Comparison Study on the Soils and Vegetation Property in Typical Steppe between Inner Mongolia of China and Mongolia

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Abstract: Study showed that organic matter，total nitrogen，total phosphorus，alkali-hydrolyzed N in average of soil are higher in Mongolia model grassland than in Inner Mongolia model grassland by the study of nourishment of soil. After correlative analysis about the soil factor and the growth and development of rhizomatous grasses besides soil factor of different soil character and the growth and development of rhizomatous grasses, we found that the correlation in soil factor and the growth and development of rhizomatous grasses is different in different grassland and different soil character.

Key words: Mongolia plateau; Typical steppe; Soil factors ; Vegetation ; Comparative study；Inner Mongolia of China and Mongolia

Inner Mongolia of China and Mongolia both hold the main body of Mongolia plateau. The configuration, the species of plant and the mode of utilization of grassland in the two countries are quite similar. So, it′s very important to comparison study on the growth development of plant, the vegetation of grassland in Mongolia plateau.

1 Study sites

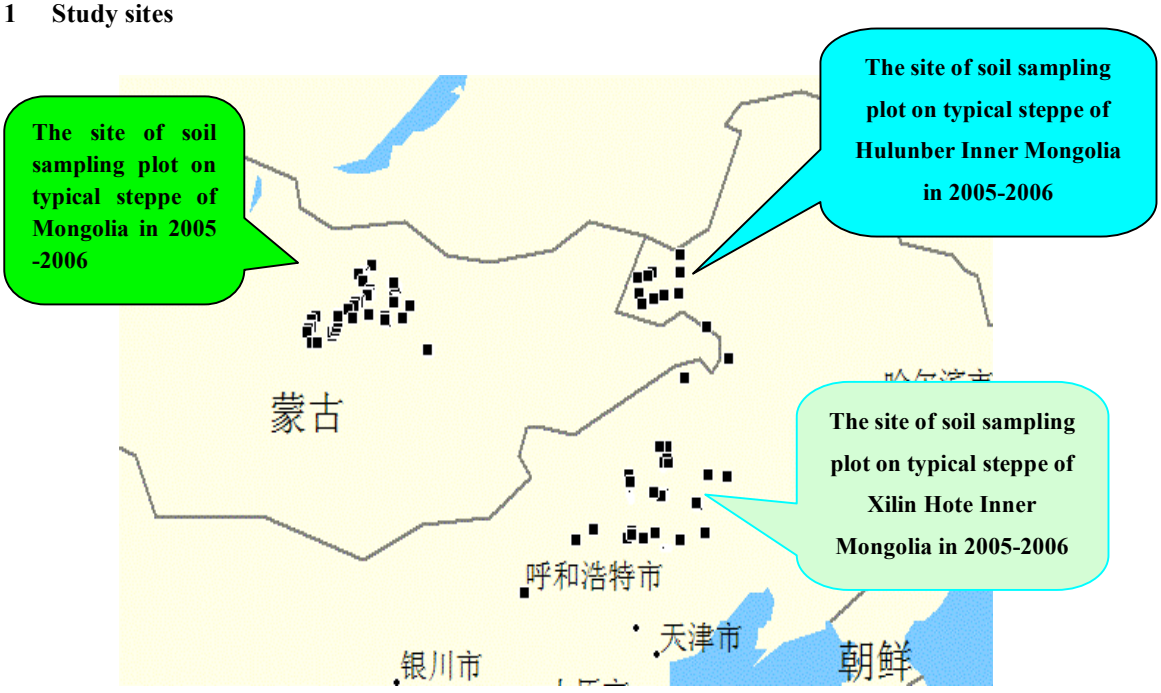


Fig. 1 The site of soil sampling plot on typical steppe of Mongolia and Inner Mongolia in 2005

2. Experimental content and method

2．1 Soil test content and method

2．1．1 The method of soil sampling

On the typical place of different plant quadrate, using the falchion sampling about 10cm to the test of soil physical character and each quadrate repeat three times. In using falchion sampling after the place 5-15cm soil blend

uniformity and soil of different quadrate of same site blend again and then adhibit quartation about soil 1kg cased in other fast envelope to test nutrition factor and weave identical the soil sample number with plant sample number.

(1) THE containing water test method (drying method).

(2) The method of Soil pH value test(electricity site method).

(3) Soil texture method (gravimeter method).

(4) The test of Soil bulk density [1], soil grain density [2]and the calculation method of specific gravity and porosity (1 cutting ring method, 2 pycnometer method).

