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**Harshita Sharma**

Department of Agronomy,  
Chandra Shekhar Azad  
University of Agriculture and  
Technology, Kanpur,  
Uttar Pradesh, India

**Ram Pyare**

Department of Agronomy,  
Chandra Shekhar Azad  
University of Agriculture and  
Technology, Kanpur,  
Uttar Pradesh, India

**Harshita**

Department of Plant Pathology,  
Chandra Shekhar Azad  
University of Agriculture and  
Technology, Kanpur,  
Uttar Pradesh, India

**Corresponding Author:****Harshita Sharma**

Department of Agronomy,  
Chandra Shekhar Azad  
University of Agriculture and  
Technology, Kanpur,  
Uttar Pradesh, India

## To assess the most adoptable hybrid variety of maize (*Zea mays* L.) for different doses of nitrogen management with seaweed extract (SoliGro Gr)

**Harshita Sharma, Ram Pyare and Harshita**

**Abstract**

A field experiment was laid out during two consecutive *kharif* season of 2018 and 2019 at Student's Instructional Farm, Chandra Shekhar Azad University of Agriculture and Technology, Kanpur to assess the most adoptable hybrid variety of maize (*Zea mays* L.) for different doses of nitrogen management with seaweed extract (SoliGro Gr). Factorial combination of the two factors viz. hybrid varieties at 3 levels and different doses of nitrogen management with seaweed extract (SoliGro Gr) at six levels gave a total of eighteen treatments which was laid in a Randomized Block Design with 3 replications. The hybrid variety DKC-7074 not only recorded significantly better growth parameters viz. plant height (102.21 cm), number of leaves/plant (12.17), fresh (154.28 g) and dry weight (76.78 g) but also attained better yield attributes viz. cobs/ plant (1.23), number of grains/ cob (266.71), cob length (21.24 cm) and test weight (251.00 g) along with highest biological yield (168.11q/ha), grain yield (36.31q/ha), stover yield (131.75q/ha) and harvest index (21.64%). Similarly, the application of SoliGro with 125% N basal + top dressing recorded significantly higher growth parameters viz. plant height (100.34 cm), number of leaves/plant (12.07), fresh (151.51 g) and dry weight (75.57 g) but also attained better yield attributes viz. cobs/ plant (1.27), number of grains/ cob (265.94), cob length (21.23 cm) and test weight (253.45 g) along with highest biological yield (167.73q/ha), grain yield (36.05q/ha), stover yield (131.69q/ha) and harvest index (21.91%). Interestingly, the treatment combination of hybrid variety DKC-7074 and SoliGro with 125%N of two time as Basal & Top dressing gave significantly higher growth parameters, yield attributes and yields in pooled data of 2018 and 2019 in study years.

**Keywords:** hybrid varieties of maize, seaweed extract, nitrogen management, growth parameters, yield attributes, yields

**Introduction**

Recently, there is an arising obligation to cut the usage of chemical fertilizers replacing it by the utilization of organics so as to meet the quality levels and protect our environment. In the same context, seaweeds extracts are reported to prove better organic fertilizers having high amount of water soluble potash and phosphorus contents along with various minerals, vitamins, enzymes, trace elements and amino acids which boosts up growth and yield. Seaweed, or macro-algae, actually refers to thousands of species of macroscopic, multi-cellular, marine algae.

Maize (*Zea mays* L.) is one of the most versatile grain crops having vast adaptability under diverse agro-climatic conditions. Being the third most important crop after rice and wheat, it is crop is a key source of food and livelihood for millions of people in the world. In India, the average production and productivity of maize is 26 million metric tons and 2.48 t ha<sup>-1</sup> respectively (Anonymous, 2020) [1]. In spite of the great relevance and high demand for maize, India contributes merely about 2.5 per cent in the world maize production.

