Effect of Different Nitrogen Sources on Tasseling, Silking, Maturing and Grain Yield of Hybrid Maize (*Zea mays L.*)

[1]**Mohamed Waseem;** [2]**Mohamed Tahir;** [3]**Hafiz Faiq Bakhat;** [2]**Imran Khan;** and [4]**Mohamed Shehzad**

[1]Dept. of Water and Marine Sciences, Faculty of Agriculture, Lasbela University of Agriculture, Uthal, Pakistan, [2]Dept. of Agronomy, University of Agriculture Faisalabad, Pakistan, [3]Comsats Institute of science and Technology, Vehari, Pakistan, [4]Dept. of Agronomy, University of Poonch Rawalakot, AJK, Pakistan,

ID # (2773)
Received: 01/ 09/ 2013
In-revised: 08/10/2013
Correspondent Author:
Mohamed Waseem
E-mail:
mianwaseem_1028@yahoo.com

KEYWORDS

Tasseling; Silking; Maturity; Nitrogen sources; Hybrid maize; Grain yield

ABSTRACT

Two year field experiment was conducted to check the influence of different Nitrogen sources on the tasseling, silking, maturity and grain yield of hybrid maize (*Zea mays* L.) at the Agronomic Research Area, University of Agriculture Faisalabad, Pakistan, during the year 2008-09. Treatments included two hybrids: (H_1) (Pioneer-30Y87) and (H_2) (Pioneer-31R88) with six Nitrogen sources each, which included at the rate of (S_0): control (0) kg Nitrogen ha^{-1}, (S_1) : chemical source (urea) 250 kg Nitrogen ha^{-1}, (S_2): poultry manure (PM) 9.6 t ha^{-1}, (S_3): farm yard manure (FYM) 17.8 t ha^{-1} , (S_4): press mud of sugarcane (PMS) 8.5 t ha^{-1} and (S_5): compost (C) 10.0 t ha^{-1}. Finding concluded that effect of Nitrogen sources on both maize hybrid was found to be non significant for number of days to tasseling and number of days to silking during 2008 while number of days to maturity and grain yield was significant. In 2009 number of days for tasseling was found significant and number of days to silking, maturity and grain yield was not significant. Significant Nitrogen sources influenced were observed for tasseling, silking, maturity and grain yield during both years 2008-09. Maximum number of days was recorded in chemical source (urea) 250 kg Nitrogen ha^{-1} for tasseling, silking, maturity and grain yield in 2009 as compared to other Nitrogen sources and minimum number of days to tasseling, silking, maturity and grain yield was found in control (0) kg Nitrogen ha^{-1} .

تأثير مصادرالنتروجين المختلفة على الإزهار وتكوين الثمار والنضوج و محصول الحبوب في هجين الذرة الشامية (*Zea mays L.*)

[1]محمد وسيم، [2]محمد طاهر، [3]حافظ فايق باخات، و [4]عمران خان محمد

قسم المياه والعلوم البحرية ، كلية الزراعة، جامعة أوثال ، باكستان
قسم الهندسة الزراعية ، كلية الزراعة، جامعة فيصل آباد ، باكستان[1]، [2]معهد العلوم والتكنولوجيا ، فيهاري، باكستان
[3]معهد العلوم والتكنولوجيا ، فيهاري، باكستان, [4]قسم الهندسة الزراعية ، كلية الزراعة، جامعة بونش راوالاكوت، باكستان

رقم المسودة: (2773)
تاريخ استلام المسودة: 2013/09/01
تاريخ المسودة المُعَدلَة: 2013/10/08
الباحث المُرَاسِل: محمد وسيم
بريد الكتروني:
mianwaseem_1028@yahoo.com

