

Supplementary Tables

Table 1. Morphological characters state and code used for PCA.

Organs/Plant part	Character	State	Code
General habit	1-Longevity (GhL)	Perennial	0
		Annual	1
	2-Juvenile growth (GhJ)	Erect	0
		Prostrate to erect	1
		Prostrate	2
		3-Color appearance (SCa)	Glaucous
3-Color appearance (SCa)	Green light	1	
	Green	2	
	Dark green	3	
	4-Culm (SCu)	Geniculate	0
Prostrate		1	
Prostrate to erect		2	
Erect		3	
Stem	5-Height (SHe)	cm	
	6-Hairiness of upper most node (SHu)	Weak	0
		Medium	1
		Strong	2
	7-Lower internode diameter (SLd)	mm	
	8-Lower internode length (SLl)	cm	
	9-Internodes (roughness) (SIR)	Smooth	0
		Scabrous	1
	10-Culm consistency (SCc)	Firm	0
		Spongy	1
11-Peduncle (SPe)	Straight	0	
	Slightly bent	1	
	Curved	2	
Leaf	12-Lobes (LeL)	Absent	0
		Present	1
	13-Intensity of green color (LeI)	Light	0
		Medium	1

	Dark	2	
	Absent	0	
14-Blade: hairiness of margins (LeB)	Weak	1	
	Medium	2	
	Absent	0	
15-Lowest leaves: hairiness of sheaths (LeS)	Weak	1	
	Medium	2	
	Strong	3	
16-Total length of longest green leaf (including petiole) (LeT)	Short	0	
	Short to medium	1	
	Medium to long	2	
	Long	3	
17-Flag leaf: glaucosity of sheath (LeF)	Absent	0	
	Weak	1	
	Medium	2	
	Strong	3	
18--Width at widest point (LeW)	Narrow	0	
	Medium	1	
	Broad	2	
19-Ligules shape at younger (LLs)	Obtuse	0	
	Acute	1	
	Obtuse with a point	2	
	Truncate with a point	3	
20-Ligules length on culm leaves (LLI)	mm		
Panicle	Equilateral	0	
	Equilateral to Slightly flagged	1	
	Slightly flagged	2	
	Flagged	3	
	Flagged or nearly so	4	
	Lax	0	
	22-Density (PaD)	Intermediate	1
		Dense	2
	23-Length (PaL)	Short	0
		Medium	1
Long		2	
Spikelets	24-Length without awns (SL)	mm	
	25-Number of florets (SN)	1 to 5	

	Semi-abscission	0
26-Separating from peduncle (SS)	Abscission	1
	Fracture only	2
	Subulate	0
27-Glume's shape (GS)	Lanceolate	1
	Cordate	2
	Equal	0
28-Glumes relative length (GR)	Nearly	1
	Slightly unequal	2
	Unequal	3
29-Upper glume length (GUL)	mm	
30-Lower glume length (GLI)	mm	
31-Upper Glume width (GUw)	mm	
32-Lower glume width (GLw)	mm	
33-Number of veins of upper glume (GNu)	3 to 11	
34-Presence of keels (GP)	Without keels	0
	Keeled	1
35-Florets: disarticulation (FDd)	Not-disarticulating	0
	Disarticulating	1
	All the florets are no disarticulating	0
	Only lowermost floret disarticulating	1
36-Floret's mode of disarticulation (FMd)	All the florets are disarticulating	2
	Basi-fracture	0
37-Separate (FSd)	Hetero-fracture	1
	Distal	2
	Disarticulating	3
	Not-existing	0
38-Shape of first floret scar (SSf)	Oval	1
	Round	2
	Heart-shaped or slightly so	3
	Elliptic	4
	Narrow elliptic	5
	Linear	6
	Not-existing	0
39-Shape of third floret scar (SSt)	Heart-shaped	1
	Not heart-shaped	2
	Not-existing	0
40-Periphery ring (SP)	Not-existing	0

		Confined to $\frac{1}{3}$ - $\frac{1}{2}$ scar	1	
		Confined to $\frac{1}{3}$ scar	2	
		Confined to $\frac{1}{4}$ scar	3	
		Confined to $\frac{1}{8}$ scar	4	
		Confined to $\frac{1}{8}$ - $\frac{1}{16}$ scar	5	
	41-Length (ScL)	mm		
	42-Width (ScW)	mm		
Callus	43- Shape (CS)	Absent	0	
		Oval	1	
		Round	2	
		Elliptical	3	
		linear elongated	4	
		Awl-shaped	5	
		White	0	
		Yellow	1	
		Red	2	
	44-Color (LCe)	Brownish-Red	3	
		Brown	4	
		Gray	5	
		Black	6	
		Glabrous	0	
	45-Hairiness (LHa)	Some glabrous and some hairy	1	
		Hairy	2	
Lemma	46-Place of awn insertion (LPa)	Absent or rudimentary, or inserted about middle of lemma to below tip	0	
		Inserted at about lower one-third	1	
		Inserted between lower one-third and one-half	2	
		Inserted at about middle	3	
		Inserted at about upper one-third	4	
		Inserted between upper one-third and one-quarter	5	
			Tough	0
		47-Structure (LSt)	Resembling glumes	1
			Tough or resembling glumes	2
			Bidenticulate	0
	Bisubulate	1		
	Biaristulate	2		
	48-Shape of tip (LTt)	Bisetulate-biaristulate	3	