Producing high-quality maize is extremely important demand for Indian food security. Hybrids varieties of maize are reported to have superior response towards application of nitrogen and other organic nutrients. Moreover, the use of seaweed extract fertilizer in conjunction with the inorganic fertilizers has been found to prove better than the other organic inputs for the growth and development of plant (Kaliaperumal, 2000) [2]. Novel organic fertilizers such as seaweed in combination with hybrid cultivars have great potential to meet future food demands of India's ever increasing population.

**Materials and Methods**

The present investigation was conducted in field no.12 at student's instructional farm (SIF) of Chandra Shekhar Azad University of Agriculture and Technology, Kanpur, Uttar Pradesh,

India. This farm is situated on the University campus at 26°29'35 North latitude and 80°18'25East longitude. Elevation from mean sea level is 125.9 meter. The soil was medium in organic carbon and fertility. The crop was sown at a spacing of 60 × 25 cm. The soil of experiment plot was sandy loam in texture having (0.45%) organic carbon, (190.7 kg/ha) available N, (11.85 kg/ha) available P, (171.16kg/ha) K in both the years. The experiment was sown on 20<sup>th</sup> June of 2018 and 23<sup>rd</sup> June of 2019 and harvested on 10<sup>th</sup> October, 2018 and 15<sup>th</sup> October, 2019. The experiment was laid out in Factorial Randomized Block Design with two factors i.e. Factor A- three hybrid maize cultivars (Azad hybrid-3, DKC-7074 and Kaveri 218<sup>+</sup>) and Factor B- six combinations of seaweed extract@10kg/ha with different nitrogen doses [SoliGro Gr @10 kg/ha (Basal) + 100% Nitrogen, SoliGro Gr @10 kg/ha (Top dressing 20 DAS) + 100% Nitrogen, SoliGro Gr @10 kg/ha (Basal & Top dressing) + 100% Nitrogen, SoliGro Gr @10 kg/ha (Basal) + 125% Nitrogen, SoliGro Gr @10 kg/ha (Top dressing 20 DAS) + 125% Nitrogen, SoliGro Gr @10 kg/ha (Basal & Top dressing) + 125% Nitrogen] replicated thrice making eighteen treatment combinations.

## Result & Discussion

### Hybrid maize cultivars

On the basis of pooled data analysis (Table 1 & 2), the hybrid variety DKC-7074 not only recorded significantly better growth parameters viz. plant height (102.21 cm), number of leaves/plant (12.17), fresh (154.28 g) and dry weight (76.78 g) but also attained better yield attributes viz. cobs/ plant (1.23), number of grains/ cob (266.71), cob length (21.24 cm) and test weight (251.00 g) along with highest biological yield (168.11q/ha), grain yield (36.31q/ha), stover yield

(131.75q/ha) and harvest index (21.64%) whereas Azad hybrid-3 showed minimum plant height (70.37 cm), number of leaves/plant (9.95), fresh weight (131.18 g), dry weight (65.28 g), cobs/ plant (1.03), number of grains/ cob (243.68), cob length (18.84 cm) and test weight (211.68 g) along with least biological yield (135.61q/ha), grain yield (29.30q/ha) and stover yield (106.53q/ha). However, minimum harvest index (21.49%) was recorded by Kaveri 218<sup>+</sup>. Similar results have been reported by Tahir *et al.* (2008) [3], Malik *et al.* (2010) [4] and Shobhana *et al.* (2012) [5].

### SoliGro Gr with N management

On the basis of pooled data analysis (Table 1 & 2), The application of SoliGro with 125% N basal + top dressing recorded significantly higher growth parameters viz. plant height (100.34 cm), number of leaves/plant (12.07), fresh (151.51 g) and dry weight (75.57 g) but also attained better yield attributes viz. cobs/ plant (1.27), number of grains/ cob (265.94), cob length (21.23 cm) and test weight (253.45 g) along with highest biological yield (167.73q/ha), grain yield (36.05q/ha), stover yield (131.69q/ha) and harvest index (21.91%) whereas minimum plant height (74.17 cm), number of leaves/plant (10.23), fresh weight (133.27 g), dry weight (66.33 g), cobs/ plant (1.04), number of grains/ cob (246.15), cob length (19.08 cm) and test weight (215.23 g) along with least biological yield (142.30q/ha), grain yield (30.31q/ha), stover yield (112.32q/ha) and minimum harvest index (21.29%) was reported under the application of SoliGro Gr with 100% N top dressing. Similar results were obtained by Dilavarnaik *et al.* (2017) [6], Basavaraja *et al.* (2018) [7] and Kumar *et al.* (2019) [8].

