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METROGLYPH ANALYSIS IN MAIZE LINES IN MEGHALAYA

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Fifty five lines of maize (F_5-F_7) were grown in a randomized block design with three replications during Kharif (rainy season) 1999 at the Experimental Farm of Division of Plant Breeding, ICAR Complex for NEH Region, Umiam (1000amsl, 26°N and 92°E), Meghalaya in rainfed acid alfisol condition (pH 5.0). The plot size was 7 sq. A spacing of 50 cm between rows and 15 cm between plants was given. The crop was fertilized as per recommended practices. Plants were thinned to maintain one plant per hill when the plants attained a height of 12-15cm. Observations were recorded on 10 random plants in each plot for dry kernel yield/ plot, ear leaf area (m^{-2}), plant height (cm), ear height (cm), shelling percentage, 100 seed weight (g), dry cob yield (g) except for days to 50% tasselling, days to 50% silking and days to 50% dry husking. This technique was used by Mukherjee *et al* (1971) also for classificatory analysis in maize.

The range of variability of each character was arbitrarily divided in three classes as low, medium and high. The 8 characters other than dry kernal yield/plot and plant height repressented on defferent positions of the glyph. Defferent length of the rays on glyph represented defferent categories. The lengths of rays represented the index value for each character. 1-no ray, 2-short ray and 3-long ray. The total index values were recorded by summing up these index scores of all the ten characters studied.

In the metroglph analysis (Fig 1) each genetype was represented by a circle. The dry kernel yield per plot was plotted in the X-abscise and the plant height in the Y- ordinate by circles for all the cellections. The horizontal lines in the Y-axis divided yield/plot into three broad groups. So, altogether there were nine groups.

The low dry kernel yield/plot group ranging from 28.1g to 66.0 g consisted of 29 genetypes. Most of the lines were characterized by medium to high days to 50% tasselling, days to 50% silking and days to 50% dry husking whereas low to medium in ear leaf area (m^{-2}), shelling percentage, 100 seed weight (g) and dry cob yield (g). The high dry kernel yield/plot (above 103.8g) also consisted of 12 genetypes mostly of low to high days to 50% tasselling, dyas to 50% silking and days to 50% dry husking whereas low to medium in ear leaf area (m^{-2}), ear height, shelling percentage, 100 seed weight (g) and dry cob yield (g) were found in medium to high range. Low plant height group below 196 cm) consisted of 3 genetypes characterized by low to high days to 50% tasselling, days to 50% silking and days to 50% dry husking, ear height and shelling percentage. The medium plant height group consisted of 10 genotypes covering low to high days to 50% tasselling, days to 50% silking, days to

50% dry husking and medium to high ear height. There was no genetype in this high plant height group (196 to 144cm). This group represented low to high days to 50% tasselling, days to 50% silking, ear height and days to 50% dry husking.

Thus 55 genetypes exhibited a clustering into all the 9 groups on the basis of dry kernel yield/plot and plat height interaction groups. The maximum number of genotypes clustered in the high plant height and low dry kernel yield/plot interacting group. The index scores of the genotypes were evident in the frequency diagram (Fig2). It was observed that genotypes 20 (RCM-39), 21 (RCM-40), 18 (RCM-37) amd 23 (RCM-42) were associated with desirable attributes. Genotype 29, (RCM-39) obtained highest index score.

Plant height, ear height, shelling percentage, 100 seed weight and days to 50% silking were relatively important characters. Hence in a breeding programme, it may be aimed to combine these characters to increase yield under our agro-climatic conditions. Thus the pattern of morphological variations in crop species can be studied by the metroglyph and index score method (Anderson, 1957). This technique has been used for classificatiry problems in maize by Mukherjee *et al*, (1971).

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Table 1: Mean data and the scores (in parenthesis) for different charactrs in the 55 maize lines of Meghalaya

