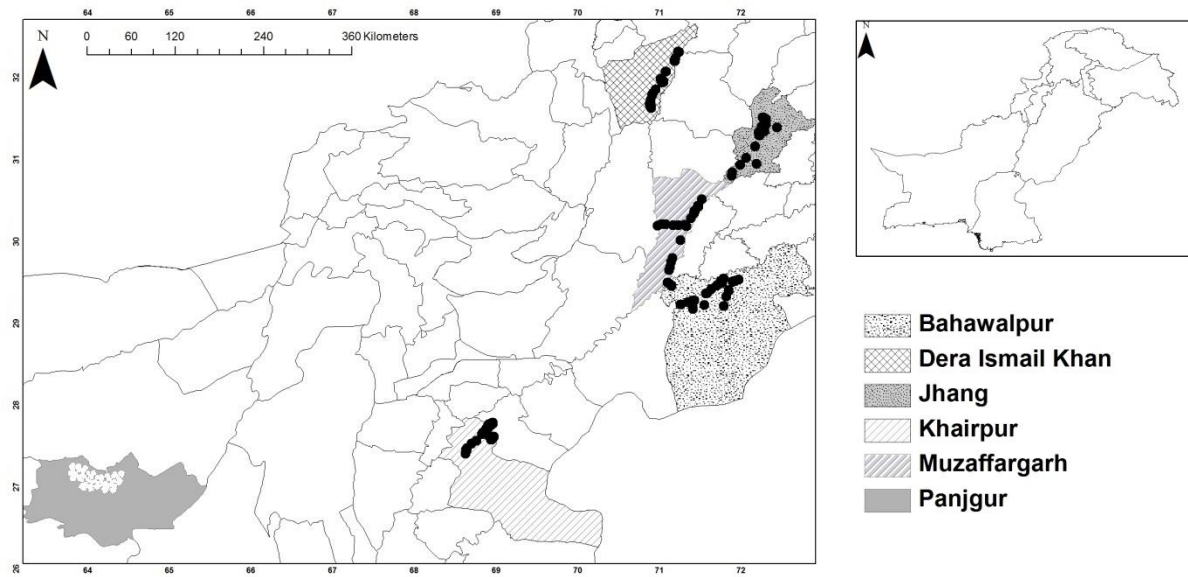


## Supplementary material



**Figure S1.** GIS-based map of the study area in Pakistan with the position of households interviewed during 2012-2013. Black dots mark the household's location in the three provinces Punjab, Khyber Pakhtunkhwa, and Sindh. White dots represent the approximated locations of interviewed households in Baluchistan province, since the recording of GPS coordinates was prohibited in this region.

**Table S1.** Means ( $\pm$ SD) of different nutritional properties of 27 date palm cultivars (individual number per cultivar <6) grown in four provinces of Pakistan during 2012-2013.