2.1.3 Soil nutrition method of research

(1) Soil organic matter method of research (potassium dichromate method)

(2) Soil total nitrogen method of research (potassium dichromate- vitriol assimilation method)

(3) Soil hydrolyze nitrogen method of research (alkaline hydrolysis diffusion method)

(4) Soil total phosphorus method of research (acid-soluble-mo-sb-vc colorimetry)

(5) Soil quick result phosphorus method (sodium bicarbonate method)

(6) Soil total Potassium method (hydrofluoric acid-$HClO_4$ heating digestion method)

(7) Soil quick result Potassium method (acetic acid-blaze luminosity method)

2.2. Plant study sites investigation content

Investigation content in every sample site (m^2): vegetable types, plant species, total coverage, every plant species coverage, reproductive branch height, nutritional branch height, total plant number, tassel number and soil character such as agro type, using mode. According the expressions account the tassel ratio, relative volume, important value of plant material.

Tassel ratio of plant (%)=tassel number of plant a / total plant number of plant ×100

Relative volume of plant = coverage of plant ×height of plant

Important value of plant a = relative volume of plant a /the relative volume's sum of whole plant in every sample site (m^2)

2.3. Data processing

Using Excel 2003 collate the data and draw pictures. The different vegetation types of soil physical properties of significant differences in the analysis of different vegetation types of soil nutrients were significant differences in the analysis and different vegetation types of plants were significant differences in the analysis software used SPSS11.0 Compare Means of One-way ANOVA conducted. Use Excel2003 collate the data and draw pictures. The physical properties of soil and plants and development of related analysis, soil nutrient levels and plant development related to the use of software Correlate SPSS11.0 in Bivariate for.

3 Results and analysis

3．1 The testing results and analysis of physical characters of soil in different sample plots

Eighteen sample sites and fifty quadrates have been selected at different places on typical grassland in Mongolia; twelve sample sites and forty quadrates have been selected on typical grassland in Inner Mongolia; and seven sample sites and seventy quadrates have been selected on Meadow grassland in Inner Mongolia. The testing results and analysis of physical characters of soil in different sample plots are on table 2、 chart 1 and chart 2.

Table 1 The results and analysis of soil physical character on differ sample plot

sample plot number	soil character	Water Content %	Soil weight g/cm³	Soil density g/cm³	small opening degree %
NMD-QR-1	light soil	5.07 ij	1．11c	2.65d	58.15e
NMD-ZR-2	midst soil	7.25i	1．04bc	2.56e	59.30de
NMD-ZR-3	midst soil	12.87h	0．85de	2．49ef	66．46cd

NMD-ZR-4	midst soil	15.48gh	0．84de	2.44f	65.77cd
NMD-SR-5	sand soil	5.73ij	1．11c	2.59de	57.03e
NMD-SR-6	sand soil	6.59i	1．23bc	2.64d	52.66f
NMD-SR-7	sand soil	8.78hi	1．16bc	2.58de	53.27f
NMD-SR-8	sand soil	10.58hi	1．09c	2．58de	57．73e
NMD-SR-9	sand soil	7.71i	1．14c	2.53e	55.15ef
NMD-ST-10	sand	8.84hi	1．32b	2.59de	49.12fg
NMD-ST-11	sand	5.28ij	1．25bc	2.61de	52.16f
NMD-ST-12	sand	2.70j	1．19bc	2.55e	53.25f
X	----	8.07	1.11	2.57	56.67
NMC-QR-1	light soil	24.16ef	0．96	2．61de	59．24de
NMC-QR-2	light soil	16.97g	1．10c	2.88b	63.52cd
NMC-ZR-3	midst soil	26.66ef	1．11c	2．57de	56．88ef
NMC-ZR-4	midst soil	31.82de	0．99cd	3．76a	71．54bc
NMC-SR-5	sand soil	20.00fg	1．53a	2．69cd	43．40gh
NMC-SR-6	sand soil	9.93hi	1．28bc	2.76c	53.55ef
NMC-ST-7	sand	15.62gh	1．60a	2．70cd	41．26hi
X	-----	20.74	1.22	2.85	55.63
MGD-QR-1	light soil	37.70c	1.02cd	2.65d	61.56de
MGD-QR-2	light soil	23.89ef	0.68e	2.26h	69.67bc
MGD-ZR-3	midst soil	17.31g	0．77de	2．60de	70．41bc
MGD-ZR-4	midst soil	65.16a	0．52f	2．16i	76．38a
MGD-ZR-5	midst soil	33.28cd	0．85de	2．57de	66．78c
MGD-ZR-6	midst soil	34.68cd	0．96cd	2.73cd	64.74cd
MGD-ZR-7	midst soil	31.37de	0．91d	2.47ef	63.21cd
MGD-ZR-8	midst soil	48.36b	0．53f	2.00gk	73.64ad
MGD-ZR-9	midst soil	15.93gh	0．98cd	2.61de	62.48d
MGD-SR-10	sand soil	7.61i	1.11c	2.71cd	59.04de
MGD-SR-11	sand soil	13.93gh	1.00cd	2.55e	60.73de
MGD-SR-12	sand soil	14.71gh	1.19bc	2.77bc	57.07e
MGD-SR-13	sand soil	13.92gh	1.00cd	2.76c	63.73cd
MGD-SR-14	sand soil	20.02fg	1.22bc	2.67cd	54.31ef
MGD-ST-15	sand	20.69fg	1.14bc	2.59de	56.06ef
MGD-ST-16	sand	12.44h	1.43ab	2.71cd	47.33g
MGD-ST-17	sand	12.05h	1.14bc	2.68cd	57.65e
MGD-ST-18	sand	3.56j	1．38ab	2．64d	51．58fg
X	-----	23.70	0.99	2.56	62.02