Sl. No.	Genotypes/ Line	Days to 50% tassellin g	Days to 50% silking	Days to 50% dry husking	Ear leaf area (m-2)	Plant height (cm)	Ear height (cm)	Shelling percent age	100 seed weight (g)	Dry cob yield (g)	Dry kernel yield (g)	Sum of Index Scores
1.	RCM-20	63(1)	66(1)	91(1)	885.6(3)	232.7(2)	101.3(1)	72.7(1)	32.5(3)	165(3)	120(3)	19
2.	RCM-21	65(2)	68(2)	101(2)	940(3)	232(2)	105.5(2)	82.4(2)	34.7(3)	212.5(3)	115(3)	24
3.	RCM-22	65(2)	68(2)	101(2)	773.5(2)	219(2)	113.3(2)	82.4(2)	32.7(3)	141.7(2)	116.7(3)	22
4.	RCM-23	63(1)	67(2)	100(2)	816.3(2)	249(3)	128.7(2)	84.7(3)	30.3(3)	108.3(2)	91.7(2)	22
5.	RCM-24	61(1)	63(1)	96(1)	716.6(2)	184(1)	82.3(1)	80.1(2)	28(3)	83.3(1)	66.7(2)	15
6.	RCM-25	60(1)	62(1)	95(1)	785.6(2)	216.3(2)	107.3(2)	83.3(3)	32.2(3)	150(2)	125(3)	20
7	RCM-26	62(1)	65(1)	98(1)	879.8(3)	180(1)	89.3(1)	66.7(1)	23(2)	75(1)	50(1)	13
8.	RCM-27	60(1)	62(1)	95(1)	895.1(3)	188.7(1)	83(1)	72.2(1)	29.9(3)	150(2)	108.3(3)	17
9	RCM-28	60(1)	62(1)	95(1)	970(3)	209.3(2)	94.3(1)	83.3(3)	28.7(3)	100(2)	83.3(2)	19
10	RCM-29	65(2)	68(2)	101(2)	843.3(2)	255(3)	94.7(1)	93.5(3)	27.7(3)	125(2)	116.7(3)	23
11	RCM-30	68(2)	71(3)	104(3)	669.9(2)	148.3(1)	83(1)	74.9(2)	20(1)	66.7(1)	50(1)	16
12	RCM-31	66(2)	70(2)	103(3)	633.3(1)	191.3(1)	119.7(2)	66.6(1)	12.7(1)	50(1)	33.3(1)	15
13	RCM-32	68(2)	71(3)	104(3)	629.6(1)	213.3(2)	108(2)	77.8(2)	30(3)	150(2)	116.7(3)	23
14	RCM-33	66(2)	69(2)	102(2)	734.7(2)	200.3(2)	105(1)	83.3(3)	29.8(3)	100(2)	83.3(2)	21
15	RCM-34	65(2)	68(2)	101(2)	873(2)	168.3(1)	87(1)	63.2(1)	31(3)	158.3(3)	100(2)	19
16	RCM-35	68(2)	71(3)	104(3)	830.5(2)	196.7(2)	95(1)	71.4(1)	26(3)	116.7(2)	83.3(2)	23
17	RCM-36	67(2)	70(2)	103(3)	736.9(2)	210.3(2)	111.7(2)	84.2(3)	34.8(3)	158.3(3)	133.3(3)	20
18	RCM-37	67(2)	70(2)	103(3)	857(2)	232.7(2)	131.3(3)	85.7(3)	31.4(3)	116.7(2)	100(2)	25
19	RCM-38	66(2)	69(2)	102(2)	795.4(2)	292.3(3)	138.7(3)	88.2(3)	33(3)	141.7(2)	125(3)	23
20	RCM-39	69(3)	71(3)	105(3)	809.6(2)	234.3(2)	126.7(2)	73.9(2)	27.4(3)	191.7(3)	141.7(3)	28
21	RCM-40	70(3)	72(3)	105(3)	853(2)	208.3(2)	87.7(1)	62.5(1)	27.1(3)	66.7(1)	41.7(1)	26
22	RCM-41	63(1)	66(1)	99(2)	717.6(2)	205(2)	86.3(1)	85.7(3)	29.8(3)	116.7(2)	100(3)	15
23	RCM-42	66(3)	75(3)	108(3)	669.9(2)	186(1)	92(1)	(75)2	30.6(3)	100(2)	75(2)	25
24	RCM-43	61(2)	69(2)	102(2)	702(2)	271.2(3)	155(3)	80.4(2)	29.1(3)	82.3(1)	66.2(2)	19
25	RCM-44	62(1)	64(1)	97(2)	966.3(3)	266.4(3)	140.4(3)	69.9(1)	26.8(2)	62.5(1)	43.7(1)	21
26	RCM-45	62(1)	65(1)	98(2)	1008(3)	262.8(3)	151.2(3)	83.1(1)	29.5(3)	82.8(1)	68.8(2)	18
27	RCM-46	62(1)	65(1)	98(2)	999.6(3)	214.2(2)	107.4(2)	81.4(2)	22.7(2)	56.6(1)	46.1(1)	20
28	RCM-47	62(1)	65(1)	98(2)	692.2(2)	269.60	152.6(3)	81.3(2)	24.7(2)	89.3(1)	72.6(2)	16
29	RCM-48	63(1)	64(1)	97(2)	919.2(3)	247(3)	138(3)	81.9(2)	22(2)	54.2(1)	44.4(1)	20
30	RCM-49	63(1)	66(1)	99(2)	801.8(2)	239.2(3)	148.8(3)	79.9(2)	23.5(2)	72.9(1)	58.3(1)	18
31	RCM-50	63(1)	66(1)	99(2)	868(2)	227.8(2)	111.4(2)	83.3(3)	23.9(2)	75(1)	62.5(1)	18
32.	RCM-51	61(1)	66(1)	99(2)	792.3(2)	223.2(2)	115.2(2)	78.8(2)	28.5(3)	75(1)	59.1(1)	17
33.	RCM-52	63(1)	63(1)	96(1)	446.4(1)	264(3)	144(3)	85.2(3)	20.8(2)	84.4(1)	71.9(2)	15