Cultivars	TSS <sup>+</sup> (g 100g <sup>-1</sup> )	Acidity (mg L <sup>-1</sup> )	Calcium (mg g <sup>-1</sup> )	Magnesium (mg g <sup>-1</sup> )	Firmness (kg)
Ajwa	62 *	5.6 *	0.47 *	0.29 *	0.31 *
Akhrot	61 *	5.5 *	0.47 *	0.28 *	0.29 *
Amber	63 *	5.7 *	0.47 *	0.29 *	0.38 *
Angoor	61 *	5.4 *	0.47 *	0.28 *	0.76 *
Barni	63 *	2.9 *	0.43 *	0.36 *	0.33 *
Basra	60 $\pm$ 4.7	6.1 $\pm$ 0.10	0.19 $\pm$ 0.06	0.19 $\pm$ 0.01	0.31 $\pm$ 0.01
Begum Jhangi	64 *	5.7 *	0.47 *	0.29 *	0.09 *
Berehmi	48 *	6.2 *	0.23 *	0.14 *	0.29 *
Chohara	53 $\pm$ 5.7	5.8 $\pm$ 0.10	0.16 $\pm$ 0.03	0.29 $\pm$ 0.01	0.29 $\pm$ 0.12
Danda	67 $\pm$ 4.7	5.9 $\pm$ 1.09	0.32 $\pm$ 0.03	0.30 $\pm$ 0.01	0.48 $\pm$ 0.05
Dandari	65 $\pm$ 11.5	5.1 $\pm$ 0.41	0.35 $\pm$ 0.06	0.23 $\pm$ 0.03	0.25 $\pm$ 0.14
Doki	45 *	4.1 *	0.44 *	0.88 *	0.44 *
Halawi	68 $\pm$ 4.2	5.9 $\pm$ 0.03	0.31 $\pm$ 0.03	0.29 $\pm$ 0.01	0.31 $\pm$ 0.02
Kalma	49 *	6.2 *	0.23 *	0.14 *	0.54 *
Ketchen	65 $\pm$ 4.6	6.2 $\pm$ 0.29	0.29 $\pm$ 0.03	0.29 $\pm$ 0.04	0.44 $\pm$ 0.04
Khudrawi	72 $\pm$ 5.2	4.2 $\pm$ 0.01	0.43 $\pm$ 0.04	0.42 $\pm$ 0.03	0.41 $\pm$ 0.06
<b>Khopra</b>	53 *	5.9 *	0.33 *	0.29 *	0.29 *
Meeri	54 *	5.5 *	0.46 *	0.29 *	0.54 *
Patal	55 *	5.4 *	0.49 *	0.30 *	0.52 *
Pathri	53 *	5.9 *	0.33 *	0.29 *	0.56 *
Sabzo	64 $\pm$ 0.4	6.3 $\pm$ 0.01	0.16 $\pm$ 0.02	0.24 $\pm$ 0.01	0.31 $\pm$ 0.03
Shamran	47 $\pm$ 3.3	5.9 $\pm$ 0.04	0.31 $\pm$ 0.02	0.29 $\pm$ 0.02	0.33 $\pm$ 0.01
Shershahi	57 *	5.6 *	0.46 *	0.29 *	0.44 *
Sufaida	52 $\pm$ 13.3	6.2 $\pm$ 0.05	0.34 $\pm$ 0.03	0.29 $\pm$ 0.03	0.61 $\pm$ 0.05
Sundri	61 $\pm$ 15.3	6.3 $\pm$ 0.31	0.34 $\pm$ 0.04	0.29 $\pm$ 0.03	0.59 $\pm$ 0.03
Zaidi	61 $\pm$ 23.4	6.2 $\pm$ 0.06	0.41 $\pm$ 0.01	0.24 $\pm$ 0.02	0.26 $\pm$ 0.06
Zeerin	55 *	5.6 *	0.46 *	0.29 *	0.52 *

+ TSS = Total Soluble Solids

\* Cultivars with sample size n = 1

**Table S2.** Means ( $\pm$ SD) of different morphological characteristics of 12 date palm cultivars (individual number per cultivar  $\geq$ 6) grown in four provinces of Pakistan during 2012-2013.