Note: NMD means typical steppe of Inner Mongolia; NMC means meadow steppe of Inner Mongolia. MGD means typical steppe of Mongolia; QR means light soil; ZR means midst soil; SR means sand soil; ST means sand (following same).

Based on sand grain size from big to small, soil texture can be classified into sandy soil, sandy loam soil, light loam soil, and medium loam soil. From table 5 and fig 1 we can see, on different grassland types, the different levels among distribution for the different types of soil texture were great. Sandy loam soil took the proportion of 42%, which was nearly the half in total. Besides, sandy soil and medium loam soil each had the proportion of 25% ,and light loam soil only 8%.

Sandy loam soil, medium loam soil, and light loam soil took the nearly proportion on meadow grassland in Inner Mongolia, which were 29%, 28%, and 28%. Medium loam soil on typical grassland in Mongolia had the biggest proportion which was 39%. Sandy loam soil and sandy soil were 28%, 25%. And light loam soil was 11%, which was the lowest. HONG Mei et al has pointed that the biomass of vegetation aboveground and content of the soil sand were inversely in proportion. It showed from the comparison that sandy soil had the biggest content in typical grassland and the lowest content in meadow grassland in Inner Mongolia. Besides, the middle level in Mongolia was basically the same as real conditions.

It can be seen from table 2 and fig 2 that the soil water content in typical grassland had a highest level in Inner Mongolia and a lowest level in Mongolia. The different level was almost three times between them. But there was just a little difference of soil water content by the proportion of 2.96% on meadow grasslands between Inner Mongolia and Mongolia.

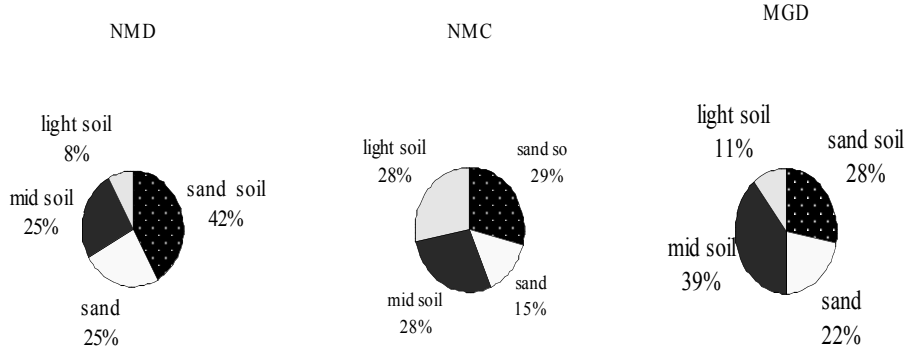


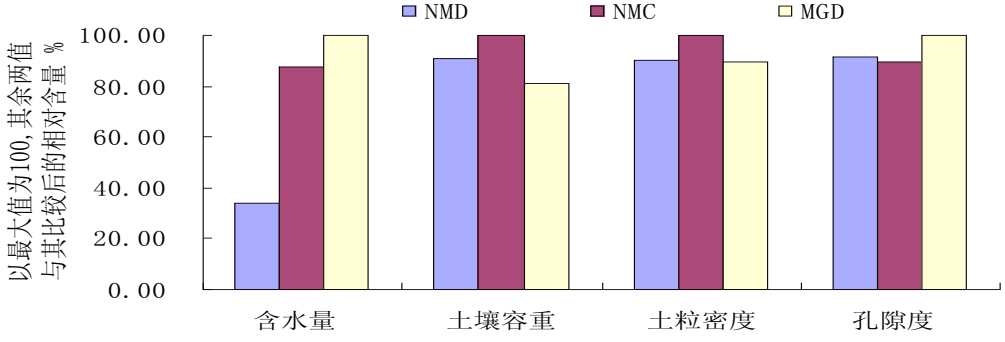
Fig.2 The proportion of four soil texture in differ sampling plot

