EFFECT OF UREA, HUMAX AND *RHIZOBIUM JAPONICUM* ON THE YIELD OF SOYBEANS

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Introduction

- Oilseed crops after cereals are the second largest source of energy supply.
- One factor that plays an important role in determining the yield potential of soybeans is the nutritional status including the feeding of nitrogen.
- The use of chemical fertilizers damages soil structure, while the use of organic fertilizers improves soil structure
- Owing to the importance of soybean as an oilseed crop and its sensitivity to nitrogen nutrition, we decided to assess the response of two soybean cultivars to different nitrogen sources (Urea, Humax and *Rhizobium japonicum*).

Material and Methods

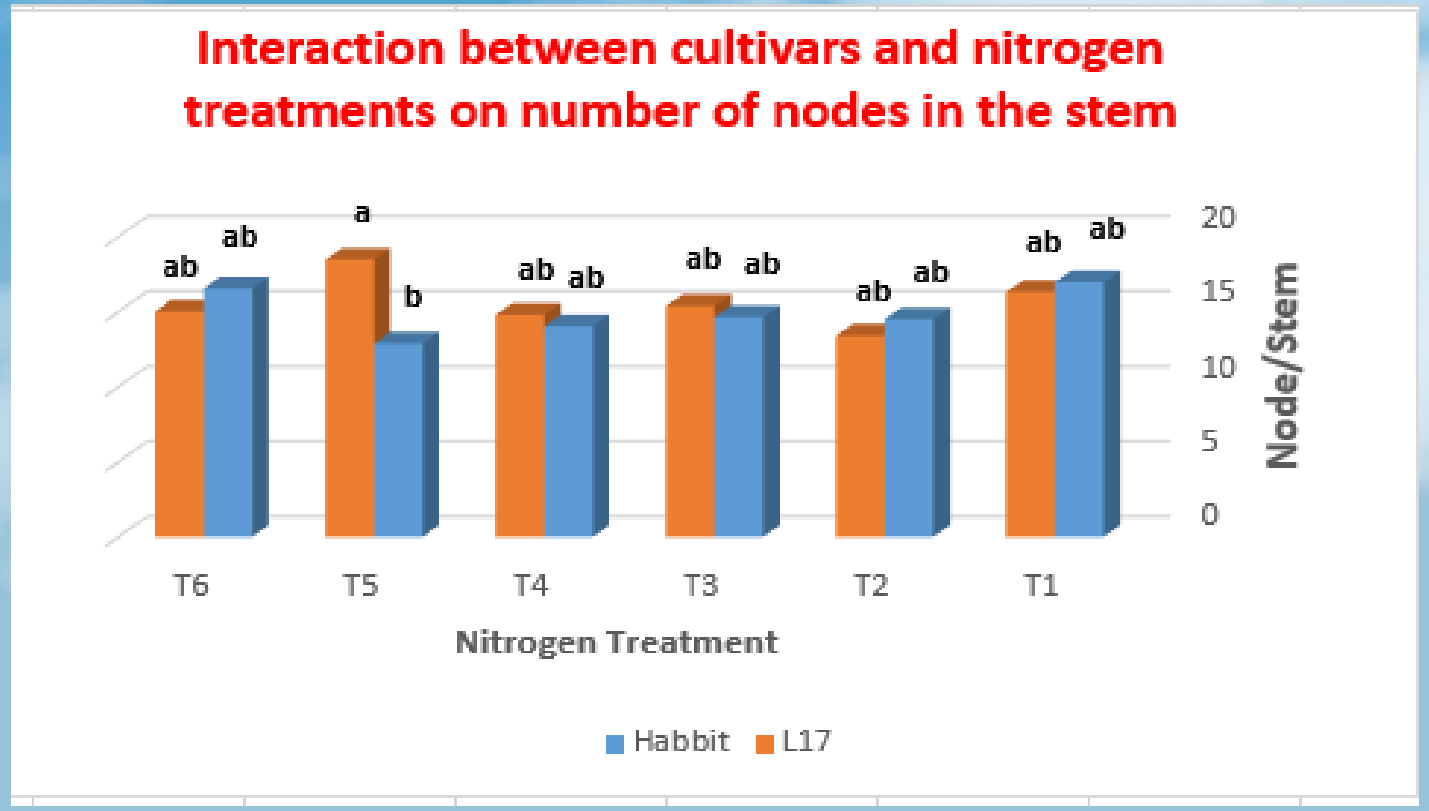
- Split plot in a randomized complete block design with three replications during 2014 in the research farm of the Islamic Azad University of Bojnourd, Iran.
- Soybean cultivars as the main factor: Habbit and L_{17}.
- Compound fertilizer as sub-plots: control(T1), seed inoculated with *Rhyzobium japonicum*(T2), nitrogen base (urea) + top-dress urea at R_2 stage(T3), nitrogen base(urea) + seed inoculated with Rhyzobium japonicum + top-dress urea at R_2 stage(T4), seed treated with Humax + top-dress Humax at R_2 stage(T5) and nitrogen base (urea) + seed treated with Humax + top-dress Humax at R_2 stage(T6).
- All data were analyzed using SAS software and data was compared with Duncan's multiple range test.

