International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2020; 8(4): 2195-2201

Received: 24-05-2020
Accepted: 25-06-2020

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Characterization of soils properties of irrigated fields of Bilara tehsil of Jodhpur district

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DOI: https://doi.org/10.22271/chemi.2020.v8.i4x.9955

Abstract
The present investigation "characterization of soils of irrigated fields of bilara tehsil of jodhpur district" was undertaken to assess and impact on physical, and chemical properties of soils as well as cationic composition of plant leaves. Forty soil sample from respective irrigated fields were collected. Soils of Bilara tehsil were found sandy to loamy sand in texture. In general, soils of the study area were mostly loamy sand in nature. Soil moisture retention of Bilara tehsil varied from 9.48 to 15.96, 7.90 to 13.30 and 1.90 to 2.84 per cent at 0.1, 0.30 and 15 bar, respectively. Available water ranged between 5.74 to 10.49 per cent. The hydraulic conductivity (H. C.) of soils of Bilara tehsil was varied from 10.81 to 14.73 cm h-1 with a mean value of 12.60 cm h-1. In the study area OC (%), available N, P2O5 and K2O (Kg/ha) ranged from 0.05 to 0.49, 41.38 to 211.25, 21.32 to 61.19 and 94.37 to 324.82 with mean values of 0.24, 114.85, 38.89 and 89.71,respectively. The fertility status of study area low organic carbon, low nitrogen and medium to high phosphorus and potash was found.

Keywords: Farmer field, soil properties

Introduction
The salt content of soil closely related to salt content of irrigation water (Lal and Lal, 1988 and Khandelwal and Lal, 1991) [9, 11] therefore, quality of irrigation water in relation to its impact on soil properties is of interest in arid and semi arid areas. In Rajasthan, arid and semi-arid tract occupy about three fourth of the state and ground water which is dubious quality is the main source of irrigation in this belt. Presence of dissolved salts in higher proportion is a common feature of ground water in western Rajasthan (Garg, 2011) [3]. In general, the chemical quality of ground water is fresh in the eastern part except in the localized area of Bharatpur district. However, chemical quality in the major parts of western Rajasthan is brackish to saline. The arid districts of western Rajasthan *viz*., Barmer, Bikaner, Churu, Ganganagar, Hanumangarh, Jaisalmer, Jalore, Jodhpur, Nagaur and Pali have ground waters. Majority of the ground water in the western arid districts have EC upto 10 dSm-1 whereas in semi arid and humid districts waters have EC upto 5 dSm-1 and 2.2 dSm-1, respectively.

A systematic study on quality of water and soil is necessary for better utilization of water and soil resources to tackle water and soil problems. The semi- arid and arid area of Rajasthan necessitates the application of supplemental water for optimizing crop production. Majority of the tube well waters contain high concentration of salts and their continuous use for irrigation adversely affects the crop production and causes soil deterioration. It is necessary to increase the better crop production in that area. It necessitates continuous monitoring of ground water for assessing the possible damage on salinity and alkalinity induced soil health (Sharma, 2011) [24]. Salinity and sodicity are known to influence physiological, biochemical and morphological changes in plants, which reflect on overall performance of the plant. Generally, these changes due to salinity stress may adversely affect the plant growth and metabolism. However, under such conditions some plant species may thrive and yield better than other species by effectively adjusting or modifying their metabolism. Since, the characterization of soil health parameters is lacking in the study area under the influence of underground irrigation water which is essential for better utilization of soil and irrigation water to obtain satisfactory yield by modifying the cultural practices in accordance with the nature of soil and quality of water.

The majority of soils of the Bilara tehsil were loamy sand in nature, with mild salinity and moderate alkalinity problem. According to the classification suggested by Sehgal (1987) [23] majority of the soils (67.5%) of the Bilara tehsil found under the class Vs.M. (very slight salinity and moderate alkalinity), (15%) S.M. (slight salinity and moderate alkalinity), (10%) Vs.St. (very slight salinity and strong alkalinity) and (7.5%) Vs.S.(very slight salinity and slight to negligible alkalinity).In the plant samples Na+ and Ca+2 content increased with increase of EC of irrigation water and Mg+2 with increase in pH of irrigation water. Based on quality of ground water and status of salinity and alkalinity of soils, nine management units were identified and accordingly management practices were suggested for better utilization of soil and water in study area. Soil properties are greatly influenced by the quality of ground irrigation water. A water containing excessive soluble salts is unsuitable for irrigation. If sodium is the dominating cation, frequent application of such water deteriorates the physical conditions of soil causing soil dispersion, which reduce infiltration rate and soil aeration. On the other hand, presence of Ca2+ and Mg2+ in excess, increase the osmotic pressure of soil solution, thereby causes disturbance in the mechanism of the uptake of nutrients and water by plants.