Table 2 The comparative result of soil physical character among four soil texture on typical steppe of China and Mongolia

soil character	Soil character of sample plot place											
	light soil			midst soil			sand soil			sand		
	NMD	MGD	N/M	NMD	MGD	N/M	NMD	MGD	N/M	NMD	MGD	N/M
1 water content(%)	5.1	30.8	1:6.1	11.9	35.2	1:3.0	7.9	14.0	1:1.8	5.6	12.2	1:2.2
2 soil weight(g/cm^3)	1.1	0.9	1:0.8	0.9	0.8	1:0.9	1.2	1.1	1:0.9	1.3	1.3	1:1
3soil densityg/cm^3	2.7	2.5	1:0.9	2.5	2.5	1:1	2.6	2.7	1:1.1	2.6	2.7	1:1.1
4 small opening degree%	58.2	65.6	1:1.1	63.8	68.2	1:1.1	55.2	59.0	1:1.1	51.5	53.2	1:1.1
5 pH value	8.9	6.7	1:0.8	7.9	6.7	1:0.8	7.9	6.8	1:0.9	8.2	6.4	1:0.8

Note: NMD means typical steppe of Inner Mongolia; MGD means typical steppe of Mongolia.

The soil bulk density had the highest content on meadow grassland in Inner Mongolia, the second highest content on typical grassland in Inner Mongolia, the lowest content on typical grassland in Mongolia. But the different level among three sites was not great. Comparison on the soil density of different vegetation types, we can see soil density on meadow grassland was obvious higher than it on typical grassland. Besides, there was almost no difference typical grassland between Inner Mongolia and Mongolia. However, the soil porosity on meadow grassland was the lowest. Soil porosity on typical grassland in Mongolia was the highest, which was 5.35% more higher than soil porosity on typical grassland in Inner Mongolia



1 2 3 4

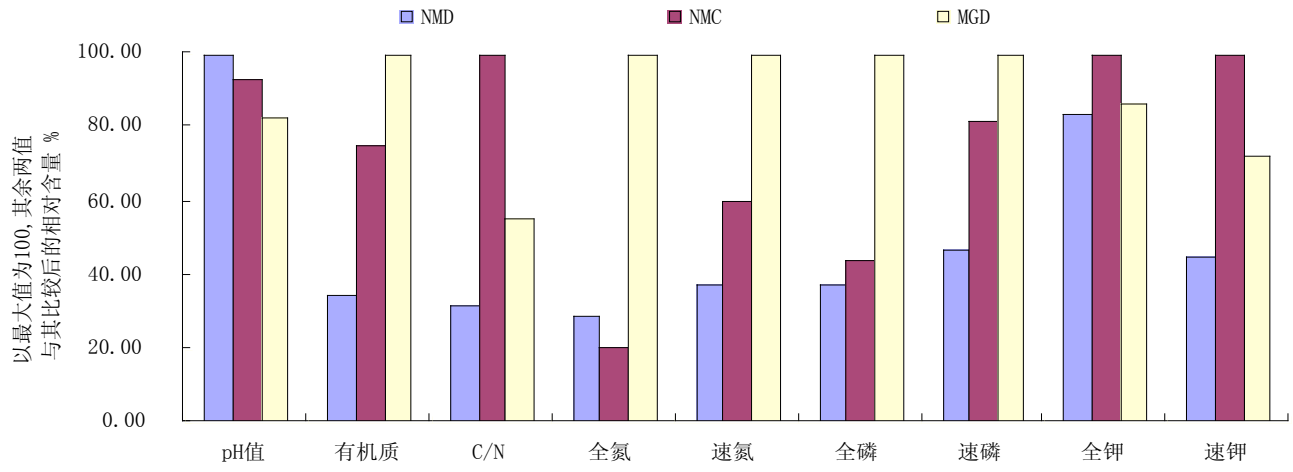
Fig.3 The relative compare of soil physical character in differ sampling plot

Note: 1 water content(%);2 soil weight(g/cm^3); 3soil densityg/cm^3; 4 small opening degree%

3.2 The results and analysis of soil nutrition characters in different sample plots

From table 3 and fig 4 show, the content of soil organic matter, soil total N, soil available N, soil total P, and soil available P on typical grassland in Mongolia were much higher than Inner Mongolia; The content of soil total N on typical steppe was higher than meadow steppe, other nutrition content on meadow steppe were higher than typical steppe in Inner Mongolia.

From table 3 is showed, soil pH value was higher than 7.00 in Inner Mongolia, the soil pH value on typical steppe was higher than meadow steppe. The soil pH value was less than 7.00 ,soil was acid in Mongolia, this related to soil water and organic content. We can see from figure 4 ,the average soil C/N, soil total kalium and soil fast available kalium on meadow steppe in Inner Mongolia were higher than typical steppe in Mongolia, the above content on typical steppe in Mongolia were higher than typical steppe in Inner Mongolia. The soil total kalium was not change, soil total kalium on typical steppe in Mongolia was higher than Inner Mongolia 0.093,it is less than soil average content 3.8% on typical steppe in Inner Mongolia.