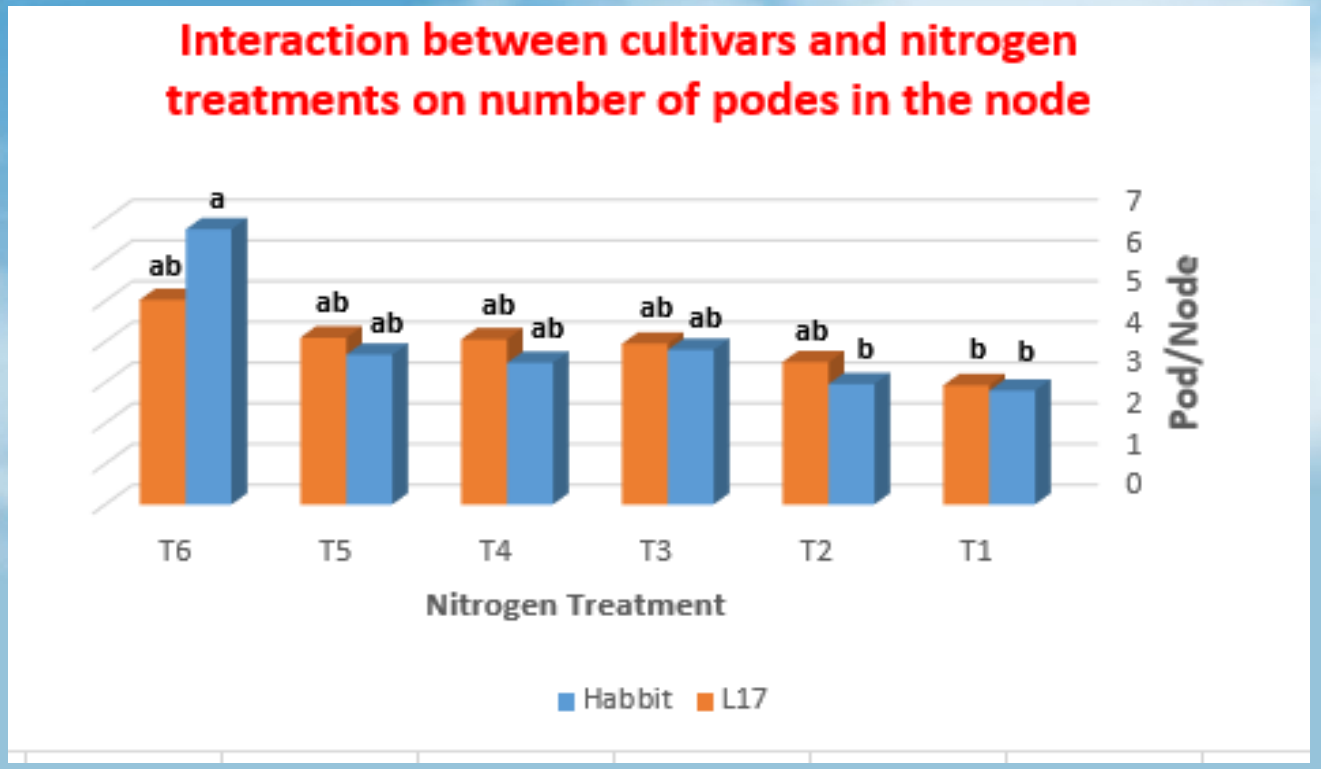
Results and Discussion

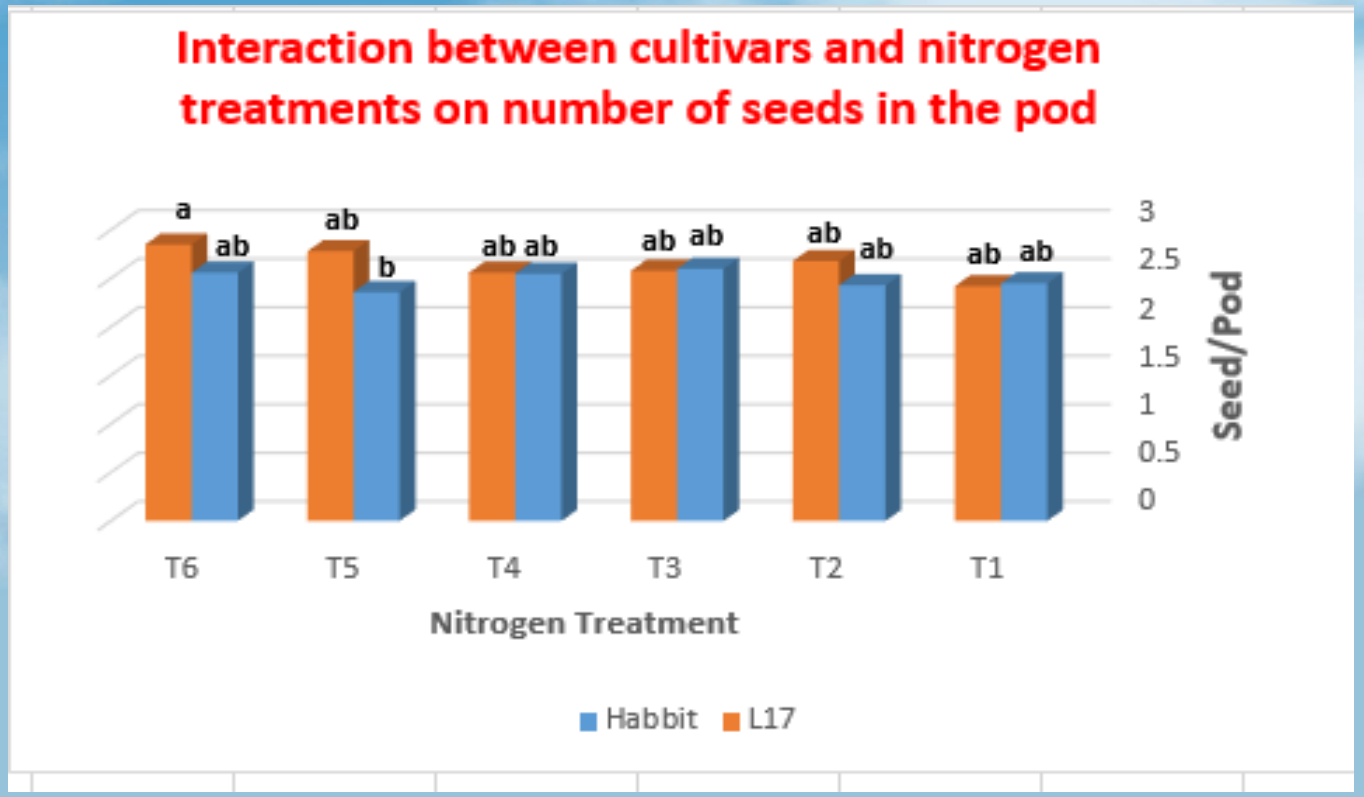
TABLE. ANALYSIS OF VARIANCE

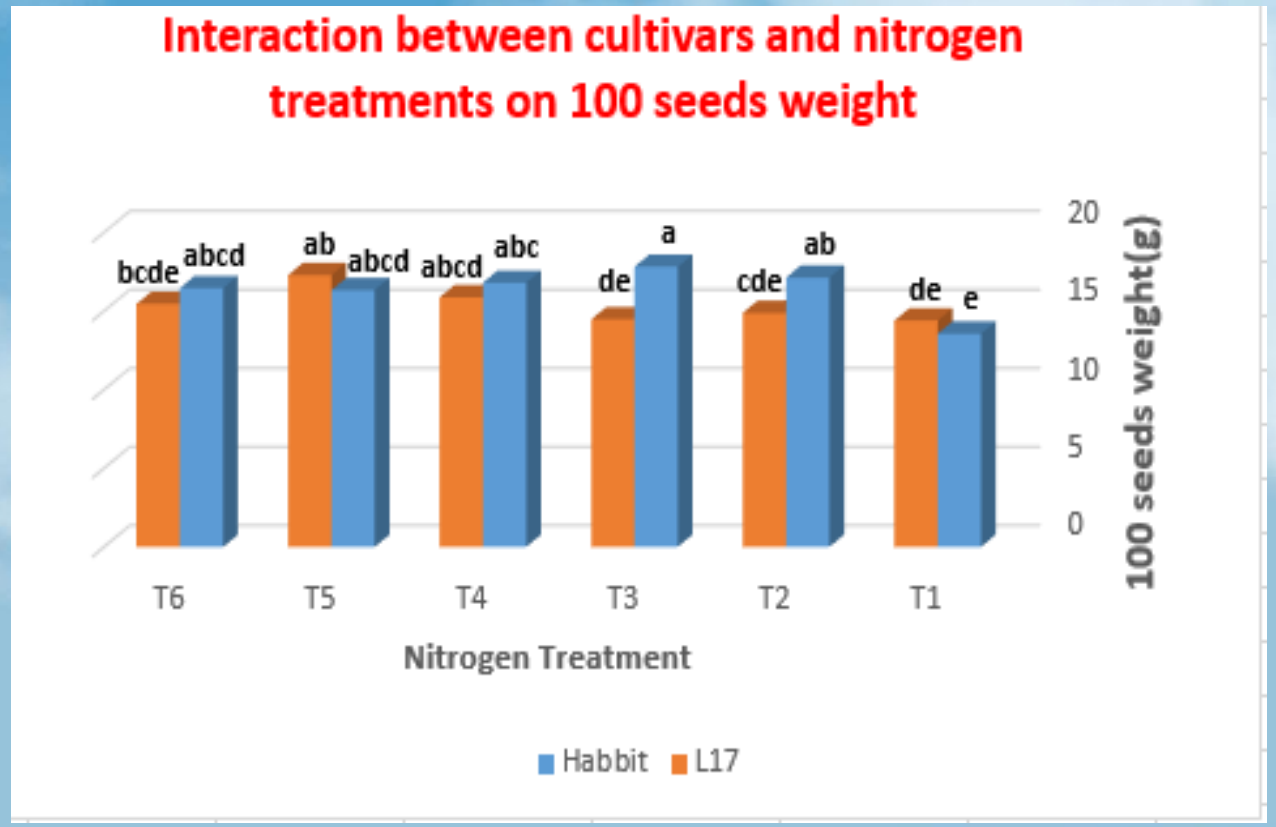
Var.source	Deg.of freedom	Node/stem	Pode/node	Seed/pode	Seed weight	Branches	Seed yield	Biomass	Harvest In.
		F value							
Replication	2	85.63	6.15	6.99	1.09	0.12	0.76	0.38	34.57
Cultivar(C)	1	6.46^{ns}	0.15^{ns}	8.38^{ns}	8.86^{ns}	4.82^{ns}	7.28^{ns}	0.68^{ns}	61**
E_a	2								
Fertilizer(F)	5	0.85^{ns}	2.16^{ns}	1^{ns}	4.62**	1.52^{ns}	8.59**	3.54**	1.39^{ns}
C*F	5	1.49^{ns}	0.37^{ns}	1.15^{ns}	3.44*	1.06^{ns}	2.72*	2.97*	1.02^{ns}
E_b	20								