Materials and Method

The investigation reported here in “Characterization of soils of irrigated fields of Bilara Tehsil of Jodhpur district” was undertaken in the year 2016-17. The details of techniques and methodology followed during the course of investigation are presented as under:

Study area and its location

The Bilara Tehsil is situated in the south-eastern part of the Jodhpur district between latitudes of 26°20’54.243” and 260 25’53.695” N and Longitudes of 73°22’55.33” and 73°53’19.113” E. It occupies an area of 1451.89 sq. km and bounded by Pali district in the east-south and north-west and Nagaur district touches in the north-east. It falls under region 2nd of the agro-ecological map (Hot arid ecoregion with desert and saline soils) and in the IIB zone, named as transitional plain of Luni Basin.

Climate

The Tehsil experiences semi-arid to sub humid type of climate. Mean annual rainfall (1971-2016) of the district is 374 mm. Rainy days are limited to maximum 15 in a year. Almost 80 per cent of the total annual rainfall is received during the southwest monsoon, which enters the district in the first week of July and withdraws in the mid of September. As the Tehsil lies in the desert area, extremes of heat in summer and cold in winter are the characteristic of the desert. Both day and night temperatures increase gradually and reach their maximum in May and June respectively. The temperature varies from 49 ºC in summer to 1 ºC in winter. The annual maximum potential evapotranspiration in the district is quite high and is highest (264.7 mm) in the month of May and lowest (76.5 mm) in the month of December.

Vegetation

Vegetation is the main component of the organic matter which sustains soil fertility status and microbial population in soil and balancing to the natural environment. It is therefore essential to add information on natural vegetation of the study area. In the study area, common trees are khejri (*Prosopis cineraria*), babool (*Acacia arabica*), vilayati babul (*Prosopis juliflora*), khair (*Acacia catechu*), kumat (*Acacia senegal*), neem (*Azadirachta indica*) and sisam (*Dalbergia sissoo*), common shrubs and bushes are munja (*Saccharum munja*), aak (*Calotrophis procera*), dhatura (*Datura metel*), kheep (*Leptadenia pyrotechnica*) and kair (*Capparis dessidua*). Main crops of the study area are: (i) Cotton (*Gossypium spp*.), bajra (*Pennisetum glaucum)*, guar (*Cyamopsis tetragonoloba*), sesamum (*Sesamum indicum*), moong (*Vigna radiat*a) and Sorghum (*Sorghum bicolor*) in kharif season. (ii) Wheat (*Triticum aestivum*), barley (*Hordeum vulgare*), mustard (*Brassica juncea*), gram (*Cicer arietinum*), fennel (*Foeniculum vulgare*) and fenugreek (*Trigonella foenum-graecum*) in *rabi*season. Main fruit trees and vegetables are ber (*Zizyphus mauritiana*), pomegranate (*Punica granatum*), guava (*Psidium guajava*), onion (*Allium cepa*), garlic (*Allium sativum*), chilli (*Capsicum annum*), cumin (*Cuminum cymium*) and coriander (*Coriandrum sativum*).

Collection of soil samples

Along with each water sample, representative and composite soil sample from surface layers (0-15 cm depths) was collected from the field, irrigated with tube well water. The soil samples were collected with the help of stainless steel khurpi. Approximately 2 kg soil sample was collected from each site and filled in polythene bags from non-rhizospheric zone and 150g of soil sample from rhizospheric zone for biological studies. Non rhizospheric soil samples were air dried, grind and passed through 2 mm sieve and stored in properly labelled polythene bags for further analysis work and rhizospheric soil samples were stored in (cool temperature) freeze.

