Supplementary file 1

Summary of materials, methods, analyzed and tabulated data of red light absorbance-transmittance measure through maize leaf for discovery of photosynthesis models

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Sup Table 1: Details of research site of the trial A1

Trial name: Trial of single cross hybrid maize
Research site: Research field of NMRP/ NARC, Rampur Chitwan Nepal
Longitude and latitude: $27^0$37'N, $84^0$24' E
Site altitude: 228 meter asl (above sea level)
Soil texture: Sandy loam
Top soil pH: 5 to 6

Sup Table 2: Details of planting and management of the hybrid maize of the trial A1grown in winter in Nepal in the year of 2012AUT-2013 SPR.

Design of experiment: Randomized complete block design (RCBD)
Number of hybrids: 5 (Fifteen); Replications: 3
Planting date: October 03, 2012; Green manure crop: Sun hemp in the summer of 2012.
Organic manure rate: 33 t ha^{-1}
Date of organic manure application: Before the start of first land plowing
Tilth: Clod free fine tilth field
Row direction: North-South
Net plot size: 3 meter x 1.4 meter (L x B) = 4.2 m^2
Spacing: 3 meter long rows separated by 0.70 m distance
Seed drop distance or hole to hole distance: 0.25 meter
Number of seeds dropped into a hole: 2 seeds
Fertilizer dose: 120: 60: 40 kg N, P_2O_5 and K_2O ha^{-1}
Basal fertilizer dose: 60: 60: 40 kg N, P_2O_5 and K_2O /ha through DAP and M/P
Split N-fertilizer dose and date: 30 kg N on 45 DAS, 30 kg N on 60^{th} DAS. It is through urea

Sup Table 3: Intercultural management of the plants of the trial

Soil loosening and manual weed removal: 30 days after plantation
Plant population: 57143 plants ha^{-1}, 24 plants /plot of 4.2 m^2 maintained on 30^{th} day
Date of earthing up: 45 days after sowing (DAS)
Irrigation date: First-50 DAS. Second-70 DAS, Third-90, Forth- 110 DAS
Irrigation method: Furrow irrigation through shallow tube well of 4" pipe
Harvest date: September 20, 2012; Crop stand duration: 110 days

Sup Table 4: General morphological, physiological and yield traits of the pipeline hybrids

†Hybrid Entry	[1]Yield (t ha^{-1})		[2]Culm Len (cm)		[3]Anth50 (days)		[4]Silk50 (days)		[5]Pop Sen (days)		[6]TAI (days)	[7]SAI (days)	[8]SPAD35 (%)
6	10.61	A	190.3	A	74.3	C	78.3	BC	178.3	B	4.7	4.0	6.9
112	9.87	A	158.7	B	78.3	B	79.3	B	181.7	A	0.7	1.0	4.0
14	9.28	A	164.8	B	82.0	A	83.0	A	176.3	B	2.3	1.0	7.5
113	8.56	A	161.2	B	84.3	A	84.3	A	181.3	A	2.7	0.0	6.5
109	7.22	A	197.2	A	71.3	D	76.7	C	175.7	B	4.3	5.3	9.1

†Hybrids and their entries are RL-111/RL-189 (6), RML-32/RML-17 (112), RML-4/NML-2 (14), RML-4/RML-17 (113) and RC/RML-8 (109). [1]Grain yield, [2]Culm length; [3]days for anthesis of 50% population; [4]days for silk emergence of the 50% population; [5]days for senescence of the all plants in the plot of each hybrid; [6]tassel emergence-anthesis interval in days; [7]anthesis-silking interval in days; [8]percent of the frequencies of the e1 leaf sectors of SPAD below 35 .

Source:

Adhikari NR, Ghimire SK, Sah SK, Koirala KB. (2015) Frequency distribution and mean comparisons of red light absorbance-transmittance of the e1 leaf sectors of five pipeline maize hybrids during early grain filling in subtropical winter. PeerJ PrePrints 3:e1836 https://dx.doi.org/10.7287/peerj.preprints.1468v2

Sup Table 5: Frequency distribution of e1 leaf sectors of varying SPAD measure, chlorophyll and nitrogen content.

[1]Hybrid entry	Mean	Trimmed Mean	Standard deviation	Coefficient of variation	Min	Max	Skewness	Kurtosis
	SPAD measure							
6	46.6	47.2	8.68	18.61	5	71.3	-1.38	4.09
112	47.0	47.2	6.46	13.75	5.9	62.7	-0.82	2.34
14	48.4	49.3	9.07	18.71	4.5	67.6	-1.62	3.69
113	47.0	47.7	8.82	18.76	2.2	68.8	-1.43	4.07
109	45.7	46.2	9.15	20.04	3.2	69	-1.06	2.62
	Chlorophyll content (µg cm^{-2})							
6	48.49	48.86	12.18	25.12	3.56	97.09	-0.46	1.46
112	48.55	48.63	9.50	19.56	4.23	76.35	-0.23	0.66
14	51.39	52.03	12.80	24.91	3.19	87.60	-0.83	1.56
113	49.14	49.52	12.41	25.26	1.54	90.57	-0.52	1.38
109	47.17	47.42	12.85	27.23	2.25	91.08	-0.26	0.64
	Nitrogen content % dry weight							
6	2.03	2.04	0.37	18.03	0.76	3.38	-0.45	1.11
112	2.03	2.03	0.29	14.24	0.77	2.84	-0.26	0.50
14	2.11	2.14	0.38	18.16	0.76	3.14	-0.86	1.43
113	2.05	2.06	0.37	18.19	0.73	3.22	-0.51	1.09
109	1.99	1.99	0.39	19.45	0.74	3.23	-0.25	0.37

[1]The mean values were computed from 1500 observations for each hybrid. Hybrids and their entries are RL-111/RL-189 (6), RML-32/RML-17 (112), RML-4/NML-2 (14), RML-4/RML-17 (113) and RC/RML-8 (109).

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Sup Table 6: Variance analysis of the frequencies of the leaf sectors under different SPAD ranges.

SOV	DF	Sum of Squares	Mean Square	Variance ratio	F probability
REPLICATIONS	2	0	0	0	
HYBRIDS	4	0	0	0	1
SPAD CLASSES	3	473915	157972	46.07	<.001
HYBRIDS x CLASSES	12	26450	2204	0.64	0.792
RESIDUAL	38	130297	3429		

SPAD classes included in the variance analysis from which plot frequencies of the leaf sectors used in the ANOVA are 0-30, 30-40, 40-50 and above 50.

Sup Table 7: Variance analysis of the SPAD measure of e1 leaf of pipeline hybrids as factor A and type of averages as factor B.

SOV	DF	Sum of Square	Mean Square	F VALUE	PROBABILITY
REPLICATIONS	2	761.5	380.75	28.76	
HYBRIDS (A)	4	221.56	55.39**	4.18	0.003
AVERAGES (B)	23	957.83	41.64**	3.15	<.001
A x B	92	1138.39	12.37 NS	0.93	0.641
RESIDUAL	238	3150.43	13.24		

For variance analysis; each measure of the five plants have been averaged to compute plot value. Then Variance analysis table has been constructed defining hybrids as factor A (5) and averages as factor B (24).