

# Phytosociological Research Center

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## Worldwide Bioclimatic Classification System

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

(Adapted to Synoptical Table 14/02/2020)

LA RIOJA (ARGENTINA)

Altitude: 517 m.

Latitude: 29°25'S Longitude: 66°52'W

Temperature observation period.: 1901-1950 (50)

Rainfall observation period....: 1901-1950 (50)

(C/mm)	Ti	Mi	mi	M'i	m'i	Pi	Epi
Jan.	26.80	35.50	20.00	46.30	9.80	71.0	164.10
Feb.	25.60	34.00	19.10	45.90	9.20	61.0	127.83
Mar.	23.10	31.30	17.20	43.50	5.00	54.0	106.69
Apr.	19.30	27.20	13.40	38.60	-0.70	19.0	65.17
May.	15.30	22.70	9.40	35.00	-2.50	12.0	38.45
Jun.	11.60	19.10	5.60	30.50	-5.00	3.0	19.91
Jul.	11.50	19.40	5.10	33.10	-4.80	4.0	20.68
Aug.	14.00	22.40	7.00	39.00	-2.70	5.0	33.20
Sep.	17.30	26.20	10.30	39.50	-2.40	6.0	54.32
Oct.	20.60	29.60	13.70	45.30	1.30	22.0	87.50
Nov.	23.80	33.00	16.80	44.20	2.50	31.0	121.22
Dec.	26.00	35.10	19.00	46.60	5.40	50.0	155.45
Year	19.58	27.96	13.05	40.63	1.26	338	994.52

### BIOCLIMATIC INDICES AND DIAGNOSIS

Thermicity index.....(It):	441
Compensated thermicity index.....(Itc):	441
Simple continentality index.....(Ic):	15.3
Diurnality index.....(Id):	16.2
Annual ombrothermic index.....(Io):	1.44
Monthly dry ombrothermic index.....(Iod1):	0.26
Bimonthly dry ombrothermic index.....(Iod2):	0.30
Threemonthly dry ombrothermic index.....(Iod3):	0.32
Fourmonthly dry ombrothermic index.....(Iod4):	0.46
Annual ombro-evaporation index.....(Ioe):	0.34
Annual positive temperature.....(Tp):	2349
Annual negative temperature.....(Tn):	0
Dry station temperature.....(Td):	371
Positive precipitation.....(Pp):	338

N. of Months	P>4T	P:2T-4T	PT-2T	P<T	T<0
	0	3	3	6	0

Latitudinal Belt...: Subtropical

Continentality.....: Oceanic - Low Eucceanic

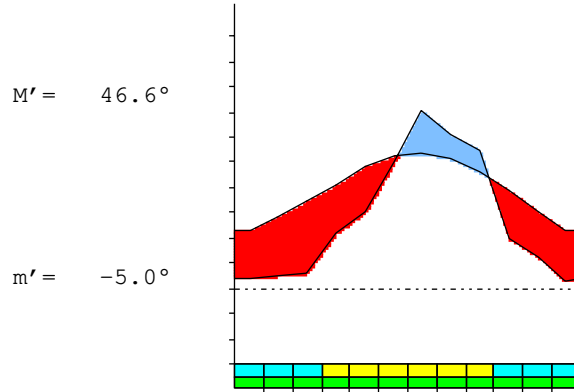
Bioclimate(Variant): TROPICAL XERIC (SEMIARID)

Bioclimatic Belt...: LOW MESOTROPICAL LOW SEMIARID

LA RIOJA (ARGENTINA)

517 m

P= 338      29° 25'S      66° 52'W      50/50 y.  
 T= 19.6 °      Ic= 15.3      Tp= 2349      Tn= 0  
 m= 5.1 °      M= 19.4 °      Itc= 441      Io= 1.4



TROPICAL XERIC (SEMIARID)  
 LOW MESOTROPICAL LOW SEMIARID

WATER INDEX CARD      LA RIOJA (ARGENTINA)  
 Altitude: 517 m.      Latitude: 29° 25'S

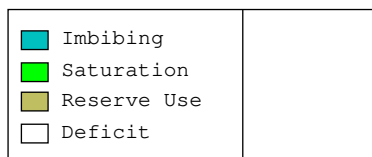
(C/mm)	T	PE	P	VR	R	RE	DF	SP	DR	HC
Jul.	11.5	21	4	0	0	4	17	0	0	-0.8
Aug.	14.0	33	5	0	0	5	28	0	0	-0.8
Sep.	17.3	54	6	0	0	6	48	0	0	-0.8
Oct.	20.6	88	22	0	0	22	66	0	0	-0.7
Nov.	23.8	121	31	0	0	31	90	0	0	-0.7
Dec.	26.0	155	50	0	0	50	105	0	0	-0.6
Jan.	26.8	164	71	0	0	71	93	0	0	-0.5
Feb.	25.6	128	61	0	0	61	67	0	0	-0.5
Mar.	23.1	107	54	0	0	54	53	0	0	-0.4
Apr.	19.3	65	19	0	0	19	46	0	0	-0.7
May.	15.3	38	12	0	0	12	26	0	0	-0.6
Jun.	11.6	20	3	0	0	3	17	0	0	-0.8
Year	19.6	995	338	*	*	338	657	0	0	*

