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*Supplement of*

## **Pollen morphological variability correlates with a large-scale gradient of aridity**

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**Table S1.** Long-term monthly climatic data of the climatic zones in the region of Tebessa, NE Algeria

Climate parameters	January	February	March	April	May	June	July	August	September	October	November	December	Average
<b>Zone 1 (Ms.Med<sup>+</sup>)</b>													
Mean temperature [°C]	6.7±0.8	7.7±0.9	10.1±1.1	12.9±1.4	16.8±1.3	21.2±1.3	24.7±1.6	24.8±1	21.8±1.1	16.6±1.1	11.8±1.1	7.8±0.9	15.2±1.1
Maximum temperature [°C]	11.6±0.8	12.9±1.6	16.6±1.1	20.5±1.3	24.9±2.4	30.4±2.7	34.2±3.1	33.3±3	29.1±2.1	22.3±1.7	17.1±1.2	12.8±0.8	22.1±1.8
Minimum temperature [°C]	2.9±1.1	3.7±1.2	5.4±1.6	7.8±1.5	12±1.5	16.3±1.5	19±1.3	18.7±1.1	16.7±1.1	12.1±1.6	7.8±1.8	4.1±1.8	10.5±1.4
Precipitation [mm]	37.8±67.3	37.7±59.5	39.9±32.1	34.3±20.8	37.8±12.3	28.1±11	17.6±4.4	16.8±7.7	22.6±8.3	33±18	35.6±42	36.8±68.8	31.5±29.3
Potential evapotranspiration [mm]	36.1±10.7	47±10.5	76.6±16	100.6±20.6	124±15.2	153.6±19.4	181.3±18.1	163.7±16.1	122±12	85.1±12.9	48.4±9.8	40.1±11.3	98.2±14.4
Ground frost frequency [%]	20	16	9	2	0	0	0	0	0	0	2	14	5
Effective rain [mm]	35	35	37	32	36	27	17	16	22	31	34	35	358
Effective rain ratio [%]	94	94	94	95	94	96	97	97	96	95	94	94	95
Rainy days	7	7	7	6	5	4	2	2	3	5	6	7	61
Solid precipitation ratio [%]	8	6	3	1	0	0	0	0	0	0	2	6	3
<b>Zone 2 (Th.Med<sup>-</sup>)</b>													
Mean temperature [°C]	6.7±0.7	7.6±0.8	10.7±1	13.6±1.5	17.7±2	23±2	26.2±2.7	25.9±2.1	22.4±1.9	16±1.5	11.2±1	8±0.8	15.8±1.5
Maximum temperature [°C]	10.8±0.7	12.3±1.3	16.2±1.1	20.5±1.3	25±2.4	31±2.3	34.9±3.2	33.8±3	29.3±1.9	21.8±1.6	16.3±1.1	11.8±0.9	22±1.7
Minimum temperature [°C]	1.9±1.1	2.9±1.1	4.6±1.5	7.3±1.5	11.7±1.7	16.2±1.8	18.9±1.7	18.3±1.4	16.2±1.3	11.3±1.6	6.8±1.6	3±1.5	9.9±1.5
Precipitation [mm]	28.7±69.1	31.7±56.4	45.8±38	34.6±23.8	39.7±11.7	26.4±13.2	9.8±5.4	25.5±6.3	37.1±10.6	28.2±21.2	32.5±42.9	25.7±71.6	30.5±30.8
Potential evapotranspiration [mm]	33.2±11.6	45.2±11.4	75.3±23	100.2±27.7	123±26.3	153.7±28.9	181.6±28.6	165.3±21.9	122.5±17.3	83.1±19.9	45.6±14.9	38.3±13.2	97.3±20.4
Ground frost frequency [%]	25	20	12	3	0	0	0	0	0	0	4	20	7
Effective rain [mm]	27	30	42	33	37	25	10	24	35	27	31	25	346
Effective rain ratio [%]	95	95	93	94	94	96	98	96	94	95	95	96	95
Rainy days	5	6	8	5	6	3	1	3	5	4	5	5	56
Solid precipitation ratio [%]	8	6	2	1	0	0	0	0	0	1	2	5	2
<b>Zone 3 (Th.Med<sup>+</sup>)</b>													
Mean temperature [°C]	6.5±1.1	7.5±1	10.6±1.2	13.5±1.3	17.5±1.3	22.8±1.5	26±1.8	25.7±1.8	22.2±1.7	15.8±1.5	11.1±1.2	7.9±1	15.6±1.4
Maximum temperature [°C]	10.6±2.5	12.1±2.4	16.1±2.5	20.5±2.6	25±3	31.1±3.5	35±3.7	33.9±3.4	29.3±2.4	21.7±2.5	16.1±2.3	11.6±2.5	21.9±2.8
Minimum temperature [°C]	1.7±2.5	2.7±2.3	4.4±2.7	7.1±3	11.6±3.2	16.1±3.5	18.8±3.5	18.2±3.3	16.1±2.5	11.1±2.8	6.6±2.9	2.7±2.8	9.8±2.9
Precipitation [mm]	27±21.1	30±26.8	46±25.7	34±15.6	40±12.7	27±10.2	10±3.6	26±5.7	37±10.1	28±8.3	32±14.4	24±26.1	30.1±15
Potential evapotranspiration [mm]	32.6±11.1	44.7±12.4	74.8±22.8	99.9±25.8	122.5±27.3	153.5±29.5	181.4±27.9	165.4±22.9	122.4±18	82.5±19.7	44.9±17.4	37.9±12.3	96.9±20.6