Table 1: Methods used for soil, analysis

S. No.	Properties	Procedure	Reference
A.	**Soil Analysis**		
1	pH (1:2.5 soil water suspension)	Using glass electrode pH meter	USDA Hand book No. 60 Richards (1954) [20]
2.	EC (1:2.5 soil water suspension)	Using the standard precision conductivity bridge	USDA Hand book No. 60 Richards (1954) [20]
3.	Particle size analysis	Hydrometer method	Bouyoucos (1962) [1]
4.	Soil moisture retention at (0.1, 0.3, 15.0 bar).	Using pressure plate membrane apparatus	Singh (1980) [26]
5.	Hydraulic conductivity	Constant head permeater	Israelsen and Hansen (1962) [7]
6.	Organic carbon	Rapid titration mthod	Walkley and Black (1934) [31]
7.	Cations-Ca2+ + Mg2+	Using Versenate titration method	USDA Hand book No.60 Richards (1954) [20]
	Na+, K+	Using Flame photometry method	USDA Hand book No.60 Richards (1954) [20]
8.	Anion-CO32- HCO3-	Titration method using standard H2SO4 (Method No.12)	USDA Hand book No.60 Richards (1954) [20]
	Cl-	Titration method using standard AgNO3 (Method No. 13)	USDA Hand book No.60 Richards(1954) [20]
9.	SO4-2	Using method by precipitation as barium sulphate (Method No.14)	USDA Hand book No.60 Richards(1954) [20]
10.	Available N	Alkaline KMnO4 method using KEL-PLUS	Subbiah and Ashija (1956) [30]
11.	Available P	Estimation with 1M NaHCO3 at pH 8.5 and development of blue colour with SnCl2	Olsen *et al.* (1954) [16]
12.	Available K	NH4OAC extract by Flame photometer method	Metson (1956) [12]
13.	Sodium Adsorption Ratio	Calculated by formula Na+SAR=Ca2+ + Mg2+2	USDA Hand book No.60 Richards(1954) [20]

Statistical analysis

The data obtained for different parameters of soil, water and plant analysis were statistically analysed for correlation and regression using the procedure given by Snedecor and Cochran (1967) [28].

Result and Discussion

Particle size distribution

Particle size analysis gives the percentage of sand, silt and clay fraction distribution in soils and points to their textural classification. The distribution of these fractions, in turn, governs the physio-chemical characteristics of soils. The determination of soil texture is, therefore, a very important aspect for the adoption of management practices. Data related to particle size distribution are presented in table 2 and discussed as follows: The data related to particle size distribution of Bilara tehsil soils revealed that sand content in different soils of studied area ranged from 78.00 to 85.40 per cent. The minimum sand per cent was found with BLw7 soil sample and maximum with BLw25 soil sample. Data further indicated that the minimum silt (7.90 per cent) and clay (5.90 per cent) contents were found with BLw25 and BLw2 soil samples, respectively, whereas, maximum silt (13.30 per cent) content was found with BLw7 and clay (8.80 per cent) content was found with BLw7 and BLw38 soil samples table 2 Gupta (2003) [6] and Srinivasarao *et al*. (2009) [29]

Hydraulic conductivity

The data related to saturated hydraulic conductivity revealed that the hydraulic conductivity of different soils of Bilara tehsil ranged from 10.81 to 14.73 cm/h. with a mean value 12.56 cm/h. of saturated hydraulic conductivity. The minimum saturated hydraulic conductivity 10.81 cm/h. was found in BLw28 and maximum saturated hydraulic conductivity 14.73 cm/h. was found in BLw26 soils sample in table 2. According to Sanks *et al.* (1976), SAR is the single most important parameter in terms of prolonged water application to soils. They reported that the use of irrigation water with high SAR values would impair soil permeability especially when the soil is high in bicarbonate. Sodium tends to disperse soil particles resulting in a decrease of macropores/micropore ratios and consequent reduction in water movement through the soil. The similar results were also reported by Paes *et al.* (2014) [17], Schacht and Marschner (2015) [22].

Table 2: Particle size distribution and hydraulic conductivity of soils of Bilara tehsil