1 2 3 4 5 6 7 8 9

Fig.4 The relative compare of soil nutrition composition in differ sampling plot

Note: 1:Ph;2:soil organic matter;3:C/N;4:soil total N;5:soil available N;
6:soil total P;7: soil **fast** available P;8: full kalium %;9: fast kalium

Table3 The results and analysis of soil nutrition characters on differ sampling plot

sample plot number	pH	organic matter%	C/N	full nitrogen %	nitrogen of alkali division mg/kg	full phosphor %	fast phosphor mg/kg	full Kalium %	fast kalium mg/kg
NMD-QR-1	8.88bc	1.79gh	4.98gk	0.19no	54.50hi	0.030gh	2.153gh	2.327c	175．68gh
NMD-ZR-2	8.35cd	2.58gh	4.17kl	0.27n	66.50h	0.013ij	2.016gh	2.372c	87.54hi
NMD-ZR-3	8.22d	4.52fg	2.02mn	1.18ij	139.50fg	0.039fg	2.616g	4.060a	177.97gh
NMD-ZR-4	7.24f	6.07ef	2.18mn	1.47hi	259.00de	0.053e	7.687bc	4.029a	1606.52b
NMD-SR-5	8.23d	2.47gh	2.71lm	0.48m	84.70gh	0.026h	1.499gh	2.327c	285.89fg
NMD-SR-6	7.85de	1.35h	1.62n	0.44mn	77.00h	0.018hi	1.014hi	2.372c	69.86i
NMD-SR-7	7.18fg	1.32h	1.79mn	0.39mn	70.00h	0.012ij	1.396h	0.729e	115.34hi
NMD-SR-8	7.83de	3.12g	7.15hi	0.23no	133.00g	0.026h	1.022hi	4.029a	263.35g
NMD-SR-9	8.31cd	2.74g	1.70mn	0.85kl	98.00gh	0.031gh	3.491f	4.060a	188.45gh

NMD-ST-10	8.16de	1.69gh	1.72mn	0.52m	63.00hi	0.022hi	6.404c	1.595d	231.64g
NMD-ST-11	8.46cd	1.04h	2.37m	0.23no	38.50hi	0.017hi	3.539f	0.684e	130.34hi
NMD-ST-12	8.06de	1.96gh	4.50k	0.23no	56.00hi	0.017hi	3.442f	1.417d	83.04hi
X	8.06	2.55	3.08	0.54	94.98	0.025	3.023	2.500	284.64
NMC-QR-1	6.75g	6.80ef	3.04lm	1.18ij	217.00e	0.051ef	2.635g	3.283b	156.04h
NMC-QR-2	5.86hi	6.45ef	14.78c	0.23no	175.00f	0.039fg	2.925fg	4.194a	179.14gh
NMC-ZR-3	8.17de	6.13ef	9.23fg	0.35mn	98.00gh	0.051ef	12.751a	3.252b	2771.68a
NMC-ZR-4	6.04hi	8.71d	17.01b	0.27n	259.00de	0.027h	3.717f	4.074a	478.59e
NMC-SR-5	10.07a	2.54gh	5.83ig	0.23no	101.50gh	0.011ij	8.122bc	2.372c	339.68f
NMC-SR-6	6.39gh	5.17ef	10.09ef	0.27n	136.50fg	0.011ij	3.539f	3.283b	220.86gh
NMC-ST-7	9.20bc	2.98fgh	6.83hi	0.23no	77.00h	0.015i	3.249fg	0.506e	293.95fg
X	7.50	5.54	9.54	0.39	152.00	0.029	5.280	2.994	634.28
MGD-QR-1	8.01de	6.53ef	1.42n	2.42de	213.50ef	0.072d	5.477d	2.327c	371.64ef
MGD-QR-2	5.34ij	20.69b	47.43a	0.23no	630.00a	0.097c	6.301c	1.417d	1098.37c
MGD-ZR-3	6.64gh	10.97c	1.46n	3.96b	367.50bc	0.077d	9.805b	4.104a	532.81e
MGD-ZR-4	5.88hi	21.32b	1.00no	11.29a	623.00a	0.122b	2.325gh	4.074a	1032.83c
MGD-ZR-5	6.49gh	11.99b	2.37m	2.67cd	329.00c	0.080d	13.514a	4.194a	715.48d
MGD-ZR-6	7.08fg	4.82fg	1.41n	1.80fg	140.00fg	0.060e	4.653e	2.372c	314.66fg
MGD-ZR-7	7.25f	4.79fg	1.31no	1.93f	164.50fg	0.078d	9.186b	4.104a	235.72g
MGD-ZR-8	6.54gh	28.71a	11.65d	1.30i	665.00a	0.215a	1.325hi	2.327c	1175.11c
MGD-ZR-9	6.68g	4.19fg	7.14hi	0.31n	199.50ef	0.047ef	12.896a	1.431d	433.94e
MGD-SR-10	6.73g	1.87gh	1.02no	0.97jk	101.50gh	0.047ef	10.114b	2.372c	533.88e
MGD-SR-11	6.86fg	4.14fg	1.53n	1.43hi	182.70f	0.050ef	7.744bc	2.327c	210.49gh
MGD-SR-12	6.59gh	2.69gh	1.24no	1.14ij	112.70gh	0.030gh	3.150fg	2.372c	171.88gh
MGD-SR-13	7.43ef	5.29ef	3.28lm	0.85kl	217.00ef	0.058e	6.713c	4.163a	338.35f
MGD-SR-14	6.57gh	2.60gh	1.61n	0.85kl	133.00g	0.039fg	2.077gh	1.417d	187.61gh
MGD-ST-15	5.56ij	4.58fg	3.31lm	0.73l	185.50ef	0.035g	9.186b	2.372c	260.86g
MGD-ST-16	6.72g	1.16h	0.79no	0.77kl	24.50i	0.017hi	2.087gh	1.550d	31.08i
MGD-ST-17	6.68g	4.04fg	4.09kl	0.52m	161.00fg	0.038fg	4.035ef	2.327c	474.44e
MGD-ST-18	6.77g	2.53gh	3.42l	0.39mn	101.50gh	0.029gh	5.580d	1.417d	199.80gh
X	6.65	7.34	5.30	1.86	252.86	0.066	6.454	2.593	462.16