الكلمات الدالة

الإزهار، تكوين الثمار، النضوج، مصادر النتروجين، محصول الحبوب، هجين الذرة الشامية

المُستلخص

أجريت تجربتين حقليتين للتحقق من تأثير مصادر النيتروجين المختلفة على الإزهار وتكوين الثمار والنضوج وإنتاج الحبوب (tasseling, silking, maturity, & grain yield)، من هجين الذرة الشامية (*Zea mays* L.) في حقول مركز بحوث الهندسة الزراعية بجامعة فيصل آباد في باكستان وذلك خلال موسمين في العامين (2008) و (2009). هذا وإشملت التجربتان على هجيني الذرة الشامية (*Zea mays* L.) هما هجين (بايونير 30Y87-(H_1)) وهجين (بايونير-(H_2)) 31R88مع عدد (6) مصادر للنيتروجين لكل منهما كالآتي: مصدر معدل (S_0) شاهد(صفر) كجم نيتروجين للهكتار$^{-1}$، و مصدرمعدل (S_1) اليوريا (250) كجم نيتروجين للهكتار$^{-1}$، و معدل (S_2) سماد الدواجن (9.6) طن للهكتار$^{-1}$، ومصدر معدل (S_3) سماد بلدي عضوي (17.8) طن للهكتار$^{-1}$، و مصدرمعدل (S_4)من مضغوط طين قصب السكر (8.5) طن للهكتار$^{-1}$، وأخيراً مصدر معدل (S_5) كمبوست (10.0) طن للهكتار$^{-1}$. يمكن تلخيص نتائج الدراسة إلى أن تأثير مصدرالنتروجين على صنفي الهجين كلاهما هجين (بايونير 30Y87-(H_1)) وهجين (بايونير 31R88-(H_2)) من الذرة الشامية (*Zea mays* L.) بصورة غير معنوية خلال عدد الأيام بالنسبة لمرحلة الإزهار (tasseling) ولمرحلة تكوين الثمار (silking) ، ولكن كان له تأثير معنوي خلال عدد الأيام بالنسبة لمرحلة النضج (maturity) خلال موسم 2008. أما بالنسبة لموسم العام (2009) فقد وجد أن مصدر النتروجين له تأثير معنوي خلال عدد الأيام لمرحلة تكوين الثمار (silking) وتأثير غير معنوي بالنسبة لمرحلتي الإزهار والنضج (tasseling & maturity) ، كما لوحظ أن تأثير مصدر النتروجين كان معنوياً لمراحل الإزهار وتكوين الثمار والنضج (tasseling, silking, & maturity) في موسمي الدراسة. يلاحظ أيضاً أن أطول مدة تأثير قد سُجلت عند استعمال مصدرمعدل (S_1) اليوريا (250) كجم نيتروجين للهكتار$^{-1}$، بالنسبة لمراحل الإزهار والنضج وإنتاج الحبوب (tasseling, maturity, & grain yield) خلال الموسم (2009) وذلك مقارنةً مع تأثير المصادر الأخرى (S_5)، (S_4)، (S_3)، (S_2)، (S_1)، (S_0). كما يلاحظ أيضاً أن أقل مدة تأثير قد سُجلت لمراحل الازهار وتكوين الثمار والنضج وانتاج الحبوب (tasseling, silking, maturity, & grain yield) قد وجدت في الشاهد من تأثير المصدر معدل (S_0) شاهد(صفر) كجم نيتروجين للهكتار$^{-1}$.

Introduction

Maize is ranked third among the cereal crops in the world after wheat and rice. In Pakistan it is grown on an area of one million hectares with the total production of 4.2 million tons (Government of Pakistan, 2011). It is highly nutritive and its seed contains; starch (78%), protein (10%), oil (4.8%), fibre (8.5%), sugar (3.1%) and ash (1.7%) (Chaudry, 1983).

Nitrogen plays a dominant role in different growth process of plants, because it is an integral part of chlorophyll and enzyme (Power and Schepers, 1989). Application of municipal solid waste to maize containing Nitrogen at rates of 0, 168, 336, 504 and 672 kg ha^{-1} increased total dry matter and total plant Nitrogen (Erikson *et al.,.*, 1999). More taller plant and ear height is produced at low planting density in maize with increasing rate of Nitrogen and split application of Nitrogen , maize with high density and 50% higher Nitrogen rates can increased leaf area and plant height compared to recommended N application and planting density (Amanulah *et al.,* 2009).

(Ayeni *et al.,* 2010) found that poultry manure at 5 and 10 t ha^{-1} enhanced maize productions by 39%-43% and on residual basis, increased yield 73% and 93%. The combination of coca pod ash at 5 t ha^{-1} and poultry manure at 10 t ha^{-1} gave the highest grain yield of 6.5 t ha^{-1} and 5.58 t ha^{-1}.