		Bisubulate to biaristulate	4
		Bidenticulate to bisubulate	5
	49-Grain husk (LGh)	Absent	0
		Present	1
		1 or absent	0
		2	1
	50-Number of awns (AN)	2 - 3	2
		3 or up	3
	51-Dorsal awn length (AD)	mm	
		Gray	0
Awns	52-Color (AC)	Brown on lower part	1
		Dark on lower part	2
		Not pubescent below geniculation	0
	53-Pubesnce (AP)	Pubescent below geniculation	1
		Without macrohairs below awn insertion	0
	54-Vestiture below awn insertion (AV)	Without macrohairs or a few around awn insertion	1
		Beset densely with macrohairs	2
		Absent or minute	0
	55-Presence (PP)	Present	1
		Straight	0
	56-Apex (incision) (PI)	Oblic	1
		muticous	0
	57-apex (presence of awn) (PA)	Awned	1
		1	0
Palea		1 or 2	1
	58-Rows of cilia along edges of keels (PR)	2	2
		1 - 3	3
		Glabrous	0
		Prickles	1
	59-Vestiture of back (PV)	Macrohairs	2
		Prickles or Glabrous	3
		Sativa	0
	60-Type (LTy)	Fatua	1
Lodicule		Fatua and Sativa	2
		Absent	0
	61-Prickles (LPr)	Present	1
Rachilla	62- Type presence (RT)	Present with lower most floret	0

		Present with all florets	1
	63-Length (RL)	mm	
		Absent	0
	64-Pubescence (RP)	Only the lowest floret	1
		Under all the florets	2
Epiblast	65-Type (ET)	Brevis	0
		Fatua	1
		Septentrionalis	2
		Sativa	3
		Sativa and Brevis	4
	66-Median range (EM)	mm	
Grain	67-Length (L)	mm	
	68-Wide (W)	mm	
	69-Thickness (T)	mm	

Table 2. Eco-geographic characteristics and Emberger quotient calculation of sampling sites of Algeria *Avena L.* species.

N°	Sites	Positions (latitude, longitude)	Accessions	Alt	Stat. Alt	Q2	Climate Type
1	Echatt	36°50'22.64"N, 7°55'39.83"E	hir	16	2	93.80	SH-warm winter
2	Guerbes	36°54'56.34"N, 7°10'20.75"E	wie	35	2	124.26	
3	Filfila	36°53'47.66"N, 7° 3'49.20"E	bar	39	2	124.83	
4	Skikda	36°51'0.19"N, 6°55'0.45"E	wie	81	2	130.85	
5	Kerkera	36°55'14.32"N, 6°35'29.76"E	bar	27	2	123.12	
6	Collo	36°59'37.80"N, 6°33'46.92"E	bar	27	2	123.12	
7	Sidi Abdelaziz	36°51'29.87"N, 6°3'47.86"E	bar-hir	12	8	119.85	
8	El KennarNouchfi	36°49'43.56"N, 5°57'56.45"E		14	8	120.11	SH-mild winter
9	Boumerdes	36°45'50.68"N, 3°28'54.78"E	bar-hir-wie	10	58	123.12	
10	Mazagran	35°53'22.78"N, 0° 3'48.02"E	bar-hir-lon-eri-cla	122	137	123.12	
11	Bethioua	35°46'14.41"N, 0°14'22.42"O	bar-eri-cla	71	90	119.85	SH-mildwinter
12	Oran	35°39'17.16"N, 0°41'53.59"O	bar-lon-eri-cla-ven	181	90	120.11	
13	El Tarf	36°45'44.99"N, 8°20'50.75"E	bar-wie	29	2	129.51	
14	Bouteldja	36°47'37.83"N, 8°11'36.82"E	hir	12	2	92.64	
15	Lac des Oiseaux	36°46'21.54"N, 8° 6'23.49"E		6	2	53.33	
16	Ben M'hidi	36°45'43.03"N, 7°54'46.61"E	bar	7	2	61.27	SH-mildwinter
17	El Besbas	36°42'25.97"N, 7°49'28.72"E	wie	17	2	77.04	
18	Berrahal	36°49'47.81"N, 7°28'14.28"E	wie	32	2	33.19	