Note: NMD means typical steppe of Inner Mongolia; NMC means meadow steppe of Inner Mongolia. MGD means typical steppe of Mongolia; QR means light soil; ZR means midst soil; SR means sand soil; ST means sand (following same).

3.3 The growth development of rhizomatous on typical steppe of Mongolia plateau

Tab.4 The growth development of rhizomatous in differ vegetation types on typical steppe

sample plot number	total species number (/m^2)	total coverage %	plant species coverage %	height (cm)		tassel number (/m^2)	Branch number (/m^2)	tassel ratio %	relative volume,	important value
				reproductive branch	nutritional branch height					
NMD-QR-1	24	82.5	70	66	37	44	568	7.75	4620.0	95.50
NMD-ZR-2	19	90	25	0	40	0	125	0	1000.0	29.11
NMD-ZR-3	20	80	60	84	59.33	29.67	315	9.42	5040.0	75.64
NMD-ZR-4	12	67.5	20.5	31	10.25	23.5	87.5	26.86	635.5	17.96
NMD-SR-5	18	50	1.5	0	12	0	6	0	18.0	2.94
NMD-SR-6	16	80	37	63	20.25	168	455	36.92	2331.0	42.98
NMD-SR-7	32	87.5	38.5	0	36	0	510	0	1386.0	44.92

NMD-SR-8	9	75	56.5	51.5	31.5	40	390	10.26	2909.75	77.4
NMD-SR-9	19	86.7	30.5	49.25	20.25	17	95	17.89	1502.13	30.27
NMD-ST-10	9	90	40	0	30	0	210	0	1200.00	47.04
NMD-ST-11	17	65	55	75	36	30	120	25	4125.0	88.79
NMD-ST-12	21	47. 4	71	48	27.58	32.5	611	5.32	3408.0	83
X	18.00	75.1	42.13	38.98	30.01	32.06	291.0	11.62	2348.0	52.96
NMC-QR-1	20	40	11.75	0	23	0	97.75	0	270.3	33.86
NMC-QR-2	24	43	18	0	42	0	142	0	756.0	41.27
NMC-ZR-3	28	57	50	60	28.92	9.4	534	1.76	3000	82.79
NMC-ZR-4	39	55	24	60	52.5	6	300	0.02	1260	57.32
NMC-SR-5	15	45	27	37	14	111	330	33.64	999	64.61
NMC-SR-6	22	32	8.14	0	16.29	0	64.14	0	132.6	27.71
NMC-ST-7	11	70	10	0	30	0	93	0	300	13.18
X	22.71	48.86	21.27	22.43	29.53	18.06	222.98	5.06	959.69	45.82
MGD-QR-1	16	14	13.75	45	27.25	9	115	7.83	618.75	77.05
MGD-QR-2	7	80	80	0	10	0	1576	0	800	97.47
MGD-ZR-3	39	90	90	125	95	45	892	5.04	8550	95
MGD-ZR-4	65	72.5	52.5	55	42.3	7	431	1.62	2554.13	96
MGD-ZR-5	12	45.83	29.8	25	21	9.25	316	2.93	745	60.95
MGD-ZR-6	24	50	28.55	40	25	4.75	406.5	1.17	1142	72.21
MGD-ZR-7	38	42.5	71	58	20	156	650	24	4118	99.85
MGD-ZR-8	11	90	90	60	40	2	2120	0.09	3600	87.8
MGD-ZR-9	16	47.5	53.33	0	32	0	1086.7	0	1706.6	86.39
MGD-SR-10	9	25	20	0	25	0	640	0	500	78.13
MGD-SR-11	33	32.5	3.5	0	19.75	0	60	0	69.13	12.96
MGD-SR-12	28	14	6	0	17.4	0	133.6	0	104.4	40.79
MGD-SR-13	17	50	35	0	10	0	480	0	350	53. 35
MGD-SR-14	26	10	7	25	5.5	1	64	1.56	175	25.33
MGD-ST-15	13	22.5	10. 5	0	15. 5	0	120	0	162. 75	31. 16
MGD-ST-16	15	11.5	20	35	10	50	356	14.04	700	95. 69
MGD-ST-17	28	25	11.75	0	16.25	0	114.5	0	190.9	30.17
MGD-ST-18	21	51	75	67.67	27.84	15.6	588	2.65	5075.3	94.94
X	23.22	42.99	38.76	29.76	25.54	16.64	563.85	3.39	1731.2	68.62