Press-mud from sugarcane is also a useful source of fertilizer; its impact is based on nutrient contents of mud and spent wash. Nitrogen is essential for sustainable crop production and healthy food for the ever increasing world population. Increasing crop production is largely depends on the fertilizer which was used to supply essential nutrients for plants. The judicious management of fertilization must attempt to ensure both an enhanced crop yield and protect the environment from fertilizer pollution (Jen-Hshuan Chen, 2008).

Inappropriate crop nutrition management and poor soil fertility are the most important factors responsible for the low yield. Soil fertility can be enhanced through the application of mineral fertilizers together with addition of organic matter to the soil. Nevertheless, imbalanced use of fertilizer without the application of organic manure and without knowing the requirements of crops and fertility status of soil causes the problem such as deterioration of soil structure, environmental and ground water pollution... *etc*. Similarly continuous use of chemical fertilizer caused the depletion of soil fertility. Objective of the study is to assess the effect of Nitrogen sources on the phonology and yield of maize.

Material and Methods

Varied Nitrogen sources influence on the tasseling, silking, maturity and grain yield of hybrid maize (*Zea mays* L.) were carried out at the Agronomic Research Area, University of Agriculture, Faisalabad in Pakistan, during the year 2008 and 2009. Experiments were laid out in a randomized complete block design (RCBD) with factorial arrangement comprising three replications with a net plot size of 3m x 5m. Treatment consisting two hybrids: i.e.; (H_1) (Pioneer-30Y87) and (H_2) (Pioneer-31R88) with six Nitrogen sources which included (S_0): control (0) kg N ha^{-1}; (S_1): chemical source (urea) 250 kg Nitrogen ha^{-1}; (S_2): poultry manure (PM) 9.6 t ha^{-1}; (S_3): farm yard manure (FYM) 17.8 t ha^{-1}; (S_4): press-mud of sugarcane (PMS) 8.5 t ha^{-1}; and (S_5): compost (C) 10.0 t ha^{-1}. A recommended dose of fertilizer containing 250 kg N ha^{-1} was applied. Organic Nitrogen sources were applied on the basis of chemical analysis of soil before four weeks of the sowing which contains: Nitrogen (0.040%), Phosphorus (7.2 mg kg^{-1}) and Potassium (145 mg kg^{-1}). Inorganic Nitrogen source was applied in split doses (half at sowing and half in two equal splits-half at knee height and remaining half at tasseling). All the organic sources i.e. farm yard manure, press-mud of sugarcane, compost and poultry manure were applied at the time of sowing. Recommended amount of 100 kg P ha^{-1} and 100 kg K ha^{-1} was applied at sowing. Some amount of P and K were applied to soil from organic sources (poultry manure, farm yard manure, press-mud of sugarcane and compost) on the analysis basis of manure and remaining from inorganic sources: i.e. Single Super Phosphate (SSP) and Sulphate of Potash (SOP). All other cultural practices including (sowing method, irrigation, plant protection measures... *etc.*) were kept normal and uniform for all the treatments. Harvesting occurred on 25 November 2008 and 10 November 2009.

The following attributes like number of days to tasseling, silking, maturity and grain yield (t ha^{-1}) were recorded at different times according to the stages. Data regarding all the traits were collected using standard procedures and analyzed by using Fisher's analysis of Variance Technique. LSD test at 5% probability was used to compare the differences among treatments means (Steel *et al.,* 1997).

Results and discussion

(1) Grain Yield (t ha^{-1})

Grain yield is the cumulative outcome of yield contributing traits such as number of cobs per plant; number of grain rows per plant and 1,000-grain weight. Hybrid maize and Nitrogen sources significantly affected the grain yield during 2008 but not in 2009 (table 1). (H_1) produced significantly more (6.01 t ha^{-1}) grain yield as compared to (H_2) (5.97 t ha^{-1}) during 2008. Grain yield differences of both hybrids were non-significant in 2009. The effect of Nitrogen sources on grain yield was also significant in both seasons. (S_1) produced maximum (7.43 t ha^{-1}) grain yield and minimum grain yield resulted from (S_0) (3.70 t ha^{-1}). A similar effect of Nitrogen sources was observed during 2009. Press-mud of sugarcane significantly increased grain yield over all other inorganic sources of Nitrogen in both years. Minimum grain yield came from compost in both seasons (table 1). Decrease in grain yield by Nitrogen sources in 2009 was due to less availability of Nitrogen to plants at the appropriate time and in proper proportion. These results are in line with those reported by (Khaliq *et al.,* 2004), (Waseem *et al.,* 2007), and (Ahmad *et al.,* 2008).