Ground frost frequency [%]	27	21	13	4	0	0	0	0	0	0	5	21	7
Effective rain [mm]	26	29	43	32	37	26	10	25	35	27	30	23	342
Effective rain ratio [%]	96	95	93	95	94	96	98	96	94	96	95	96	95
Rainy days	5	5	8	5	6	3	1	3	5	4	5	4	54
Solid precipitation ratio [%]	8	6	3	1	0	0	0	0	0	1	2	5	2
<b>Zone 4 (X.T.Med)</b>													
Mean temperature [°C]	5.7±0.8	6.6±0.8	9.6±0.9	12.4±1.5	16.3±1.5	21.7±2	24.8±2.2	24.5±1.8	21.1±1.5	14.8±1.5	10.3±1	7.1±0.6	14.6±1.4
Maximum temperature [°C]	9.7±0.7	11.2±1.1	15.4±1.5	20±2.1	24.5±2.5	31.1±3.6	35±3.8	33.8±3.3	29.1±2.4	21±1.6	15.2±1.2	10.7±1	21.4±2.1
Minimum temperature [°C]	0.8±0.8	1.9±1	3.6±1.6	6.3±2.2	10.9±2.7	15.6±3.2	18.3±3.1	17.5±2.6	15.5±1.9	10.3±1.6	5.7±1.5	1.7±1.5	9±2
Precipitation [mm]	31.3±13.7	34.6±10.6	52.6±14.5	37.9±7.7	45.6±8	30.1±13.7	11.7±4.5	28±7.1	39.8±7.5	31.9±4.8	37.2±7.3	28.7±12.2	34.1±9.3
Potential evapotranspiration [mm]	29.3±11.6	41.6±12.9	71.3±23.6	96.7±27.4	117.3±28.2	150.8±30.6	178±29.9	163.9±24.4	120.6±19.1	78.4±20.4	40.5±16.8	36.4±13.5	93.7±21.5
Ground frost frequency [%]	32	26	17	6	0	0	0	0	0	0	8	27	9
Effective rain [mm]	30	33	48	36	42	29	11	27	37	30	35	27	385
Effective rain ratio [%]	95	94	92	94	93	95	98	96	94	95	94	95	94
Rainy days	6	6	9	6	7	4	1	3	5	5	6	5	63
Solid precipitation ratio [%]	10	8	3	1	0	0	0	0	0	1	3	7	3
<b>Zone 5 (Sb.Des<sup>-</sup>)</b>													
Mean temperature [°C]	9.8±1.1	11.6±1	15.1±1.5	19±2	23.3±1.8	27.8±2.4	31±2.6	30.7±2.3	27.1±2.1	21.8±1.8	15.6±1.2	10.8±0.8	20.3±1.7
Maximum temperature [°C]	15.8±2.4	19±2.4	22±2.4	25.7±2.8	31.1±3.3	34.7±3.5	39±3.9	38.2±3.4	32.7±2	27.6±2.4	21.2±2.2	15.6±2.3	26.9±2.8
Minimum temperature [°C]	4.5±2.3	6.8±2.1	9.3±2.6	12.6±3.1	17.6±3.3	21.7±3.9	24.2±3.6	24.6±3.5	20.7±2.9	15.6±2.7	10±2.3	5±2.3	14.4±2.9
Precipitation [mm]	15±13.2	11±13.2	16±17.1	14±9.4	11±12.2	5±11.7	1±3.5	7±5.7	14±10.9	13±8.3	17±8.9	13±14.2	11.4±10.7
Potential evapotranspiration [mm]	53.8±8.7	64.9±11.1	116.3±20.8	145.1±24.4	191.6±29.2	205.8±28.7	237.6±32.2	212.3±22.7	159.8±17.7	123.1±19.8	80±14.7	54.9±21.4	137.1±20.9
Ground frost frequency [%]	12	4	0	0	0	0	0	0	0	0	0	10	2
Effective rain [mm]	15	11	16	14	11	5	1	7	14	13	17	13	134
Effective rain ratio [%]	98	98	97	98	98	99	100	99	98	98	97	98	98
Rainy days	3	2	3	2	1	1	0	1	2	2	3	2	22
Solid precipitation ratio [%]	3	2	1	0	0	0	0	0	0	0	1	2	1
<b>Zone 6 (Sb.Des<sup>+</sup>)</b>													
Mean temperature [°C]	9.8±1.3	11.6±1.3	15.1±1.4	19±2.2	23.3±2.1	27.8±3	31±3	30.7±2.7	27.1±2.2	21.8±1.9	15.6±1.3	10.8±0.9	20.3±1.9
Maximum temperature [°C]	15.8±2.6	19±2.5	22±2.5	25.7±2.7	31.1±3.3	34.7±3.4	39±4.2	38.2±3.7	32.7±2.3	27.6±2.5	21.2±2.3	15.6±2.7	26.9±2.9
Minimum temperature [°C]	4.5±2.7	6.8±2.5	9.3±3.1	12.6±3.6	17.6±3.6	21.7±4.1	24.2±3.8	24.6±3.7	20.7±3.2	15.6±3.2	10±3	5±2.8	14.4±3.3
Precipitation [mm]	15±16.9	11±14.8	16±24	14±13	11±13.4	5±12.7	1±3.5	7±5.7	14±9.4	13±8.1	17±12.2	13±14.7	11.4±12.4