Cultivar	Frond length (cm)	Frond width (cm)	Fruit length (cm)	Fruit width (cm)	Seed length (cm)	Seed width (cm)	Fruit weight (g)	Seed weight (g)
Aseel	370 $\pm$ 20.3	61 $\pm$ 10.8	3.7 $\pm$ 0.55	1.9 $\pm$ 0.16	2.1 $\pm$ 0.18	1.0 $\pm$ 0.25	7.4 $\pm$ 0.91	1.0 $\pm$ 0.13
Desi	300 $\pm$ 20.4	60 $\pm$ 8.1	3.2 $\pm$ 0.47	1.7 $\pm$ 0.27	2.2 $\pm$ 0.32	0.7 $\pm$ 0.11	4.8 $\pm$ 1.86	0.9 $\pm$ 0.19
Dhakki	301 $\pm$ 27.3	60 $\pm$ 10.1	7.2 $\pm$ 1.13	2.9 $\pm$ 0.28	2.4 $\pm$ 0.21	1.0 $\pm$ 0.09	9.6 $\pm$ 2.73	1.4 $\pm$ 0.41
Haleni	309 $\pm$ 21.8	47 $\pm$ 11.6	4.0 $\pm$ 0.10	2.4 $\pm$ 0.25	2.0 $\pm$ 0.10	3.0 $\pm$ 3.70	9.4 $\pm$ 0.44	2.0 $\pm$ 0.19
Karbalaen	295 $\pm$ 29.4	58 $\pm$ 10.0	3.3 $\pm$ 0.17	1.7 $\pm$ 0.17	1.9 $\pm$ 0.15	0.9 $\pm$ 0.03	5.7 $\pm$ 0.52	0.9 $\pm$ 0.03
Karooh	299 $\pm$ 38.9	61 $\pm$ 10.5	3.3 $\pm$ 0.12	1.8 $\pm$ 0.30	2.3 $\pm$ 0.11	0.8 $\pm$ 0.09	3.1 $\pm$ 0.17	0.8 $\pm$ 0.06
Koharba	301 $\pm$ 15.2	61 $\pm$ 8.6	3.1 $\pm$ 0.13	1.9 $\pm$ 0.07	1.9 $\pm$ 0.04	0.8 $\pm$ 0.04	3.6 $\pm$ 1.43	1.0 $\pm$ 0.26
Khopra	288 $\pm$ 17.7	59 $\pm$ 16.3	2.8 $\pm$ 0.14	1.4 $\pm$ 0.05	1.9 $\pm$ 0.57	0.8 $\pm$ 0.07	4.0 $\pm$ 1.03	0.8 $\pm$ 0.21
Muzawati	297 $\pm$ 22.7	58 $\pm$ 11.2	4.2 $\pm$ 0.20	1.4 $\pm$ 0.31	2.3 $\pm$ 0.10	0.9 $\pm$ 0.10	7.2 $\pm$ 1.31	1.9 $\pm$ 0.54
Pori	255 $\pm$ 42.4	58 $\pm$ 17.7	3.3 $\pm$ 0.57	1.6 $\pm$ 0.42	2.4 $\pm$ 0.71	0.7 $\pm$ 0.09	4.5 $\pm$ 2.00	1.1 $\pm$ 0.16
Rati	300 $\pm$ 35.4	70 $\pm$ 10.0	2.9 $\pm$ 1.06	1.4 $\pm$ 0.21	2.1 $\pm$ 0.64	0.8 $\pm$ 0.07	3.7 $\pm$ 2.04	1.1 $\pm$ 0.64
Sawi	305 $\pm$ 7.1	52 $\pm$ 2.8	2.8 $\pm$ 0.21	1.3 $\pm$ 0.14	1.9 $\pm$ 0.28	0.6 $\pm$ 0.07	3.4 $\pm$ 0.21	0.8 $\pm$ 0.25

**Table S3.** Means of assessed parameters and calculated ratios of different morphological characteristics: FL (frond length, cm), FW (frond width, cm), FR (frond length-to-frond width ratio), FRL (fruit length, cm), FRW (fruit width, cm), FRR (fruit length-to- fruit width ratio), SL (seed length, cm), SW (seed width, cm), SR (seed length-to-seed width ratio), FWT (fruit weight, g), SWT (seed weight, g), FSR (fruit weight-to-seed weight ratio) of 27 date palm cultivars (individual number per cultivar <6) grown in four provinces of Pakistan during 2012-2013.

