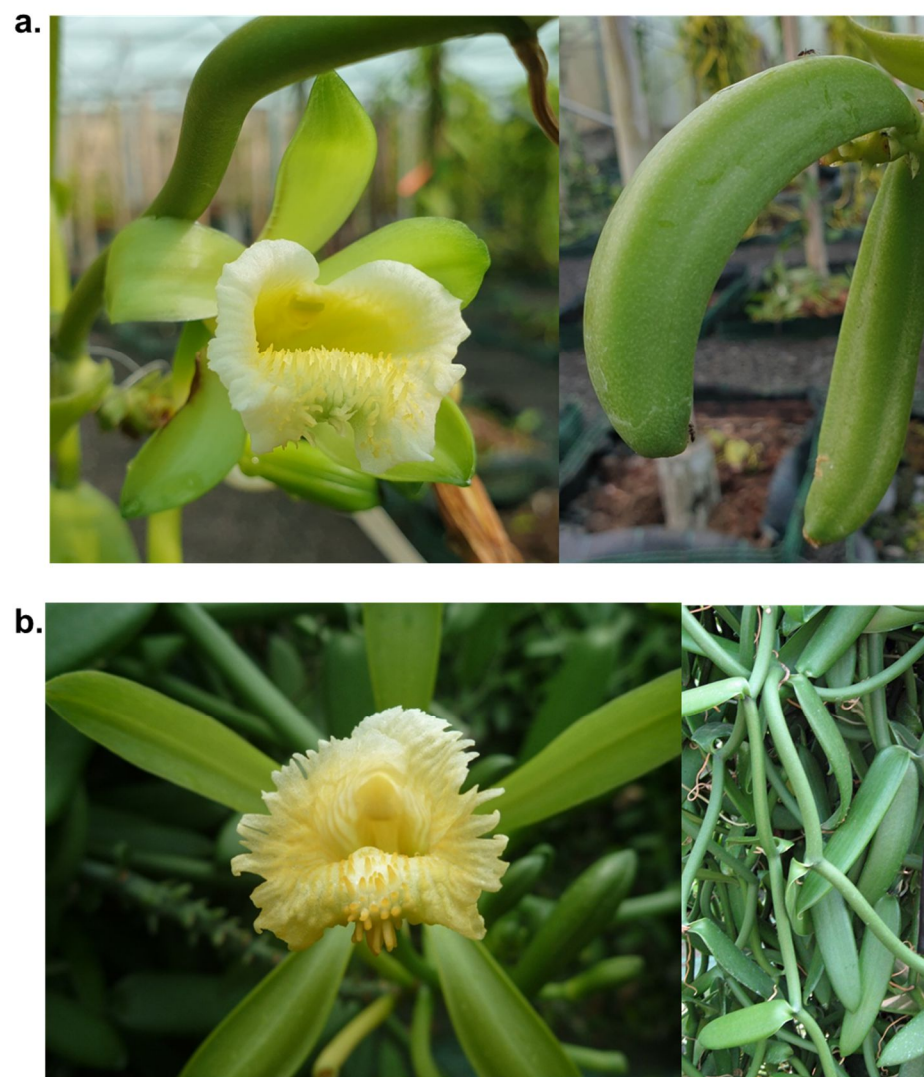
Supporting Information Fig. S2 Principal coordinates analysis (PCoA) based on 2,004 SNPs. Accessions are color-coded by species.



Supporting Information Fig. S3 Principal coordinates analysis (PCoA) based on 1,129 *Vanilla planifolia* SNPs. Accessions are color-coded by **a.** type of reproduction, **b.** growing area of cultivars, **c.** ploidy level.



Supporting Information Fig. S4 Genetic structure of 84 *V. planifolia* using 1,129 informative SNPs. a. Genetic clustering as determined by STRUCTURE for K = 2 et K = 4. The X-axis provides accessions and the y-axis provides the probability of each accession belonging to a cluster. Accessions are assigned to one cluster if their probability of belonging to this cluster is higher than 60%. The remaining accessions are classified as admixed. The dotted ground indicates accessions with admixture. **b.** DeltaK graph shows the best K as determined by STRUCTURE HARVESTER. **c.** Mean likelihood L(K) and standard deviation (SD) per K value from STRUCTURE HARVESTER.



Supporting Information Fig. S5 Morphology of a. *V. odorata* cf. CR3612 flower and fruits, b. *V. insignis* cf. CR0087 flower and leaves.