Potential evapotranspiration [mm]	53.8±9.4	64.9±10.4	116.3±21.7	145.1±24.4	191.6±28.1	205.8±27.1	237.6±30.7	212.3±23.3	159.8±17	123.1±19.4	80±15.3	54.9±19	137.1±20.5
Ground frost frequency [%]	12	4	0	0	0	0	0	0	0	0	0	10	2
Effective rain [mm]	15	11	16	14	11	5	1	7	14	13	17	13	134
Effective rain ratio [%]	98	98	97	98	98	99	100	99	98	98	97	98	98
Rainy days	3	2	3	2	1	1	0	1	2	2	3	2	22
Solid precipitation ratio [%]	3	2	1	0	0	0	0	0	0	0	1	2	1
<b>Zone 7 (Desert)</b>													
Mean temperature [°C]	10.1±0.9	11.9±0.9	15.4±1.2	19.6±1.8	23.7±1.6	28.4±2.6	31.6±2.6	31.4±2.2	27.9±1.8	21.8±1.4	15.8±0.9	11.2±0.9	20.7±1.6
Maximum temperature [°C]	15.3±0.5	18.5±0.6	21.6±1.5	25.3±2.1	30.7±2.4	34.4±2.6	38.7±3.2	37.9±2.6	32.4±1.2	27.1±0.5	20.7±0.5	15.2±0.8	26.5±1.5
Minimum temperature [°C]	4.2±1.5	6.4±1.4	8.9±2.1	12.2±2.8	17.2±3.2	21.3±3.8	23.8±3.4	24.2±3	20.3±2.7	15.2±2.1	9.6±1.7	4.7±1.4	14±2.4
Precipitation [mm]	11.9±14.6	10.1±13	16.1±22.3	11.6±11.9	7.6±11.5	4.4±11.3	0.8±4.3	3±6.7	8.3±6.6	10.8±7.1	14.3±11.3	12±9.9	9.2±10.9
Potential evapotranspiration [mm]	52.1±14	63.4±15.6	114.4±27.2	143.6±31.1	189.4±33.1	204.7±31.9	236.5±36	211.7±25.5	158.9±20.9	121.4±23.5	78.1±17.9	54±20.5	135.7±24.8
Ground frost frequency [%]	14	5	1	0	0	0	0	0	0	0	0	12	3
Effective rain [mm]	12	10	16	11	7	4	1	3	8	11	14	12	109
Effective rain ratio [%]	98	98	97	98	99	99	100	100	99	98	98	98	98
Rainy days	2	2	3	2	1	0	0	0	1	1	2	2	16
Solid precipitation ratio [%]	3	2	1	0	0	0	0	0	0	0	1	2	1