

Phytosociological Research Center

www.globalbioclimatics.org

Worldwide Bioclimatic Classification System

S.Rivas-Martinez(+) & S.Rivas-Saenz

(Adapted to Synoptical Table 14/02/2020)

BUJARALUZ (ESP ZARAGOZA)

Altitude: 327 m.

Latitude: 41°30'N Longitude: 0°9'W

Temperature observation period.: 1963-1970 (8)

Rainfall observation period....: 1963-1970 (8)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	EPI
Jan.	6.80	10.40	3.20	15.00	-1.20	26.0	14.16
Feb.	6.70	11.30	2.10	15.80	-2.20	24.0	13.85
Mar.	9.20	14.30	4.20	19.70	-0.50	30.0	28.08
Apr.	12.20	17.50	7.00	24.30	2.60	26.0	46.78
May.	15.70	21.10	10.30	28.00	5.20	38.0	77.04
Jun.	21.00	27.70	14.30	36.00	10.20	39.0	120.52
Jul.	25.40	33.20	17.60	39.20	14.60	19.0	161.92
Aug.	24.00	30.90	17.20	37.80	13.00	23.0	138.17
Sep.	20.40	26.60	14.20	30.30	10.00	39.0	94.46
Oct.	15.80	20.90	10.80	25.00	6.20	53.0	58.65
Nov.	9.30	13.70	5.00	18.60	0.80	38.0	22.73
Dec.	6.70	10.30	3.10	14.20	-2.50	36.0	13.34
Year	14.43	19.82	9.08	25.33	4.68	391	789.69

BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	278
Compensated thermicity index.....(Itc):	282
Simple continentality index.....(Ic):	18.7
Diurnality index.....(Id):	15.6
Annual ombrothermic index.....(Io):	2.26
Monthly estival ombrothermic index.....(Ios1):	0.75
Bimonthly estival ombrothermic index.....(Ios2):	0.85
Threemonthly estival ombrothermic index.....(Ios3):	1.15
Fourmonthly estival ombrothermic index.....(Ios4):	1.38
Annual ombro-evaporation index.....(Ioe):	0.50
Annual positive temperature.....(Tp):	1732
Annual negative temperature.....(Tn):	0
Estival temperature.....(Ts):	704
Positive precipitation.....(Pp):	391

N. of Months	P>4T	P:2T-4T	PT-2T	P<T	T<0
	2	6	2	2	0

Latitudinal Belt....: Low Eutemperate

Continentality.....: Oceanic - Low Semicontinental

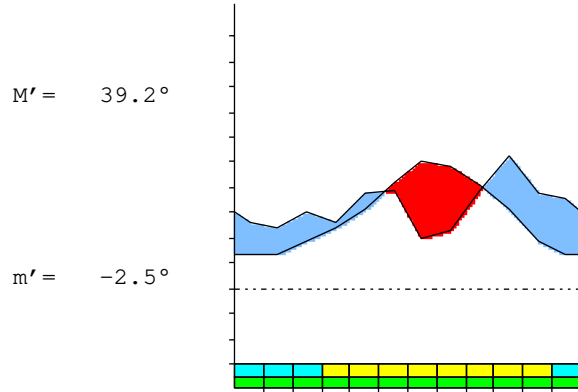
Bioclimate.....: MEDITERRANEAN PLUVISEASONAL-OCEANIC

Bioclimatic Belt....: UPPER MESOMEDITERRANEAN LOW DRY

BUJARALUZ (ESP ZARAGOZA)

327 m

P= 391 41° 30'N 0° 9'W 8/8 y.
 T= 14.4 ° Ic= 18.7 Tp= 1732 Tn= 0
 m= 2.1 ° M= 11.3 ° Itc= 282 Io= 2.3



MEDITERRANEAN PLUVISEASONAL-OCEANIC
 UPPER MESOMEDITERRANEAN LOW DRY

WATER INDEX CARD BUJARALUZ (ESP ZARAGOZA)
 Altitude: 327 m. Latitude: 41° 30'N

(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jan.	6.8	14	26	12	50	14	0	0	0	0.8
Feb.	6.7	14	24	10	60	14	0	0	0	0.7
Mar.	9.2	28	30	2	62	28	0	0	0	0.0
Apr.	12.2	47	26	-21	41	47	0	0	0	-0.4
May.	15.7	77	38	-39	2	77	0	0	0	-0.5
Jun.	21.0	121	39	-2	0	41	79	0	0	-0.6
Jul.	25.4	162	19	0	0	19	143	0	0	-0.8
Aug.	24.0	138	23	0	0	23	115	0	0	-0.8
Sep.	20.4	94	39	0	0	39	55	0	0	-0.5
Oct.	15.8	59	53	0	0	53	6	0	0	0.0
Nov.	9.3	23	38	15	15	23	0	0	0	0.6
Dec.	6.7	13	36	23	38	13	0	0	0	1.6
Year	14.4	790	391	*	*	391	399	0	0	*