19	Ramdane Djamel	36°44'56.74"N, 6°53'49.36"E	bar	39	2	92.72	
20	Tamalous	36°49'21.26"N, 6°39'4.91"E	hir	54	2	92.91	
21	Bin el oudiene	36°48'40.53"N, 6°33'3.35"E	bar	90	2	92.36	
22	Ain kechra	36°45'3.07"N, 6°25'21.23"E	hir	239	2	91.46	
23	Settara	36°43'48.83"N, 6°20'35.14"E		182	8	91.52	
24	El milia	36°44'20.96"N, 6°17'1.38"E	bar-hir	214	8	92.15	
25	AinTinn	36°23'46.66"N, 6°19'48.33"E	bar	614	437	92.34	
26	Mila	36°27'19.52"N, 6°14'29.26"E		413	437	106.02	
27	Zeghaïa	36°27'55.06"N, 6°10'57.87"E	bar-wie	374	437	121.63	SH-temperate winter
28	Redjas	36°25'51.50"N, 6°7'48.42"E	bar	340	437	124.74	
29	Ferdjioua	36°23'59.66"N, 5°55'35.25"E		506	437	125,14	
30	Kherrata	36°28'37.51"N, 5°16'42.68"E	hir	522	2	132.20	H-mild winter
31	El kseur	36°40'33.12"N, 4°52'2.70"E	bar-hir-wie	37	2	120.61	SH-mild winter
32	Sidi aiche	36°34'35.36"N, 4°39'44.72"E	bar	101	2	121.56	SH-temperate winter
33	Tazmalt	36°23'10.22"N, 4°24'32.42"E	bar-hir-wie	284	555	122.51	
34	Issers	36°43'28.40"N, 3°39'0.97"E	hir-wie	24	58	124.10	SH-mild winter
35	Boudouaou	36°43'20.80"N, 3°25'17.91"E	hir-wie-eri	46	58	133.52	
36	Hoceinia	36°19'54.53"N, 2°25'14.94"E	bar	285	294	123.70	USA-mild winter
37	Ain defla	36°14'49.02"N, 1°55'43.11"E		273	294	126.59	
38	Yellel	35°43'35.42"N, 0°21'56.07"E	bar	115	95	138.85	LSA-mild winter
39	Sirat	35°46'38.59"N, 0°11'37.25"E		49	137	133.64	
40	Boutlélis	35°34'59.24"N, 0°49'24.25"O	wie	98	90	136.15	HSA-mild winter
41	AinTémouchent	35°18'0.41"N, 1°9'54.36"O	bar-wie	207	235	83.42	
42	El amirabdelkader	35°12'55.22"N, 1°24'49.43"O	bar	18	235	104.15	LSA-warm winter
43	M'Daourouche	36°5'20.67"N, 7°49'41.19"E	lon	856	680	91.78	SH-cool winter
44	Guelma	36°27'14.78"N, 7°26'54.82"E	wie	270	227	89.44	
45	Hammam Debagh	36°26'8.18"N, 7°18'4.53"E	hir	315	227	87.42	SH-temperate winter
46	Ksar Sbahi	36°5'0.78"N, 7°16'7.60"E	lon	878	889	97.43	USA-cool winter
47	Ain abid	36°14'21.37"N, 6°57'46.15"E	bar	882	693	45.55	
48	El khroub	36°14'41.72"N, 6°43'38.05"E	bar-wie	701	693	172.50	SH-cool winter
49	Zighoud Youcef 1	36°31'1.02"N, 6°41'50.58"E	bar-hir	532	693	131.02	
50	Zighoud Youcef 2	36°32'13.13"N, 6°41'32.15"E	bar	674	693	116.96	
51	Ksar Naadja	36°31'34.30"N, 6°39'11.22"E		677	693	89.38	
52	Beni Hamidene	36°29'45.00"N, 6°34'25.59"E		442	693	160.69	SH-temperate winter
53	Didouchemourad	36°28'14.05"N, 6°38'3.36"E	bar-hir	483	693	97.14	SH-cool winter
54	Université Cne1	36°20'23.05"N, 6°37'10.97"E		612	693	95.97	
55	Université Cne3	36°16'51.03"N, 6°35'25.12"E	bar	744	693	94.76	