S. No.	Sample code no.	Sand (%)	Silt (%)	Clay (%)	Textural classes	Hydraulic conductivity (cmh)
1	BLw1	81.20	11.90	6.90	Loamy sand	11.18
2	BLw2	83.40	10.70	5.90	Loamy sand	10.82
3	BLw3	82.30	11.00	6.70	Loamy sand	11.86
4	BLw4	84.20	9.80	6.00	Loamy sand	13.33
5	BLw5	80.50	11.80	7.70	Loamy sand	11.49
6	BLw6	81.20	11.30	7.50	Loamy sand	12.09
7	BLw7	78.00	13.30	8.70	Loamy sand	14.47
8	BLw8	84.40	8.70	6.90	Loamy sand	13.47
9	BLw9	80.50	11.70	7.80	Loamy sand	13.07
10	BLw10	80.40	10.80	8.80	Loamy sand	11.71
11	BLw11	81.60	10.70	7.70	Loamy sand	12.92
12	BLw12	83.00	10.30	6.70	Loamy sand	11.49
13	BLw13	81.50	10.70	7.80	Loamy sand	12.47
14	BLw14	83.20	9.70	7.10	Loamy sand	11.18
15	BLw15	81.50	11.00	7.50	Loamy sand	13.22
16	BLw16	82.40	10.70	6.90	Loamy sand	12.47
17	BLw17	80.20	11.80	8.00	Loamy sand	14.21
18	BLw18	81.50	10.50	8.00	Loamy sand	10.96
19	BLw19	84.00	9.30	6.70	Loamy sand	12.88
20	BLw20	82.30	10.70	7.00	Loamy sand	12.47
21	BLw21	81.60	10.70	7.70	Loamy sand	13.83
22	BLw22	84.20	9.00	6.80	Loamy sand	12.62
23	BLw23	82.20	9.90	7.90	Loamy sand	14.51
24	BLw24	80.60	10.70	8.70	Loamy sand	14.36
25	BLw25	85.40	7.90	6.70	Sandy	13.96
26	BLw26	81.20	11.00	7.80	Loamy sand	14.73
27	BLw27	81.40	11.90	6.70	Loamy sand	14.51
28	BLw28	80.60	11.70	7.70	Loamy sand	10.81
29	BLw29	81.30	10.70	8.00	Loamy sand	11.71
30	BLw30	81.60	11.60	6.80	Loamy sand	13.15
31	BLw31	83.00	9.80	7.20	Loamy sand	13.75
32	BLw32	81.00	11.70	7.30	Loamy sand	12.69
33	BLw33	83.20	9.30	7.50	Loamy sand	13.37
34	BLw34	82.60	9.70	7.70	Loamy sand	10.88
35	BLw35	81.50	9.80	8.70	Loamy sand	11.41
36	BLw36	83.30	8.90	7.80	Loamy sand	12.47
37	BLw37	81.60	11.70	6.70	Loamy sand	12.09
38	BLw38	79.20	12.00	8.80	Loamy sand	12.32
39	BLw39	81.60	10.90	7.50	Loamy sand	11.94
40	BLw40	82.40	10.80	6.80	Loamy sand	11.11
Mean		81.92	10.65	7.43		12.60
Maximum		85.40	13.30	8.80		14.73
Minimum		78.00	7.90	5.90		10.81

Soil moisture retention

Soil moisture is very important aspect for better utilization of soil and water. Determination of water retention characteristic of soils is necessary for assessing water requirement and planning of irrigation schedule for optimum crop production. Soil moisture analysis at 0.1, 0.33 and 15 bar are important parameters to know the water retention capacity of soil. Data related to soil moisture retention analysis are presented in table 3. The data related to soil moisture revealed that moisture at 0.1 bar in different soils of study area ranged from 9.48 to 15.96 per cent. The minimum and maximum soil moisture content was found with BLw25 and BLw7 soil samples, respectively. Data further indicated that (65) soil moisture content at 0.33 bar and 15 bar ranged between 7.90 to 13.30 and 1.90 to 2.84 per cent, respectively. The minimum and maximum moisture content at 0.33 was found with BLw25 and BLw7, whereas 15 bar was found with BLw2 and BLw10 soil samples, respectively. The available water content ranged between 5.74 to 10.49 per cent. The minimum and maximum available water content was found with BLw25 and BLw7 soil samples, respectively in table 3. Water retention is more closely related with clay content as compared to sand and silt fractions. Soils with lowest sand and highest clay showed highest water retention. Similar results were also reported by Padole *et al*. (1996) [18], Prasad *et al*. (1998) [19], Srinivasarao *et al*. (2009) [29] and Sharma (2010).