A significant interaction of maize hybrids and Nitrogen sources was observed for both years. In 2008, maximum grain yield was recorded in the (H_1) (S_1) (7.65 t ha^{-1}) treatment combination while the minimum was found in the (H_1) (S_0) (3.70 t ha^{-1}) combination. In 2009, maximum grain yield was recorded for H_1(S_1) (7.16 t ha^{-1}) while the minimum was found in interaction of (H_1) (S_0) (3.60 t ha^{-1}). These results are corroborating the findings of Waseem *et al.,*. (2007) and Sudhu and Kapoor (1999).

(Table 1) in 2008, comparisons between two hybrids (H_1) vs (H_2) and inorganic (S_1) vs (S_2), (S_3), (S_4), (S_5) Organic Nitrogen sources were highly significant for grain yield. Comparisons between (S_0) (Control) vs (S_1), (S_2), (S_3), (S_4), (S_5) (Nitrogen sources) were non-significant for grain yield. In 2009, comparisons of two hybrids (H_1) vs (H_2) and (S_0) (Control) vs (S_1), (S_2), (S_3), (S_4), (S_5) (Nitrogen sources) on grain yield were significant, while coomparisons for chemical (S_1) vs ((S_2), (S_3), (S_4), (S_5)) Organic Nitrogen sources were highly significant for grain yield.

A significant difference was found between (S_0) (Control) vs (S_1), (S_2), (S_3), (S_4), (S_5) (Nitrogen sources) during 2008 and 2009 for grain yield. A contrast comparison between chemical source (S_1) vs (S_2), (S_3), (S_4), (S_5) Organic Nitrogen sources was observed to be highly significant during both year for grain yield in 2008 and 2009.

Table 1: Effect of Hybrid Maize and Incorporated Nitrogen Sources on Grain Yield (t ha^{-1})

Treatments	2008	2009
(A) Hybrids		
(H_1): Pioneer-30Y87	6.01 a	5.93
(H_2): Pioneer-31R88	5.97 b	5.90
LSD) at 5% probability	0.02*	NS
(B) Nitrogen Sources		
(S_0): Control 0 kg Nha^{-1}	3.70 f	3.49f
(S_1) Chemical source (urea) @ 250 kg N ha^{-1}	7.43 a	7.16a
(S_2) Poultry manure (PM) @ 9.6 t ha^{-1}	6.24 c	6.21c
(S_3): Farm yard manure (FYM) @ 17.8 t ha^{-1}	6.07 d	6.08d
(S_4): Press-mud of sugarcane (PS) @8.5t ha^{-1}	6.53 b	6.54b
(S_5): Compost (C) @ 10 t ha^{-1}	5.96 e	6.00e
(LSD) at 5% probability	0.03*	0.06*
(C) Interaction (H x NS)		
(H_1) (S_0)	3.59 j	3.45 g
(H_1) (S_1)	7.65 a	7.16 a
(H_1) (S_2)	5.90 i	6.52 c
(H_1) (S_3)	6.18 f	5.98 f
(H_1) (S_4)	6.70 c	6.36 d
(H_1) (S_5)	5.89 i	6.10 e
(H_2) (S_0)	3.71 j	3.54 g
(H_2) (S_1)	7.21 b	7.16 a
(H_2) (S_2)	6.57 d	5.90 e
(H_2) (S_3)	5.96 h	6.18 e
(H_2) (S_4)	6.34 e	6.71 b
(H_2) (S_5)	6.03 g	5.90 f
(LSD) at 5% probability	0.04*	0.08*
(D) Contrasts		
(S_0) vs (S_1), (S_2), (S_3), (S_4), (S_5)	*	*
(S_1) vs (S_2), (S_3), (S_4), (S_5)	**	**

(*Mean values in column not showing* same *letter vary significantly at*
P *at 5% probability: *=Significant* at 5% *level/ **=Significant at 5% level/*
NS = *Non significant*)

(2) Number of Days to Tasseling

The Hybrid maize variety significantly affected the number of days taken to tasseling during 2009 but non-significant in 2008. Data in Table 2 showed that (H_2) (44.33) significantly took more days to tasseling than did (H_1) (42.83) during 2009. (Modarres *et al.,* 1998), (Sudhu and Kapoor, 1999), and (Tamayo *et al.,* 1997) also reported similar effects of hybrids on number of days to tasseling.