56	Hammabouziane	36°24'54.04"N, 6°36'41.83"E		524	693	95.96	SH-temperate winter
57	Aïn Smara	36°15'22.14"N, 6°29'6.19"E		616	693	110.37	SH-cool winter
58	Ibn Ziad	36°22'55.14"N, 6°29'00.50"E	bar-wie	485	693	62.25	SH-temperate winter
59	Oued el Athmania	36°14'40.27"N, 6°18'12.02"E	bar-hir	688	437	61.61	
60	ChelghoumLaïd	36°11'7.35"N, 6°11'11.44"E	wie	754	437	45.24	SH-cool winter
61	El Eulma	36°10'19.23"N, 5°41'28.93"E	lon	978	1007	52.10	HSA-cold winter
62	Setif	36°12'1.57"N, 5°27'30.99"E	hir	1108	1007	64.57	SH-cold winter
63	Bordj Bou Areridj	36° 2'43.25"N, 4°47'59.62"E	bar-lon	912	928	69.20	LSA-cool winter
64	Ain Oussara	35°27'23.91"N, 2°49'35.98"E	lon	671	1180	56.79	UA-cool winter
65	Médéa	36°15'2.27"N, 2°44'5.31"E		748	1030	77.74	SH-temperate winter
66	Boumedfaa	36°20'36.40"N, 2°31'17.45"E		330	294	90.96	HSA-cool winter
67	Mahdia	35°25'53.81"N, 1°43'29.20"E	bar	915	997	63.35	HSA-cool winter
68	Chlef	36°7'56.54"N, 1°21'59.37"E		156	143	73.31	LSA-mild winter
69	Tiaret	35°22'21.23"N, 1°18'20.16"E		1062	997	73.60	HSA-cool winter
70	Rahouia	<u>35°32'13.89"N, 1° 0'1.09"E</u>		623	997	75.94	LSA-temperate winter
71	Oued Rhiou	35°58'23.00"N, 0°54'24.36"E		63	95	54.29	LSA-mild winter
72	Oued el abtal	35°27'18.71"N, 0°41'15.27"E	bar-hir	263	511	95.10	
73	Matmar	35°43'49.89"N, 0°28'23.37"E	bar-hir-lon	68	95	97.75	
74	Tighenif	35°23'56.37"N, 0°17'49.31"E	bar-hir-lon	497	511	86.14	HSA-temperate winter
75	Mascara	35°21'58.25"N, 0°6'2.02"E	bar-hir	491	511	101.23	
76	Bou Hanifia	35°17'37.29"N, 0° 5'22.26"O	hir	297	511	75.67	LSA-mild winter
77	Sidi Bel abbès	35°10'32.43"N, 0°34'50.00"O	bar-lon	484	475	84.44	HSA-tempearte winter
78	Tlemcen	34°52'52.24"N, 1°17'26.86"O	bar	776	246	84.63	SH-cool winter
79	Moghnia	34°50'28.62"N, 1°46'2.45"O	bar	399	428	70.24	HSA-temperate winter
80	El Aouinet	35°52'26.34"N, 7°52'51.83"E	hir	643	680	72.70	UA-cool winter
81	Berriche	35°54'15.70"N, 7°22'10.16"E	bar	902	889	80.58	HSA-cool winter
82	Guettar El Aich	36°11'28.41"N, 6°35'10.58"E		749	693	88.86	SH- cool winter
83	Fesdis	35°36'39.03"N, 6°14'2.63"E	bar-wie-lon	956	822	75.19	LSA-cool winter
84	Batna	35°34'25.52"N, 6°11'7.49"E	wie-lon	1015	822	80.83	HSA-cool winter
85	Hidoussa	35°30'32.76"N, 5°57' 8,96"E	wie	1446	822	72.82	SH-cold winter
86	M'sila	<u>35°39'58.02"N, 4°30'37.89"E</u>	bar	446	441	71.26	UA-temperate winter
87	Ichemoul	35°18'13,03"N, 6°33'39,85"E	wie	1525	822	108.84	SH-cold winter
88	Ichemoul2	35°17'51,10"N, 6°36'46,22"E	ven	1777	822	113.10	
89	Bou Saâda	35°11'48.24"N, 4° 9'5.68"E	lon	702	111	119.40	LSA-cool winter
90	Hamla	35°34'33.39"N, 6° 2'28.03"E		1568	822	47.42	SH-cold winter
91	Oued Echaaba 1	35°34'26.55"N, 6° 1'58.85"E		1563	822	53.44	
92	Oued Echaaba 2	35°34'24.48"N, 5°59'29.08"E	mac	1737	822	36.72	
93	Djurdjura 3	36°28'20.42"N, 4°12'26.61"E		1641	555	89.36	H-cold winter

94	Djurdjura 2	36°27'49.78"N, 4°11'00.26"E	1613	555	27.18
95	Djurdjura 1	36°27'36.00"N, 4°09'52.24"E	1810	555	73.85
96	Tikejda 3	36°27'39.28"N, 4°08'42.18"E	1651	555	55.88
97	Tikejda 2	36°27'37.48"N, 4°08'09.17"E	1605	555	57.41
98	Tikejda 1	36°26'28.03"N, 4°06'53.46"E	1498	555	50.98