Table 3: Soil moisture retention of soils of Bilara tehsil

S. No.	Sample code no	Soil moisture retention (%) at			Available Water (%)
		0.1 bar	0.3 bar	15 bar	
1	BLw1	14.28	11.90	2.23	9.67
2	BLw2	12.84	10.70	1.90	8.80
3	BLw3	13.20	11.00	2.16	8.84
4	BLw4	11.76	9.80	1.94	7.86
5	BLw5	14.16	11.80	2.48	9.32
6	BLw6	13.56	11.30	2.42	8.88
7	BLw7	15.96	13.30	2.81	10.49
8	BLw8	10.44	8.70	2.23	6.47
9	BLw9	14.04	11.70	2.52	9.18
10	BLw10	12.96	10.80	2.84	7.96
11	BLw11	12.84	10.70	2.48	8.22
12	BLw12	12.36	10.30	2.16	8.14
13	BLw13	12.84	10.70	2.52	8.18
14	BLw14	11.64	9.70	2.29	7.41
15	BLw15	13.2	11.00	2.42	8.58
16	BLw16	12.84	10.70	2.23	8.47
17	BLw17	14.16	11.80	2.58	9.22
18	BLw18	12.60	10.50	2.58	7.92
19	BLw19	11.16	9.30	2.16	7.14
20	BLw20	12.84	10.70	2.26	8.44
21	BLw21	12.84	10.70	2.48	8.22
22	BLw22	10.80	9.00	2.19	6.81
23	BLw23	11.88	9.90	2.55	7.35
24	BLw24	12.84	10.70	2.81	7.89
25	BLw25	9.48	7.90	2.16	5.74
26	BLw26	13.20	11.00	2.52	8.48
27	BLw27	14.28	11.90	2.16	9.74
28	BLw28	14.04	11.70	2.48	9.22
29	BLw29	12.84	10.70	2.58	8.12
30	BLw30	13.92	11.60	2.19	9.41
31	BLw31	11.76	9.80	2.32	7.48
32	BLw32	14.04	11.70	2.35	9.35
33	BLw33	11.16	9.30	2.42	6.88
34	BLw34	11.64	9.70	2.48	7.22
35	BLw35	11.76	9.80	2.81	6.99
36	BLw36	10.68	8.90	2.52	6.38
37	BLw37	14.04	11.70	2.16	9.54
38	BLw38	14.40	12.00	2.84	9.16
39	BLw39	13.08	10.90	2.42	8.48
40	BLw40	12.96	10.80	2.19	8.61
Mean		12.78	10.65	2.40	8.26
Maximum		15.96	13.30	2.84	10.49
Minimum		9.48	7.90	1.90	5.74

Fertility status of soil

All the soil samples collected (surface soil) from different sites of the studied area were analyzed for organic carbon, available nitrogen, available phosphorus, available potassium and results are presented in table 4.

Organic carbon

The organic carbon content not only plays an important role in increasing aggregation, water holding capacity and fertility status of (68) soils but also contributes to a great deal, both directly and indirectly in influencing many physico-chemical properties of soils. Organic carbon content of soils varied from 0.05 to 0.49 per cent with the mean value of 0.24 per cent. The minimum value (0.05 per cent) was found with BLw1 soil sample and the maximum value (0.49 per cent) was found with BLw20 soil sample. All the soil samples fall under low category of organic carbon. The low organic carbon content of these soils might be due to the absence of stable aggregate (Jolivet *et al*. 1997) [8], severe wind erosion (Wu and Tiessen, 2002) [32], high microbial decay, scanty natural vegetations and poor decomposition due to low rainfall and rapid oxidation due to high summer temperature.

Available nitrogen

Available nitrogen of these soils varied between 41.36 to 211.25 kg/ha with a mean value of 114.85 kg/ha. The lowest value of available N (41.36kg/ha) was observed at BLw1 and highest value (211.25kg/ha) at BLw20 soil sample table 4. Soils having available nitrogen less than 250 kg/ha could be classified as low in available nitrogen (Subbaih and Asija, 1956). From the data, it is clear that all the soils were low in available nitrogen. The low levels of N may mainly be ascribed low organic carbon content, resulting from sub-optimal vegetation, high temperature and high soil pH, favouring higher oxidation and volatilization losses (Choudhary *et al.* 2006 and Kumar *et al*. 2013) [2, 10]. Most of the soil nitrogen as estimated based on the organic matter present in the soil. There is a definite relation of organic carbon with available N because organic matter releases the mineralizable N in a proportionate amount present in the soil. Hence, organic carbon status of the soil can predict the available N, which also showed positive relationship. Similarly, organic carbon level also markedly affects the soil N levels and the results are in agreement with Meena *et al*. (2006) [13], Sharma *et al*. (2008) [2] and Kumar *et al*. (2013) [10].