Note: NMD means typical steppe of Inner Mongolia; NMC means meadow steppe of Inner Mongolia. MGD means typical steppe of Mongolia; QR means light soil; ZR means midst soil; SR means sand soil; ST means sand (following same).

From table 4 and figure 4 were showed, the total plant number, branch number of rhizomatous, important value of rhizomatous were highest, but total coverage, the nutrition branch height of rhizomatous, tassel number and tassel ratio of rhizomatous were lowest, species coverage, the reproductive branch height and relative volume of rhizomatous on typical steppe in Mongolia were consisted in typical and meadow steppe in Inner Mongolia.

The sample site total coverage, rhizomatous species coverage, reproductive branch height, nutrition branch height, tassel number and tassel ratio and relative volume on typical steppe in Inner Mongolia were highest, total species number was lowest, rhizomatous branch number and important value were between typical steppe in Mongolia and meadow steppe in Inner Mongolia.

The total species number on meadow steppe in Inner Mongolia and typical steppe in Mongolia were not discrepancy, it was evident higher than typical steppe in Inner Mongolia. The rhizomatous nutrition branch height on meadow steppe of Inner Mongolia was consistent with typical steppe in Mongolia, it was higher than typical steppe in Mongolia, rhizomatous species coverage ,procreative branch height, branch number, relative volume and important value were lowest; sample site total coverage, tassel number and tassel ratio were consisted on typical steppe in Mongolia and typical steppe in Inner Mongolia.

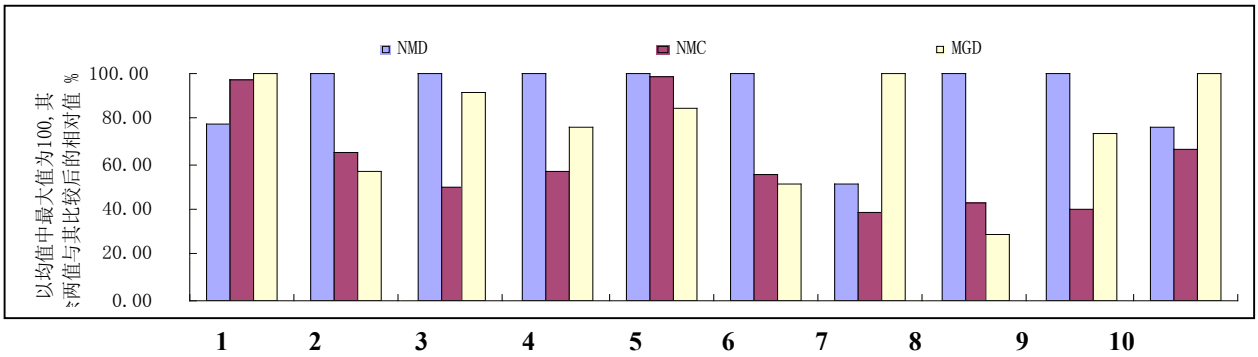


Fig.4 The growth development of rhizomatous in differ vegetation types on typical steppe

Note : 1:plant species,2: total coverage, 3: plant species coverage, 4:reproductive branch height, 5:nutritional branch height, 6:tassel number;7 total branch number ;8: the tassel ratio, 9:relative volume, 10:important value of plant material.