Cultivar	FL	FW	FR	FRL	FRW	FRR	SL	SW	SR	FWT	SWT	FSR
Ajwa	330	31	10.65	3.1	1.5	2.07	2.2	0.8	2.75	3.2	1.0	3.2
Akhrot	310	32	9.69	3.1	1.5	2.07	2.2	0.8	2.75	3.2	1.0	3.2
Amber	300	28	10.71	3.2	1.6	2.0	2.1	0.7	3.0	8.2	0.9	9.11
Angoor	340	32	10.62	3.1	1.5	2.07	2.2	0.8	2.75	3.2	1.0	3.2
Barni	330	80	4.13	2.9	1.5	1.93	1.9	0.8	2.38	3.1	0.9	3.44
Basra	318	60	5.3	3.9	2	1.95	2.2	0.7	3.14	4.4	0.8	5.5
Begum Jangi	300	61	4.92	3.2	1.5	2.13	2.1	0.7	3.0	4.5	0.9	5.0
Berehmi	310	70	4.43	3.7	2	1.85	2.4	0.7	3.43	4.0	1.1	3.65
Chohara	325	70	4.64	3.1	1.2	2.58	2.2	0.5	4.4	1.5	0.8	1.88
Denda	300	50	6.0	3.2	1.6	2.0	2.1	0.7	3.0	6.0	1.2	5.0
Dandari	300	60	5.0	3.2	1.7	1.88	2.2	0.7	3.14	4.8	0.9	5.33
Doki	301	60	5.02	3.2	1.5	2.13	2.1	0.7	3.0	4.5	0.9	5.0
Halawi	300	65	4.62	3.5	1.5	2.33	2.2	0.6	3.67	5.5	0.8	6.88
Kalma	290	60	4.83	3.1	1.6	1.94	2.4	0.6	4.0	5.4	0.9	6.0
Ketchen	310	54	5.74	3.2	2.2	1.45	2.2	0.7	3.14	4.9	1.1	4.45
Khudrawi	280	60	4.67	3.6	1.5	2.4	1.9	0.8	2.38	7.0	1.8	3.89
<b>Khopra</b>	300	61	4.92	3.1	1.6	1.94	2.4	0.6	4.0	5.4	0.9	6.0
Meeri	295	57	5.18	3.2	1.6	2.0	2.2	0.7	3.14	5.3	0.6	8.83
Patal	295	57	5.18	3.2	1.6	2.0	2.2	0.7	3.14	5.3	0.6	8.83
Pathri	290	60	4.83	3.1	1.6	1.94	2.4	0.6	4.0	5.4	0.9	6.0
Sabzo	370	52	7.12	3.3	1.9	1.74	2.3	0.6	3.83	5.0	0.7	7.14
Shamran	280	60	4.7	3.1	1.6	1.94	2.3	0.6	3.83	4.5	0.9	5.0
Shershahi	310	69	4.49	3.2	1.5	2.13	2.4	0.8	3.0	4.3	1.2	3.58
Sufaida	304	47	6.47	3.3	1.6	2.06	2.4	0.4	6.0	6.2	0.9	6.89
Sundri	305	60	5.08	3.2	1.7	1.88	2.4	0.6	4.0	3.0	0.7	4.29
Zaidi	225	45	5.0	3.1	1.8	1.72	2.3	0.6	3.83	5.4	1.0	5.4
Zeerin	300	68	4.41	3.2	1.5	2.13	2.4	0.8	3.0	4.3	1.2	3.58

**Table S4.** Means ( $\pm$ SD) of different morphological characteristics of 27 date palm cultivars (individual number per cultivar <6) grown in four provinces of Pakistan during 2012-2013.