Available phosphorus

Data given in table 4 indicate that the available phosphorus in the soils of Bilara tehsil of Jodhpur district varied from 21.32 to 61.19 P2O5 kg/ha. The maximum value (61.19 P2O5 kg/ha.) of available phosphorus was observed at BLw20, while, the minimum value (21.32 Kg P2O5/ha.) was observed at BLw14 soil samples, respectively. Adopting the classification of Muhr *et al.* (1965) [14], 30 samples (75%) were found medium (20-50 P2O5 kg/ha.) and 10 samples (25%) were found high (>50 P2O5 kg/ha.) in available phosphorus and none of the sample was found low (<20 P2O5/ha), i.e. soils were medium to high in available phosphorus in table 4.6. The availability of phosphorus increased with increase in organic carbon which might be due to, (i) formation of phosphorus humic complexes which are easily assimilated by plants, (ii) anions replacement of phosphate by humation and (iii) the coating of sesquioxide by particles of humus to form a protective cover and thus reduce the phosphorus fixing capacity of the soils (Gharu and Tarafdar, 2004) [4].

Available potassium

The available potassium in these soils ranged between 94.37 and 324.82 K2O kg/ha. indicated that in table 4. The lowest value of available potassium was observed in the soils samples collected from BLw1, whereas, the highest value was found in the sample of BLw40. As per criterion laid down by Muhr *et al.* (1965) [14], most of the soils samples are under medium category (125 to 300 kg K2O/ha.) of available potassium. The available potassium was found medium to high due to presence of potash bearing minerals (muscovite, biotite and feldspar) which on weathering slowly release potash (Kumar *et al*. 2013) [10]. It has also been observed that increase in organic carbon resulted in the increase of available potassium content. This might be due to creation of favourable soil environment with the presence of high organic matter content of soil. Similar types of results were also reported by Singh and Singh (1985) [27], Ghosh and Mukhopadhyay (1996) [5], Prakash (2001) [15], Meena *et al*. (2006) [13] and Sharma *et al*. (2008) [2].

Table 4.6: Fertility status of soils of Bilara tehsil of Jodhpur

S. No.	Sample code no.	OC (%)	Available N (Kg. /ha.)	Available (P2O5) (Kg. /ha.)	Available (K2O) (Kg. /ha.)
1	BLw1	0.05	41.36	31.52	94.37
2	BLw2	0.19	54.08	36.99	133.06
3	BLw3	0.17	88.16	32.64	266.11
4	BLw4	0.24	125.44	49.73	276.99
5	BLw5	0.15	75.00	21.85	155.23
6	BLw6	0.15	75.00	51.72	199.58
7	BLw7	0.20	100.35	50.99	150.88
8	BLw8	0.23	72.50	30.06	167.77
9	BLw9	0.44	179.52	30.59	199.58
10	BLw10	0.18	88.16	30.06	232.64
11	BLw11	0.30	68.99	32.78	266.11
12	BLw12	0.19	93.75	30.59	155.23
13	BLw13	0.14	68.99	53.17	104.86
14	BLw14	0.17	57.81	21.32	98.70
15	BLw15	0.47	202.5	40.06	133.06
16	BLw16	0.24	125.44	55.56	110.88
17	BLw17	0.21	125.79	54.49	232.64
18	BLw18	0.30	150.00	29.14	185.23
19	BLw19	0.29	150.53	58.27	199.58
20	BLw20	0.49	211.25	61.19	288.64
21	BLw21	0.14	68.99	28.41	221.76
22	BLw22	0.26	121.89	30.79	110.88
23	BLw23	0.26	137.98	52.45	133.06
24	BLw24	0.26	137.98	30.59	230.46
25	BLw25	0.36	121.89	29.14	155.23

26	BLw26	0.34	168.75	29.20	221.76
27	BLw27	0.32	156.80	51.38	224.82
28	BLw28	0.16	81.89	29.73	199.58
29	BLw29	0.24	88.75	36.62	155.23
30	BLw30	0.43	203.75	41.72	276.99
31	BLw31	0.31	156.98	39.93	199.58
32	BLw32	0.29	144.26	48.07	243.94
33	BLw33	0.08	67.50	27.25	108.70
34	BLw34	0.18	94.43	31.56	210.46
35	BLw35	0.14	85.75	33.01	221.76
36	BLw36	0.2	100.35	37.54	177.41
37	BLw37	0.36	131.89	39.00	155.23
38	BLw38	0.34	168.75	35.56	254.82
39	BLw39	0.15	75.00	56.82	110.88
40	BLw40	0.15	125.79	44.10	324.82
Mean		0.24	114.85	38.89	189.71
Maximum		0.49	211.25	61.19	324.82
Minimum		0.05	41.36	21.32	94.37

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