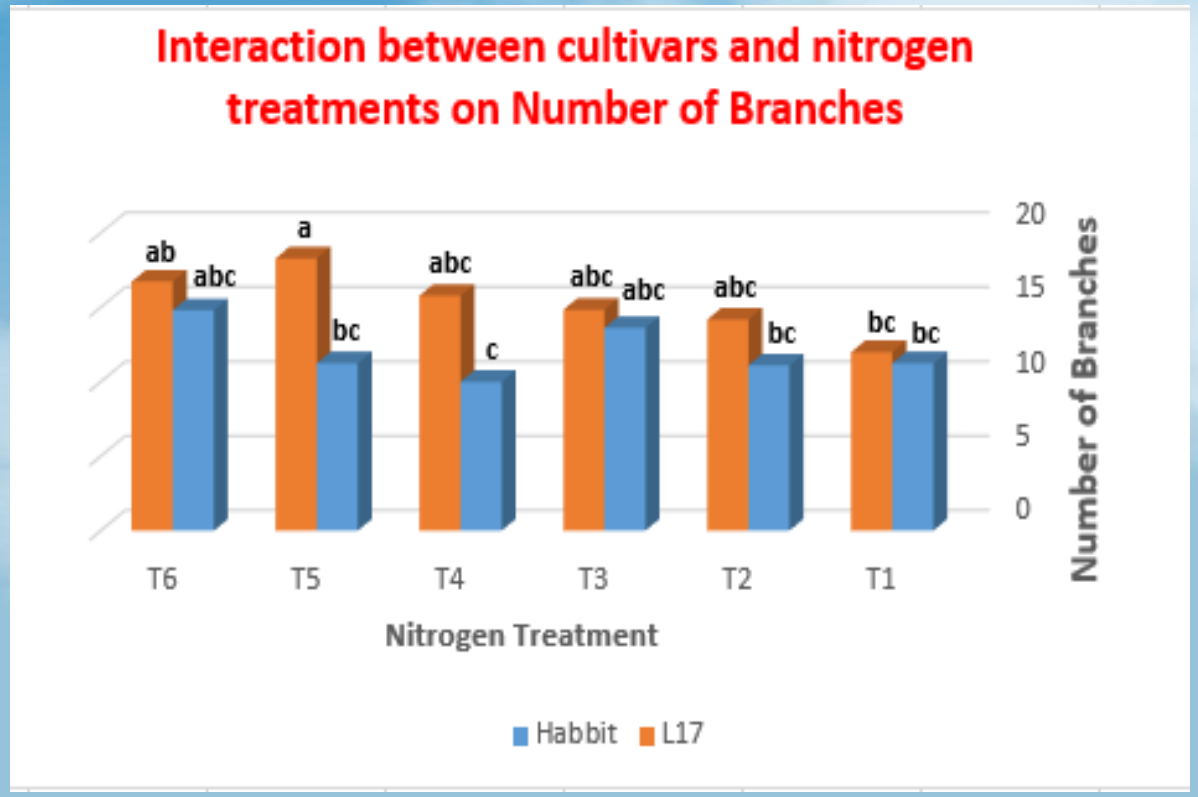
^{ns}, ** & * are respectively not significant, significant at α = 1&5%