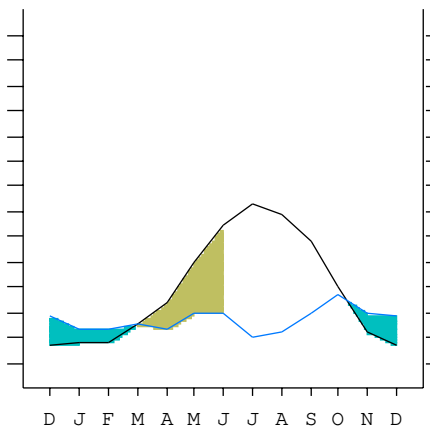
R = Reserve VR = Variation of the reserve RE = Real evapotranspiration
 DR = Drainage HC = Humidity coefficient DF = Deficit SP = Superavit

BUJARALUZ (ESP ZARAGOZA)

41°30'N 0°9'W 327 m 8/8 y.

T= 14.4 Ic= 18.7 MEDITERRANEAN PLUVISEASONAL-OCEANIC
 m= 2.1 Tp= 1732 UPPER MESOMEDITERRANEAN
 M= 11.3 Tn= 0 LOW DRY
 M' = 39.2 Itc= 282
 m' = -2.5 Io= 2.3
 P= 391 mm ———
 PE= 790 mm ———

Imbibing	9 Oct.
Saturation	3 Mar.
Reserve Use	1 Jun.
Deficit	



BUJARALUZ (ESP ZARAGOZA)

Latitude: 41°30'N Longitude: 0°9'W Altitude: 327 m

SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continentality Index [B1a]
 + Type: B. Oceanic
 + Subtype: 1. Semicontinental
 + Variant: a. Low

Thermic types [B1.B4]
 + Latitudinal zone: B. Temperate
 + Latitudinal belt: 1. Low Eutemperate
 + Thermic type: B. Temperate
 + Thermic subtype: 4. Temperate

Bioclimatic types [B8.3a.5b]
 + Macrobioclimate: B. MEDITERRANEAN
 + Bioclimate: 8. PLUVISEASONAL-OCEANIC
 + Bioclimatic variant .:
 + Thermic type.....: 3. MESOMEDITERRANEAN
 + Thermic subtype.....: a. UPPER
 + Ombrothermic type ...: 5. DRY
 + Ombrothermic subtype : b. LOW

Bioclimatic ClassificationMepo.Mme.Dry.Sec

BUJARALUZ (ESP ZARAGOZA)

Latitude: 41°30'N Longitude: 0°9'W Altitude: 327 m

PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 211
 Coldest semester of the year.....(Psw): 180
 Warmest four months period of the year.....(Pcm1): 120
 Following warmest four months period.....(Pcm2): 153
 Positive precipitation dryest 3 months.....(Ppd): 80
 Positive precipitation dryest 2 months.....(Ppd2): 42
 Positive precipitation dryest 1 month.....(Ppd1): 19
 Positive precipitation warmest 3 months.....(Pps): 81
 Positive precipitation warmest 2 months.....(Pps2): 42
 Positive precipitation warmest 1 month.....(Pps1): 19
 Positive precipitation coldest 3 months.....(Ppw): 86
 Positive precipitation coldest 2 months.....(Ppw2): 50
 Positive precipitation coldest 1 month.....(Ppw1): 24

Seasons	Winter Tr1-W	Spring Tr2-P	Summer Tr3-S	Automn Tr4-F
Rainfall	86	94	81	130

Seasonal rainfall rhythms: F > P > W > S

BUJARALUZ (ESP ZARAGOZA)

Latitude: 41°30'N Longitude: 0°9'W Altitude: 327 m

TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 25.4
 Average coldest month [T].....(Tmin): 6.7
 Maximum temp. warmest month [M].....(Tmmax): 33.2
 Minimum temp. coldest month [m].....(Tmmin): 2.1
 Absolute Max.temp. warmest month [M'].....(Tamax): 39.2
 Absolute Min.temp. coldest month [m'].....(Tamin): -2.5
 First warmest contrasted month [M].....(Tcmax): 33.2 (7)
 First coldest contrasted month [m].....(Tcmin): 17.6 (7)
 Estival temperature.....(Ts): 704
 Positive temperature dryest 3 months.....(Tpd): 227
 Positive temperature dryest 2 months.....(Tpd2): 494
 Positive temperature dryest 1 month.....(Tpd1): 254
 Positive temperature warmest 3 months.....(Tps): 704
 Positive temperature warmest 2 months.....(Tps2): 494
 Positive temperature warmest 1 month.....(Tps1): 254
 Positive temperature coldest 3 months.....(Tpw): 202
 Positive temperature coldest 2 months.....(Tpw2): 135
 Positive temperature coldest 1 month.....(Tpw1): 67

BUJARALUZ (ESP ZARAGOZA)