34.	RCM-53	62(1)	66(1)	99(2)	923.4(3)	231(2)	127(2)	81.6(2)	20.7(2)	45(1)	36.7(1)	21
35.	RCM-54	63(1)	65(1)	98(2)	874.9(3)	253.6(3)	124.4(2)	79.6(2)	23.3(1)	58.3(1)	46.4(1)	17
36	RCM-55	62(1)	66(1)	99(2)	776.2(2)	280.2(3)	151.6(3)	83.4(3)	23.6(2)	50(1)	41.7(1)	17
37.	RCM-56	62(1)	65(1)	98(2)	1084(3)	267.6(3)	146.8(3)	80.1(2)	29.9(3)	83.3(1)	66.7(2)	20
38	RCM-57	63(1)	65(1)	98(2)	940.9(3)	261.4(3)	147.2(3)	83.4(3)	30(3)	64.3(1)	53.6(1)	21
39.	RCM-58	63(1)	66(1)	99(2)	948.6(3)	266.8(3)	139.6(3)	79.7(2)	22.9(2)	61.2(1)	48.8(1)	21
40.	RCM-59	63(1)	65(2)	98(2)	925.1(3)	243(2)	137(3)	75(2)	23.5(2)	40(1)	30(1)	19
41.	RCM-60	63(1)	67(2)	100(2)	748(2)	230.2(2)	129.8(2)	78.8(2)	18.6(1)	58.9(1)	46.4(1)	18
42.	RCM-61	63(1)	67(2)	100(2)	858.3(2)	250(3)	127(2)	79.9(2)	21.5(2)	66.7(1)	53.3(1)	16
43.	RCM-62	64(1)	66(1)	99(2)	938.9(3)	225(2)	111.8(2)	78.7(2)	23.1(2)	51.6(1)	40.61(1)	18
44	RCM-63	63(1)	68(2)	101(2)	870.3(2)	252.6(3)	146(3)	78.1(2)	25.9(2)	51.2(1)	40(1)	17
45.	RCM-64	63(1)	67(2)	100(2)	824.6(2)	265.8(3)	144.4(3)	79.9(2)	22.6(2)	53.6(1)	42.8(1)	19
46	RCM-65	63(1)	66(1)	99(2)	960(3)	274.8(3)	155(3)	81.1(2)	35.1(3)	78.1(1)	63.6(1)	19
47.	RCM-66	63(1)	66(1)	99(2)	811.7(2)	252.4(3)	138.6(3)	85.6(3)	27.5(3)	76(1)	60(1)	19
48	RCM-67	64(1)	67(2)	100(2)	921.2(3)	244.6(3)	136.2(3)	78.2(2)	25.6(2)	67.6(1)	52.9(1)	22
49.	RCM-68	63(1)	67(2)	100(2)	1066.2(3)	238.6(2)	122.2(2)	82.2(2)	24.1(2)	86.1(1)	70.8(2)	20
50	RCM-69	64(1)	66(1)	98(2)	913.9(3)	244.4(3)	125.2(2)	81.9(2)	27.6(3)	75(1)	61.4(1)	19
51	RCM-70	63(1)	65(1)	98(2)	994.9(3)	237.4(2)	128.8(2)	74.8(2)	14.8(1)	41.7(1)	31.2(1)	18
52	RCM-71	64(1)	67(2)	100(2)	744.6(2)	214.6(2)	124.4(2)	80.2(2)	11.7(1)	45.4(1)	36.4(1)	19
53	RCM-72	62(1)	65(1)	100(2)	813.3(2)	237.8(3)	132.4(3)	75.1(3)	10.5(1)	37.4(1)	28.1(1)	15
54	RCM-73	63(1)	67(2)	100(2)	712.3(2)	225(2)	111.8(2)	78.7(2)	23.1(2)	51.6(1)	40.6(1)	16
55	RCM-74	63(1)	66(1)	99(2)	616.2(1)	244.6(3)	136.2(3)	78.2(2)	25.6(2)	67.6(1)	52.9(1)	17
Mean		63.8	66.8	99.7	977.8	231.9	121.3	79.3	25.9	90.9	72.3	
Range		60-73	62-75	91-108	446.4-1084	148-292	82.5-155	62.5-93.5	10.5-35.1	37.4-212.5	28.1-141.7	