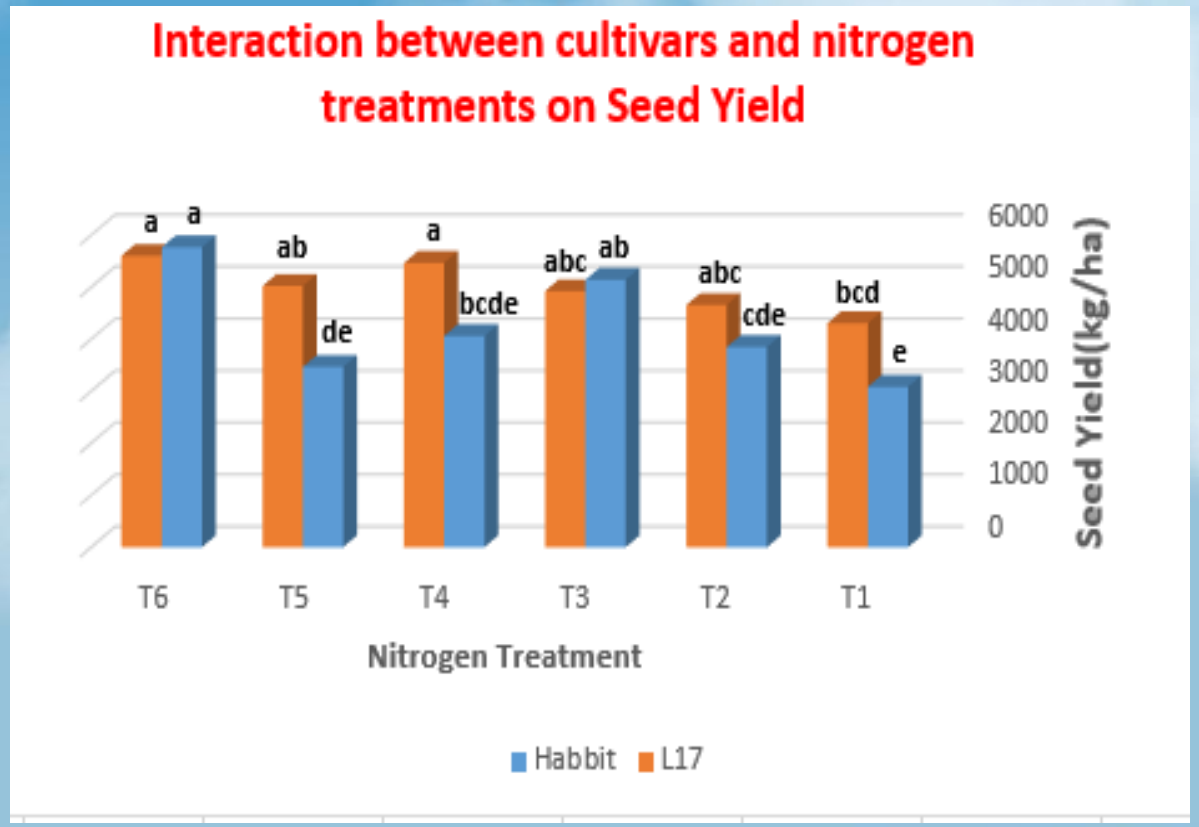

Interaction between cultivars and nitrogen treatments on number of nodes in the stem
a
b
ab
20
15
10
5
0
Node/Stem
T6
T5
T4
T3
T2
T1
Nitrogen Treatment
Habbit
L17