3.4 The correlation analysis between soil nutrition and rhizomatous growth development on typical steppe

Table 7 **The correlation analysis between soil character and Rhizomatous growth development on of Inner Mongolia**

	pH	organic matter%	C/N	full nitrogen %	nitrogen of alkali division mg/kg	full phosphor %	fast phosphor mg/kg	full Kalium %	fast kalium mg/kg
1	-0.0126	-0.3303	-0.1643	-0.2026	-0.3773	-0.3387	-0.4386	-0.4131	-0.3640
2	0.0199	-0.0863	-0.1793	0.0544	-0.0706	-0.0935	-0.0335	0.1318	-0.1789
3	0.3072	-0.2281	0.4231	-0.3251	-0.2921	-0.1278	-0.1221	-0.1433	-0.3611
4	0.3386	0.0861	0.1229	0.0991	0.0487	0.2755	-0.1289	0.2819	-0.1069
5	0.3182	-0.0906	0.1389	-0.1334	-0.2824	-0.1945	-0.2836	-0.0758	-0.4869
6	-0.0338	-0.1816	-0.0551	-0.0855	-0.0335	-0.0618	-0.3026	0.0791	-0.1252
7	-0.0660	-0.3448	0.3573	-0.4100	-0.2972	-0.3021	-0.3690	-0.2615	-0.3664
8	-0.1569	0.1538	-0.2767	0.3106	0.3266	0.3052	0.1513	0.2409	0.3274
9	0.4548	-0.1225	0.2807	-0.1733	-0.2312	0.0177	-0.2240	-0.0140	-0.3546
10	0.3919	-0.2927	0.4496	-0.4063	-0.3510	-0.1672	-0.1773	-0.2071	-0.3889

Note : 1:plant species,2: total coverage, 3: plant species coverage, 4:reproductive branch height, 5:nutritional branch height, 6:tassel number;7 total branch number ;8: the tassel ratio, 9:relative volume, 10:important value of plant material.

Table 8 The correlation analysis between soil character and Rhizomatous growth development on typical steppe of Mongolia

	pH	organic matter %	C/N	full nitrogen %	nitrogen of alkali division mg/kg	full phosphor %	fast phosphor mg/kg	full Kalium %	fast kalium mg/kg

1	**-0.0184**	**0.1045**	**-0.3640**	**0.7922****	**0.1638**	**0.0802**	**-0.2279**	**0.4770***	**0.0229**
2	**-0.3119**	**0.7868****	**0.4464**	**0.3575**	**0.8061****	**0.7257****	**0.0798**	**0.3376**	**0.7484***
3	**-0.1908**	**0.6166****	**0.4307**	**0.1708**	**0.6139****	**0.6008****	**0.0913**	**0.1899**	**0.5574***
4	**0.1744**	**0.2930**	**-0.2115**	**0.4213**	**0.2505**	**0.3534**	**-0.0996**	**0.3486**	**0.1338**
5	**0.0161**	**0.3323**	**-0.1621**	**0.4509**	**0.3524**	**0.3501**	**0.1950**	**0.3945**	**0.2958**
6	**0.2581**	**-0.1262**	**-0.1651**	**0.0629**	**-0.1540**	**0.0037**	**0.1458**	**0.3738**	**-0.2391**
7	**-0.2722**	**0.7175****	**0.6142****	**-0.0826**	**0.6800****	**0.7333****	**0.0018**	**-0.0952**	**0.7015***
8	**0.3671**	**-0.1869**	**-0.2058**	**0.0483**	**-0.2357**	**-0.0633**	**0.0396**	**0.2572**	**-0.3159**
9	**0.0342**	**0.2796**	**-0.0646**	**0.2784**	**0.2753**	**0.3187**	**0.1231**	**0.3248**	**0.1805**
10	**-0.0023**	**0.3887**	**0.2647**	**0.2773**	**0.3617**	**0.3745**	**0.0506**	**0.1105**	**0.3818**

Note : 1:plant species,2: total coverage, 3: plant species coverage, 4:reproductive branch height, 5:nutritional branch height, 6:tassel number;7 total branch number ;8: the tassel ratio, 9:relative volume, 10:important value of plant material.

* : r=0.05; **:r=0.01.

Table 8 show : They wear positively correlated between the soil organic matter, nitrogen alkali soil, soil total phosphorus ,potassium of soil samples with the vegetation total coverage, plant species coverage, branch number.

The comparative and reason analysis of soil nutrition differences in Mongolian Plateau

Generally, in our study in 2005-2006, the soil nutritional traits in addition to soil pH, C/N, total K in Mongolian steppe less than Inner Mongolia, the other indicators are better than Inner Mongolia, especially between typical steppes. After comparison study show that soil pH 0f Mongolian steppe lower than Inner Mongolia, and the remaining nutrition indicators were higher than Inner Mongolia.