Table 2 Range of means and index scores for different characters in the 55 maize lines of Meghalaya

Characters	Range of means	Score-I Value less than	Score-II Sign	Score-III Value from to	Sign	Value more than	Sign
Days to 50% taselling	60.0-73.0	64.3	0	64.3-68.7	0	68.7	0
Days to 50% silking	62.0-75.0	66.3	0	66.3-70.6	0	70.6	0
Days to 50% dry husking	91.0-108.0	96.7	0	96.7-102.3	0	102.3	0
Ear leaf area (m^{-2})	446.4-1084	658.9	0	658.9-871.5	0	871.5	0
Plant height (cm)	148.0-292.0	196.0	0	196.0-244.0	0	244.0	0
Ear height (cm)	82.3-155.0	106.5	0	106-5-130.8	0	130.8	0
Shelling percentage	62.52-93.5	72.8	0	72.8-83.1	0	83.1	0
100 seed weight (g)	10.5-35.1	18.7	0	18.7-26.9	0	26.9	0
Dry cob yield (g)	37.4-212.5	95.8	0	95.8-154.1	0	154.1	0
Dry kernel yield (g)	28.1-141.7	66.0	0	66.0-103.8	0	103.8	0

Fig 1: Metroglyph scatter diagram representing maize genotypes on the basis of some morphological characters.

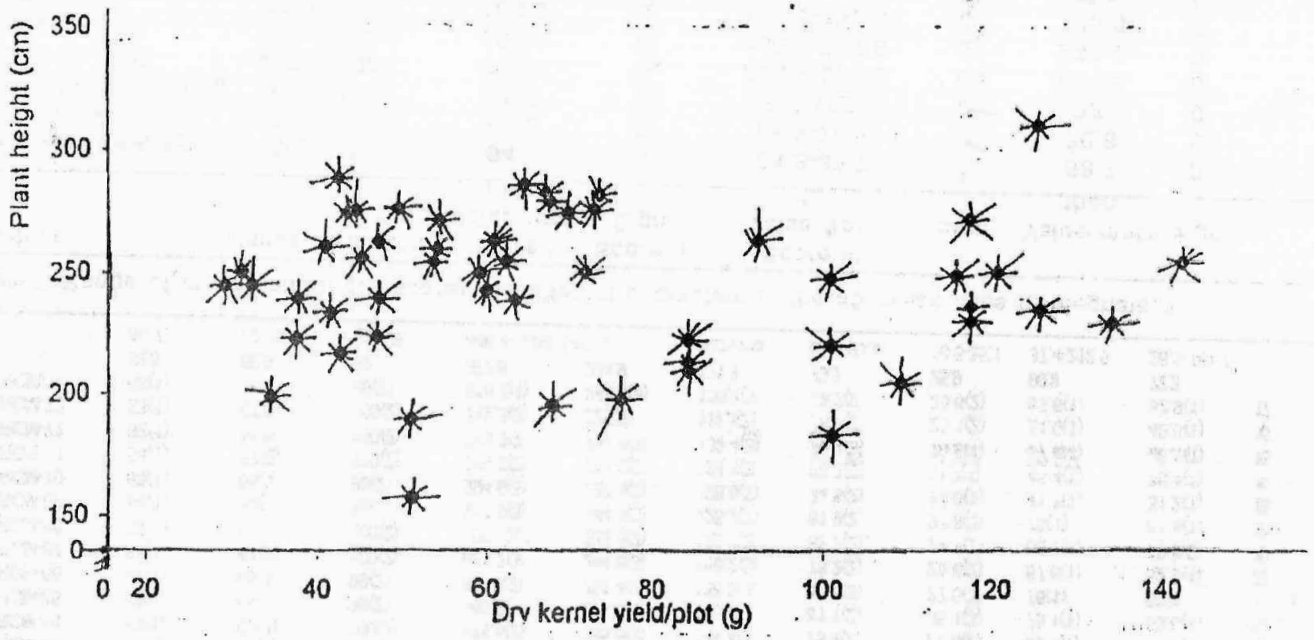

Fig 2. Frequency histogram of index scores in different maize inbreds of Meghalaya