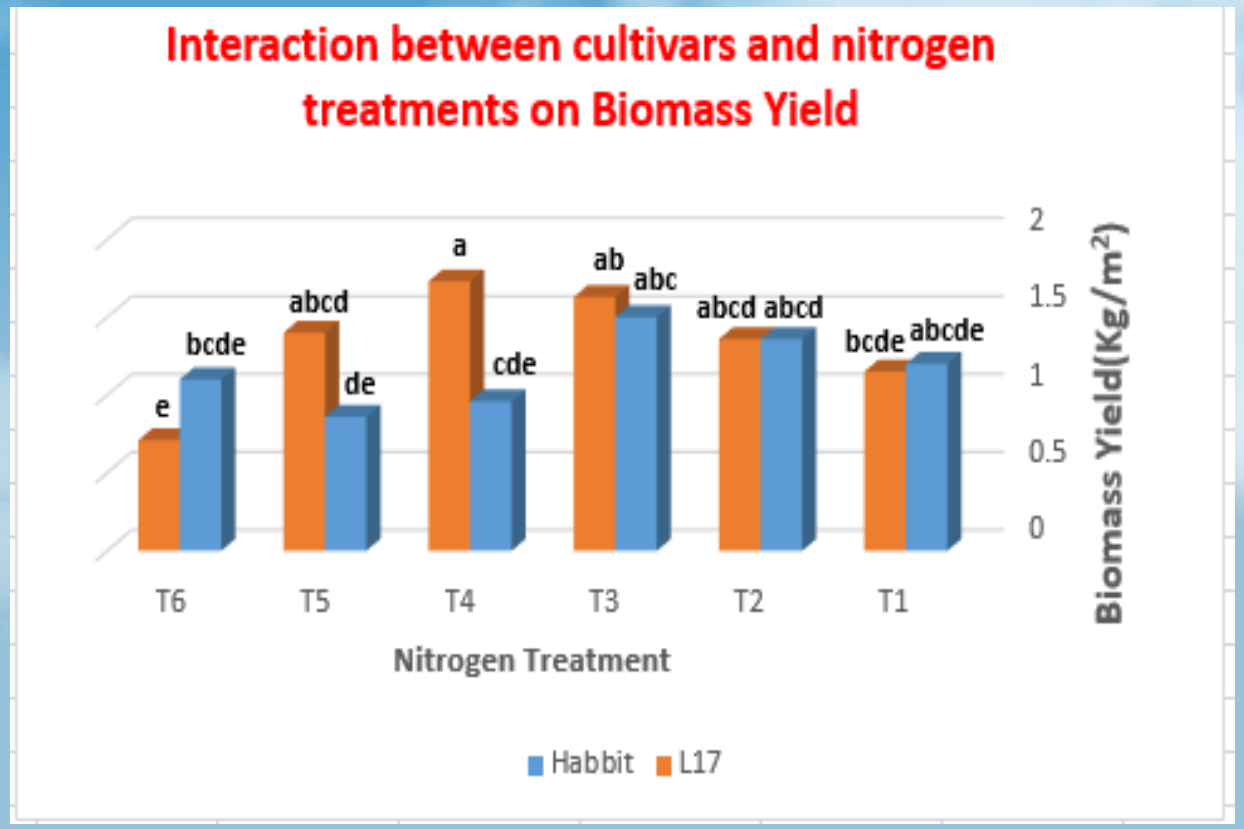

Interaction between cultivars and nitrogen treatments on number of podes in the node
a
ab
ab
ab
ab
ab
ab
ab
ab
ab
b
b
b
b
7
6
5
4
3
2
1
0
Pod/Node
T6
T5
T4
T3
T2
T1
Nitrogen Treatment
Habbit
L17