Latitude: 41°30'N Longitude: 0°9'W Altitude: 327 m

SEASONAL PARAMETERS

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Warmest semester... (Sms)					o	o	o	o	o	o		
Dryest semester... (Smd)			o	o	o	o	o	o				
Warmest 4 months... (Cm1)						o	o	o	o			
Dryest 4 months... (Cmd)	o	o	o	o								
Vegetation Activity (Pav)	o	o	o	o	o	o	o	o	o	o	o	o
Ultragelid... [M' <=0] (Pf)												
Hypergelid... [M <=0] (Pf)												
Gelid... [T <=0] (Pf)												
Subgelid... [m <=0] (Pf)												
Pregelid... [m' <=0] (Pf)	o	o	o									o
Agelid... [m' > 0] (Pf)				o	o	o	o	o	o	o	o	
HiperAgelid... [all >0] (Pf)				o	o	o	o	o	o	o	o	

BUJARALUZ (ESP ZARAGOZA)

Latitude: 41°30'N Longitude: 0°9'W Altitude: 327 m

OMBROTHERMIC PARAMETERS

Annual aridity index. [PE/P]..... (Iar): 2.02
 Mediterranean index of July. [PE/P]..... (Im1): 8.52
 Mediterranean index of July & August..... (Im2): 7.15
 Mediterranean index of June, July & August.... (Im3): 5.19

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp (x10)	360	260	240	300	260	380	390	190	230	390	530	380
Tp	67	68	67	92	122	157	210	254	240	204	158	93
Io (Iom)	5.37	3.82	3.58	3.26	2.13	2.42	1.86	0.75	0.96	1.91	3.35	4.09
Seasons	Winter			Spring			Summer			Autumn		
Pp (x10)/Tp	860 / 202			940 / 371			810 / 704			1300 / 455		
Io (Iot)	4.257			2.534			1.151			2.857		
Semesters	December-May						June-November					
Pp (x10)/Tp	1800 / 573						2110 / 1159					
Io (Iosm)	3.141						1.821					

BUJARALUZ (ESP ZARAGOZA)

Latitude: 41°30'N Longitude: 0°9'W Altitude: 327 m

Aridity Value Index (AVI)

[10xPP/TP=IO]: 3910/1732=2.26 There is No Yearly Aridity

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	360	260	240	300	260	380	390	190	230	390	530	380
Tp [T*10]	67	68	67	92	122	157	210	254	240	204	158	93
Iom [Pp/Tp]	537	382	358	326	213	242	186	75	96	191	335	409
Avm [200-Iom]	***	***	***	***	***	***	14	125	104	9	***	***
Seasons	Winter			Spring			Summer			Autumn		
Pp / Tp	860 / 202			940 / 371			810 / 704			1300 / 455		
Iot [Pp/Tp]	426			253			115			286		
Avs E [Avm < 200]	***			***			244			***		
Strong upper arid [1]							Weak upper arid [1]					
Strong lower semiarid [1]							Weak upper semiarid [2]					

BUJARALUZ (ESP ZARAGOZA)

Latitude: 41°30'N Longitude: 0°9'W Altitude: 327 m

BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin]	(Sp): 18.70
CI of Gorezinski (1920) [1.7*Sp/sin(Lat)-20.4]	27.58
CI of Conrad (1946) [1.7*Sp/sin(Lat+10)-14]	26.62
+ Oceanic (20<CI<40)	
CI of Currey (1974) [CI=Sp/(1+Lat/3)]	1.26
+ Subcontinental (1.1<CI<1.7)	
Rainfall Index of Lang (1925) [R=P/T]	27.09
+ Steppic (40>R>0)	
Aridity Index of Martonne (1926) [Ia=P/(T+10)]	16.00
+ Semiarid -mediterranean- (20>Ia>15)	
I of Emberger (1930) [Q=100*P/(Tmax ² -Tmin ²)]	35.62
+ Semiarid (50>Q>30)	
I of Dantin & Revenga (1940) [DR=100*T/P]	3.69
+ Arid (6>DR>3)	
Aridity Index of UNEP [I=P/PE]	0.50
+ Semiarid (0.5>Im>0.2)	
Potencial Erosion I of Fournier (1960) [K=Pi ² /P].....	7.18
+ Very low (K<60)	

BUJARALUZ (ESP ZARAGOZA)

Latitude: 41°30'N Longitude: 0°9'W Altitude: 327 m

BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)
 + Climate: A. Warm and temperate warm
 + Region: 3. Termoxeroteric (Mediterranean warm)
 + Thermic type: 4. Mesothermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.14	0.13	0.15	0.12	0.16	0.14	0.06	0.07	0.14	0.23	0.19	0.20
T-E ratio	3.06	3.01	4.14	5.49	7.06	9.45	11.43	10.80	9.18	7.11	4.19	3.01
Precipitation-effectiveness: 17.39						Temperature-efficiency: 77.94						
Moisture Index [MI=100*(P-PE)/PE]												
+ D.Semiarid (-66.7<MI<-33.3)												
Index of dryness [DI=100*d/PE]												
+ Strong deficit (33.3<DI)												
Index of humidity [HI=100*s/PE]												
+ No surplus (0<HI<10)												
Potential Evapotranspiration PE												
+ Second mesothermic (712<PE<855)												