Cultivar	Frond length (cm)		Frond width (cm)		Fruit length (cm)		Fruit width (cm)		Seed length (cm)		Seed width (cm)		Fruit weight (g)		Seed weight (g)	
Ajwa	330	*	31	*	3.1	*	1.5	*	2.2	*	0.8	*	3.2	*	1.0	*
Akhrot	310	*	32	*	3.1	*	1.5	*	2.2	*	0.8	*	3.2	*	1.0	*
Amber	300	*	28	*	3.2	*	1.6	*	2.1	*	0.7	*	8.2	*	0.9	*
Angoor	340	*	32	*	3.1	*	1.5	*	2.2	*	0.8	*	3.2	*	1.0	*
Barni	330	*	80	*	2.9	*	1.5	*	1.9	*	0.8	*	3.1	*	0.9	*
Basra	318	$\pm$ 60.0	60	$\pm$ 14.1	3.9	$\pm$ 1.34	2.0	$\pm$ 0.07	2.2	$\pm$ 0.35	0.7	$\pm$ 0.07	4.4	$\pm$ 2.46	0.8	$\pm$ 0.16
Begum Jhangi	300	*	61	*	3.2	*	1.5	*	2.1	*	0.7	*	4.5	*	0.9	*
Berehmi	310	*	70	*	3.7	*	2.0	*	2.4	*	0.7	*	4.0	*	1.1	*
Chohara	325	$\pm$ 70.0	70	$\pm$ 8.0	3.1	$\pm$ 0.19	1.2	$\pm$ 0.09	2.2	$\pm$ 0.31	0.5	$\pm$ 0.50	1.5	$\pm$ 0.05	0.8	$\pm$ 0.05
Denda	300	$\pm$ 10.0	50	$\pm$ 9.0	3.2	$\pm$ 0.29	1.6	$\pm$ 0.09	2.1	$\pm$ 0.09	0.7	$\pm$ 0.80	6.0	$\pm$ 0.07	1.2	$\pm$ 0.06
Dandari	300	$\pm$ 21.4	6	$\pm$ 8.1	3.2	$\pm$ 0.47	1.7	$\pm$ 0.27	2.2	$\pm$ 0.32	0.7	$\pm$ 0.09	4.8	$\pm$ 1.86	0.9	$\pm$ 0.19
Doki	301	*	60	*	3.2	*	1.5	*	2.1	*	0.7	*	4.5	*	0.9	*
Halawi	300	$\pm$ 11.0	65	$\pm$ 10.0	3.5	$\pm$ 0.06	1.5	$\pm$ 0.10	2.2	$\pm$ 0.10	0.6	$\pm$ 0.04	5.5	$\pm$ 0.13	0.8	$\pm$ 0.05
Kalma	290	*	60	*	3.1	*	1.6	*	2.4	*	0.6	*	5.4	*	0.9	*
Ketchen	310	$\pm$ 18.0	54	$\pm$ 8.0	3.2	$\pm$ 0.28	2.2	$\pm$ 0.08	2.2	$\pm$ 0.00	0.7	$\pm$ 0.08	4.9	$\pm$ 1.02	1.1	$\pm$ 0.04
Khudrawi	280	$\pm$ 9.0	60	$\pm$ 3.0	3.6	$\pm$ 0.08	1.5	$\pm$ 0.05	1.9	$\pm$ 0.40	0.8	$\pm$ 0.01	7.0	$\pm$ 0.12	1.8	$\pm$ 0.06
Khopra	300	*	61	*	3.1	*	1.6	*	2.4	*	0.6	*	5.4	*	0.9	*
Meeri	295	*	57	*	3.2	*	1.6	*	2.2	*	0.7	*	5.3	*	0.6	*
Patal	295	*	57	*	3.2	*	1.6	*	2.2	*	0.7	*	5.3	*	0.6	*
Pathri	290	*	60	*	3.1	*	1.6	*	2.4	*	0.6	*	5.4	*	0.9	*
Sabzo	370	$\pm$ 10.0	52	$\pm$ 5.0	3.3	$\pm$ 0.10	1.9	$\pm$ 0.02	2.3	$\pm$ 0.08	0.6	$\pm$ 0.05	5.0	$\pm$ 0.06	0.7	$\pm$ 0.05
Shamran	280	$\pm$ 15.0	60	$\pm$ 9.0	3.1	$\pm$ 0.07	1.6	$\pm$ 0.03	2.3	$\pm$ 0.20	0.6	$\pm$ 0.09	4.5	$\pm$ 0.11	0.9	$\pm$ 0.06
Shershahi	310	*	69	*	3.2	*	1.5	*	2.4	*	0.8	*	4.3	*	1.2	*
Sufaida	304	$\pm$ 24.0	47	$\pm$ 7.2	3.3	$\pm$ 0.26	1.6	$\pm$ 0.07	2.4	$\pm$ 0.19	0.4	$\pm$ 0.06	6.2	$\pm$ 0.12	0.9	$\pm$ 0.07
Sundri	305	$\pm$ 15.0	60	$\pm$ 7.4	3.2	$\pm$ 0.19	1.7	$\pm$ 0.04	2.4	$\pm$ 0.90	0.6	$\pm$ 0.04	3.0	$\pm$ 0.00	0.7	$\pm$ 0.05
Zaidi	225	$\pm$ 29.0	45	$\pm$ 9.6	3.1	$\pm$ 0.19	1.8	$\pm$ 0.08	2.3	$\pm$ 0.39	0.6	$\pm$ 0.03	5.4	$\pm$ 0.09	1.0	$\pm$ 0.08
Zeerin	300	*	68	*	3.2	*	1.5	*	2.4	*	0.8	*	4.3	*	1.2	*

\*Cultivars with sample size n = 1