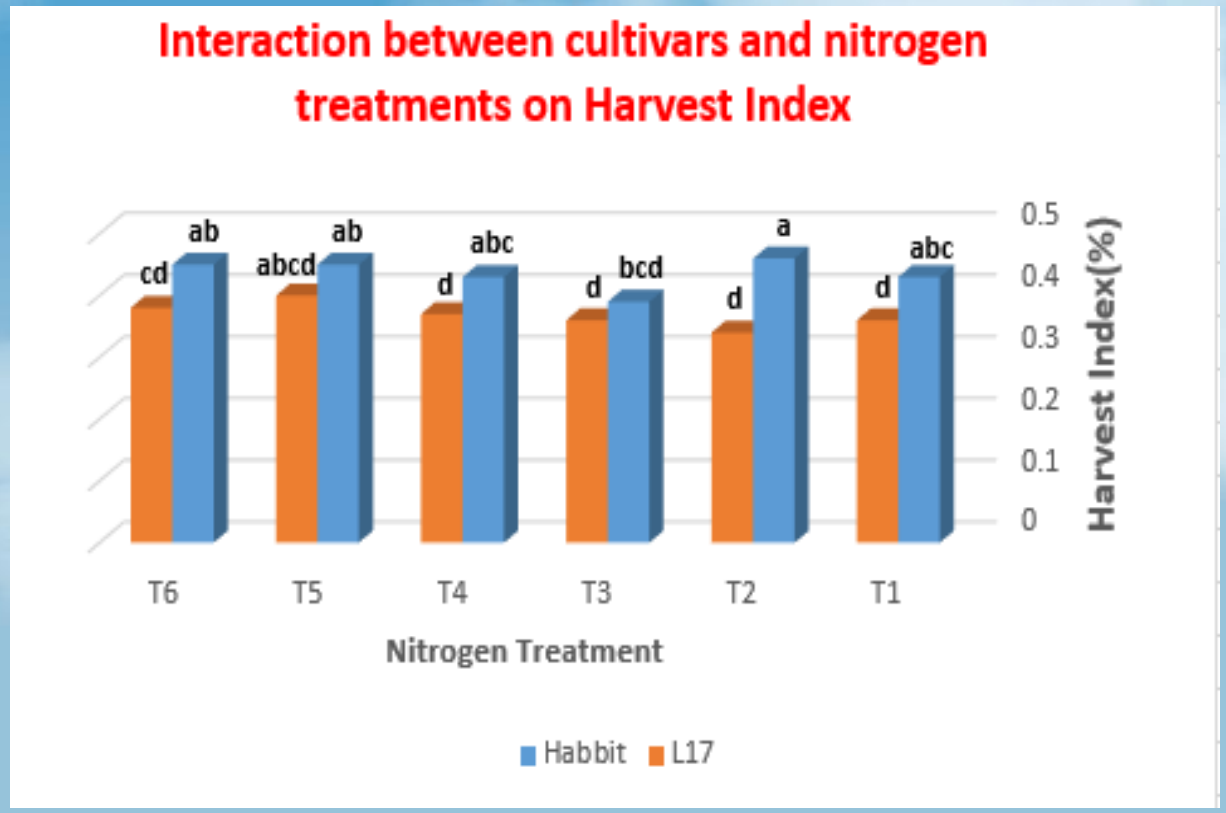

Interaction between cultivars and nitrogen treatments on number of seeds in the pod
a
ab
ab
b
ab ab
ab ab
ab
ab
ab ab
3
2.5
2
1.5
1
0.5
0
Seed/Pod
T6
T5
T4
T3
T2
T1
Nitrogen Treatment
Habbit
L17


Interaction between cultivars and nitrogen treatments on 100 seeds weight
bcde
abcd
ab
abcd
abcd
abc
de
a
cde
ab
de
e
20
15
10
5
0
100 seeds weight(g)
T6
T5
T4
T3
T2
T1
Nitrogen Treatment
Habbit
L17


Interaction between cultivars and nitrogen treatments on Number of Branches
ab
abc
a
bc
abc
c
abc
abc
abc
bc
bc
bc
20
15
10
5
0
Number of Branches
T6
T5
T4
T3
T2
T1
Nitrogen Treatment
Habbit
L17


Interaction between cultivars and nitrogen treatments on Seed Yield
a
a
ab
de
a
bcde
abc
ab
abc
cde
bcd
e
6000
5000
4000
3000
2000
1000
0
Seed Yield(kg/ha)
T6
T5
T4
T3
T2
T1
Nitrogen Treatment
Habbit
L17


Interaction between cultivars and nitrogen treatments on Biomass Yield
e
bcde
abcd
de
a
cde
ab
abc
abcd abcd
bcde
abcde
2
1.5
1
0.5
0
Biomass Yield(Kg/m2)
T6
T5
T4
T3
T2
T1
Nitrogen Treatment
Habbit
L17


Interaction between cultivars and nitrogen treatments on Harvest Index
cd
ab
abcd
ab
d
abc
d
bcd
d
a
d
abc
0.5
0.4
0.3
0.2
0.1
0
Harvest Index(%)
T6
T5
T4
T3
T2
T1
Nitrogen Treatment
Habbit
L17

Conclusions

- The best fertilizer treatment in terms of seed yield was treatment 6 (nitrogen base + seed treated with Humax + top-dress Humax at R_2 stage).
  - Both L_{17} and Habbit cultivar had tha same seed yield. However, Habbit cultivar is recommended for cold conditions because of its determinate growth, which prevents the coincidence of maturity phase and the cold season.
- Basic nitrogen in soybean farming is clearly beneficial.
- At the end of flowering (R_2), and as soil nitrogen reserves are in decline, the application of nitrogen can improve the potential for a higher yield.


THANK YOU