**Table 1:** Effect of hybrids varieties and seaweed extract with N% on growth & yield attributes of maize crop as pooled analysis (2018 & 2019)

Treatment	Growth Attributes				Yield Attributes			
	Plant height (cm)	No. of leaves/ plant	Fresh weight (g)	Dry weight (g)	No. of cobs/ plant	No. of grains/cob	Cob Length (cm)	Test weight (g)
Azad -3	70.37	9.95	131.18	65.28	1.03	243.68	18.84	211.68
DKC 7074	102.21	12.17	154.28	76.78	1.23	266.71	21.24	251.00
Kaveri218+	90.91	11.19	144.87	72.18	1.12	255.73	20.14	229.85
SEd	1.257	0.145	1.125	0.471	0.029	1.614	0.198	0.724
CD at 5%	2.490	0.287	2.228	0.933	0.057	3.196	0.392	1.434
<b>Seaweed extract@10kg/ha with Nitrogen %</b>								
SoliGro with100% N Basal Dose	85.20	10.86	144.27	71.79	1.08	253.52	19.86	223.18
SoliGro with 100% N Topdressing	74.17	10.23	133.27	66.33	1.04	246.15	19.08	215.23
SoliGro with 100% N Basal+Top	97.14	11.77	150.37	74.83	1.19	261.24	20.74	240.90
SoliGro with 125% N Basal Dose	91.50	11.14	143.55	71.44	1.10	255.42	20.10	228.95
+SoliGro with 125% N Topdressing	78.65	10.58	137.69	68.52	1.08	249.98	19.43	223.34
SoliGro with 125% N Basal+Top	100.34	12.07	151.51	75.57	1.27	265.94	21.23	253.45
SEd	1.778	0.205	1.591	0.666	1.084	2.283	0.280	1.024
CD at 5%	3.211	0.405	3.151	1.319	1.041	4.520	0.554	2.028

**Table 2:** Effect of hybrids varieties and seaweed extract with N% on growth & yield attributes of maize crop as pooled analysis (2018 & 2019)

Treatments	Yields			
	Biological yield (q/ha)	Grain yield (q/ha)	Stover yield (q/ha)	Harvest index (%)
Azad -3	135.61	29.30	106.53	21.58
DKC 7074	168.11	36.31	131.75	21.64
Kaveri218+	155.84	33.49	122.35	21.49
SEd	1.017	0.404	0.849	0.032
CD at 5%	2.013	0.800	1.682	0.063
<b>Seaweed extract@10kg/ha with Nitrogen %</b>				
SoliGro with100% N Basal Dose	154.41	33.08	121.35	21.43
SoliGro with 100% N Topdressing	142.30	30.31	112.32	21.29
SoliGro with 100% N Basal+Top	157.42	34.39	123.03	21.49
SoliGro with 125% N Basal Dose	153.83	33.46	120.37	21.77
SoliGro with 125% N Topdressing	143.43	30.93	112.50	21.53

SoliGro with 125% N Basal+Top	167.73	36.05	131.69	21.91
SEd	1.438	0.571	1.201	0.077
CD at 5%	2.846	1.131	2.378	0.153

### Conclusion

The treatment combination of hybrid variety DKC-7074 and SoliGro Gr with 125% N doses which was two times used as basal & top dressing gave significantly higher growth parameters, yield attributes and yields in the pooled data of 2018 and 2019 study.

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