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

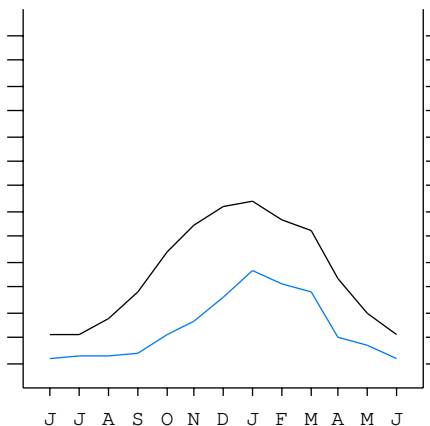
LA RIOJA (ARGENTINA)

29°25'S      66°52'W      517 m 50/50 y.

T= 19.6      Ic= 15.3      TROPICAL XERIC (SEMIARID)  
 m= 5.1      Tp= 2349      LOW MESOTROPICAL  
 M= 19.4      Tn= 0      LOW SEMIARID  
 M' = 46.6      Itc= 441  
 m' = -5.0      Io= 1.4  
 P= 338      mm ———  
 PE= 995      mm ———



All over the year,  
 there is hydic deficit



LA RIOJA (ARGENTINA)

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SUMMARY OF RIVAS-MARTINEZ CLASSIFICATION

Continentality Index [B2b]  
 + Type .....: B. Oceanic  
 + Subtype .....: 2. Euoceanic  
 + Variant .....: b. Low  
 Thermic types [A3.A2]  
 + Latitudinal zone ....: A. Warm  
 + Latitudinal belt ....: 3. Subtropical  
 + Thermic type .....: A. Warm  
 + Thermic subtype .....: 2. Warm  
 Bioclimatic types [A3.3b.4b]  
 + Macrobioclimate .....: A. TROPICAL  
 + Bioclimate .....: 3. XERIC  
 + Bioclimatic variant .: SEMIARID  
 + Thermic type.....: 3. MESOTROPICAL  
 + Thermic subtype.....: b. LOW  
 + Ombrothermic type ...: 4. SEMIARID  
 + Ombrothermic subtype : b. LOW  
 Bioclimatic Classification .....Trxe(Sdr).Mtr.Sar.Euo

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PRECIPITATION PARAMETERS

Warmest semester of the year.....(Pss): 289  
 Coldest semester of the year.....(Psw): 49  
 Warmest four months period of the year.....(Pcm1): 213  
 Following warmest four months period.....(Pcm2): 88  
 Positive precipitation dryest 3 months.....(Ppd): 12  
 Positive precipitation dryest 2 months.....(Ppd2): 7  
 Positive precipitation dryest 1 month.....(Ppd1): 3  
 Positive precipitation warmest 3 months.....(Pps): 182  
 Positive precipitation warmest 2 months.....(Pps2): 121  
 Positive precipitation warmest 1 month.....(Pps1): 71  
 Positive precipitation coldest 3 months.....(Ppw): 12  
 Positive precipitation coldest 2 months.....(Ppw2): 7  
 Positive precipitation coldest 1 month.....(Ppw1): 4

Seasons	Winter Tr1-W	Spring Tr2-P	Summer Tr3-S	Automn Tr4-F
Rainfall	12	59	182	85

Seasonal rainfall rhythms: S > F > P > W

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TEMPERATURE PARAMETERS

Average warmest month [T].....(Tmax): 26.8  
 Average coldest month [T].....(Tmin): 11.5  
 Maximum temp. warmest month [M].....(Tmax): 35.5  
 Minimum temp. coldest month [m].....(Tmin): 5.1  
 Absolute Max.temp. warmest month [M'].....(Tamax): 46.6  
 Absolute Min.temp. coldest month [m'].....(Tamin): -5.0  
 First warmest contrasted month [M].....(Tcmax): 33.0 (11)  
 First coldest contrasted month [m].....(Tcmin): 16.8 (11)  
 Dry station temperature.....(Td): 371  
 Positive temperature dryest 3 months.....(Tpd): 371  
 Positive temperature dryest 2 months.....(Tpd2): 231  
 Positive temperature dryest 1 month.....(Tpd1): 116  
 Positive temperature warmest 3 months.....(Tps): 784  
 Positive temperature warmest 2 months.....(Tps2): 528  
 Positive temperature warmest 1 month.....(Tps1): 268  
 Positive temperature coldest 3 months.....(Tpw): 371  
 Positive temperature coldest 2 months.....(Tpw2): 231  
 Positive temperature coldest 1 month.....(Tpw1): 115