The effect of Nitrogen sources was significant in both seasons. (S_1) produced highest (46.67) numbers of days to tasseling and minimum low number of days to tasseling was noted in S_0 (40.67). Number of days to tasseling in 2009 was at par with 2008. Prolonging the number of days to tasseling was due to availability of Nitrogen to plants at appropriate times and in proper proportions. These results are similar as reported by Martin (1981).

Interactions of maize hybrids and Nitrogen sources on number of days to tasseling were found to be non-significant during both years.

In 2008 and 2009 differences between the (S_0) (Control) vs (S_1), (S_2), (S_3), (S_4), (S_5) (Nitrogen sources) and chemical (S_1) vs (S_2), (S_3), (S_4), (S_5) organic Nitrogen sources for days to tasseling were highly significant.

(3) Number of Days to Silking

Number of days to silking with two hybrid maize varieties were non-significant during 2008 and 2009. Table 2 showing the effect of Nitrogen sources, showed significant differences for the number of days to silking in both seasons. Highest (56.0) number of days to silking was found for (S_1) and the lowest number of days to silking was noted in (S_0) (48.0). A similar trend on number of days to silking was found for year 2009, with no significant difference between years. Enhancement in number of days to silking was due to the availability of Nitrogen to plants at proper times and in proper proportions. These results are closely related with those reported by (Modarres *et al.,* 1998), (Rizwan *et al.,* 2003), and (Sharif *et al.,* 2004).

Significant interactions of maize hybrids and Nitrogen sources were observed during both years. The highest number of days to silking (58.0) was recorded in (H_1) (S_1) while the lowest number of days taken to silking (48.0) was found in interactions of (H_1) (S_0). These results have a semblance to those of (Egbe and Ali, 2010).

Table 2 showed that differences between the (S_0) (Control) vs (S_1), (S_2), (S_3), (S_4), (S_5) (Nitrogen sources) and chemical (S_1) vs (S_2), (S_3), (S_4), (S_5) Organic Nitrogen sources for days to silking were highly significant during 2008 and 2009

(4) Number of Days to Maturity

Hybrid maize variety significantly affected the number of days to maturity during 2008 and non-significant during 2009. Data in Table 2 shows that (H_1) (108.17) took significantly more days to maturity than (H_2) (104.50) during 2008. These results are similar to those of (Amanullah *et al.,* 2009).

The effects of Nitrogen sources were also significant in both seasons. (S_1) (111.50) took the most days to maturity and the least days to maturity were noted in (S_0) (102.50). The numbers of days taken to maturity were the same for 2009 and 2008. An increase in days to maturity was due to availability of Nitrogen to plants at appropriate times and in proper proportions. These results are closely related to those reported by (Hamid and Nasab, 2001) and (Amanullah *et al.,* 2009).

Significant interactions of maize hybrids and Nitrogen sources were observed for both years. In 2008, the highest number of days to maturity was recorded for the (H_1) (S_1) (115.0) treatment combination, while lowest numbers to maturity were found for (H_2) (S_0) (100.0). In 2009 the highest numbers of days to maturity were recorded in (H_2) (S_1) (118.0) and the lowest to maturity were found for (H_2) (S_0) (100.0). Similar results were reported by (Hamid and Nasab, 2001) and (Amanullah *et al.,* 2009), (See table 2). In 2008 differences between two hybrids (H_1) (Pioneer-30Y87) and (H_2) (Pioneer-31R88) were significant for number of days to maturity. The differences for (S_0) (Control) vs (S_1), (S_2), (S_3), (S_4), (S_5) (Nitrogen sources) on days to maturity were found to be highly significant while inorganic (S_1) vs (S_2), (S_3), (S_4), (S_5) Organic Nitrogen sources were also observed to be highly significantly different for biological yield. The comparison from 2009 among two hybrids (H_1) (Pioneer-30Y87) vs (H_2) (Pioneer-31R88) was significant for days to maturity. In 2008 and 2009 differences between the (S_0) (Control) vs (S_1), (S_2), (S_3), (S_4), (S_5) (Nitrogen sources) and chemical (S_1) vs (S_2), (S_3), (S_4), (S_5) Organic Nitrogen sources for days to maturity were found to be highly significant. (See table 2).