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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	o	o			
Agelid.....[m'> 0] (Pf)	o	o	o							o	o	o
HiperAgelid..[all>0] (Pf)	o	o	o							o	o	o

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OMBROTHERMIC PARAMETERS

Annual aridity index.[PE/P].....(Iar): 2.94  
 Mediterranean index of January.....(Im1): 2.31  
 Mediterranean index of January & February....(Im2): 2.21  
 Mediterranean index of December to February...(Im3): 2.46

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp(x10)	500	710	610	540	190	120	30	40	50	60	220	310
Tp	260	268	256	231	193	153	116	115	140	173	206	238
Io (Iom)	1.92	2.65	2.38	2.34	0.98	0.78	0.26	0.35	0.36	0.35	1.07	1.30
Seasons	Summer			Autumn			Winter			Spring		
Pp(x10)/Tp	1820 / 784			850 / 577			120 / 371			590 / 617		
Io (Iot)	2.321			1.473			0.323			0.956		
Semesters	December-May						June-November					
Pp(x10)/Tp	2670 / 1361						710 / 988					
Io (Iosm)	1.962						0.719					

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Aridity Value Index (AVI)

[10xPP/TP=IO]: 3380/2349=1.44 **There is No Yearly Aridity**

Months	Dec.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Pp [P*10]	500	710	610	540	190	120	30	40	50	60	220	310
Tp [T*10]	260	268	256	231	193	153	116	115	140	173	206	238
Iom [Pp/Tp]	192	265	238	234	98	78	26	35	36	35	107	130
Avm [200-Iom]	8	***	***	***	102	122	174	165	164	165	93	70
Seasons	Summer			Autumn			Winter			Spring		
Pp / Tp	1820 / 784			850 / 577			120 / 371			590 / 617		
Iot [Pp/Tp]	232			147			32			96		
Avs E[Avm<200]	***			***			504			328		
Lower hyperarid [1]						Upper hyperarid [4]						
Strong upper arid [1]						Weak upper arid [2]						
Strong lower semiarid [1]						Weak lower semiarid [1]						
Weak upper semiarid [1]												

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BIOCLIMATIC INDICES I

CI of Supan (1884) [Tmax-Tmin] .....	(Sp): 15.30
CI of Gorezinski (1920) [1.7*Sp/sin(Lat)-20.4] .....	32.56
CI of Conrad (1946) [1.7*Sp/sin(Lat+10)-14] .....	26.96
+ Oceanic (20<CI<40)	
CI of Currey (1974) [CI=Sp/(1+Lat/3)] .....	1.42
+ Subcontinental (1.1<CI<1.7)	
Rainfall Index of Lang (1925) [R=P/T] .....	17.27
+ Steppic (40>R>0)	
Aridity Index of Martonne (1926) [Ia=P/(T+10)] .....	11.43
+ Arid -steppic- (15>Ia>5)	
I of Emberger (1930) [Q=100*P/(Tmax <sup>2</sup> -Tmin <sup>2</sup> )] .....	27.39
+ Arid (30>Q>0)	
I of Dantin & Revenga (1940) [DR=100*T/P] .....	5.79
+ Arid (6>DR>3)	
Aridity Index of UNEP [I=P/PE] .....	0.34
+ Semiarid (0.5>Im>0.2)	
Potencial Erosion I of Fournier (1960) [K=Pi <sup>2</sup> /P].....	14.91
+ Very low (K<60)	

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BIOCLIMATIC INDICES II

Bioclimatic classification of Gaussen & Bagnouls (1957)  
 + Climate ....: A. Warm and temperate warm  
 + Region .....

+ Thermic type: 2. Macrothermic

Thornthwaite (1948)												
	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
P-E ratio	0.24	0.21	0.19	0.07	0.04	0.01	0.01	0.02	0.02	0.08	0.10	0.17
T-E ratio	12.06	11.52	10.40	8.68	6.89	5.22	5.18	6.30	7.78	9.27	10.71	11.70
Precipitation-effectiveness: 11.68						Temperature-efficiency ....: 105.70						
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 .....												
+ Third mesothermic (855<PE<997)												