Table 2: Impact of Nitrogen Sources on the Number of Days to Tasseling, Silking, and Maturity Traits of Hybrid Maize

Treatment	Days to Tasseling		Days to Silking		Days to Maturity	
Year	2008	2009	2008	2009	2008	2009
(A) Hybrids						
(H_1): Pioneer-30Y87	43.56	42.83 b	52.33	53.07	108.1a	108.0
(H_2): Pioneer-31R88	44.06	44.33 a	51.17	52.17	104.5b	109.22
(LSD) at 5% probability	NS	1.26*	NS	NS	1.39*	NS
(B) Nitrogen Sources						
(S_0): Control 0 kg Nha^{-1}	40.67 c	40.0c	48.0 d	47.0 c	102.5d	101.50 d
(S_1): Chemical source (urea) @ 250 kg N ha^{-1}	46.67 a	47.5 a	56.0 a	57.0 a	111.5a	116.00 a
(S_2): Poultry manure (PM) @ 9.6 t ha^{-1}	45.0 ab	44.5 b	50.50 c	53.50 b	107.5b	109.17 b
(S_3): Farm yard manure (FYM) @ 17.8 t ha^{-1}	44.0 b	43.0 b	53.0 b	53.83 b	106.5b	105.00 c
(S_4): Press-mud of sugarcane (PS) @8.5t ha^{-1}	43.0 b	43.0 b	53.17 b	52.0 b	106.0 bc	109.50 b
(S_5): Compost (C) @ 10 t ha^{-1}	43.50 b	43.5 b	49.83 cd	52.33 b	104.0 cd	110.50 b
(LSD) at 5% probability	2.32*	2.18*	2.05*	2.32*	2.42*	2.64*
(C) Interaction (H x NS)						
(H_1) (S_0)	41.33	40.0	48.0 e	45.0 e	105 .0cd	100.0 i
(H_1) (S_1)	46.0	46.0	58.0 a	58.67 a	115.0 a	114.0 b
(H_1) (S_2)	45.0	44.0	51.0 d	54.0 bc	107.0 bc	106.0 fgh
(H_1) (S_3)	44.0	42.0	55.0 b	55.0 b	108.0 bc	105.0 gh
(H_1) (S_4)	43.0	43.0	52.0 cd	54.67 b	109.0 b	110.0cde
(H_1) (S_5)	42.0	42.0	50.0 de	51.0 cd	105.0 cd	113.0 bc
(H_2) (S_0)	40.0	40.0	48.0 e	49.0 d	100 e	103.0 hi
(H_2) (S_1)	47.33	49.0	54.0 bc	55.33 b	108.0 bc	118.0 a
(H_2) (S_2)	45.0	45.0	50.0 de	53.0 bc	108 bc	112.3bcd
(H_2) (S_3)	44.0	44.0	51.0 d	52.67bc	105.0 cd	105.0 gh
(H_2) (S_4)	43.0	43.0	54.33 bc	49.33 d	103.0 de	109.0 def
(H_2) (S_5)	45.0	45.0	49.67 de	53.67bc	103.0 de	108.0 efg
(LSD) at 5% probability	NS	NS	2.91*	3.28*	3.42*	3.73*
(D) Contrasts						
(S_0) vs (S_1), (S_2), (S_3), (S_4), (S_5)	**	**	**	**	**	**
(S_1) vs (S_2), (S_3), (S_4), (S_5)	**	**	**	**	**	**

(*Mean values in column not showing* same *letter vary significantly at at* 5% *probability: *=Significant* at 5% *level/ **=Significant at* 5% *level/* NS = *Non significant*)

Conclusion

Based on the year experiments (2008 & 2009), it is concluded that effect of Nitrogen sources on both maize hybrid (H_1 (Pioneer-30Y87) & H_2 (Pioneer-31R88)), was found to be non significant for number of days to tasseling and number of days to silking during 2008, while number of days to maturity and grain yield was significant. In 2009 number of days for tasseling was found significant and number of days to silking, maturity and grain yield was not significant. Significant Nitrogen sources influenced were observed for tasseling, silking, maturity and grain yield during both years 2008 & 2009. Maximum number of days was recorded in chemical source (urea) 250 kg Nitrogen ha^{-1} for tasseling, silking, maturity and grain yield in 2009 as compared to other Nitrogen sources and minimum number of days to tasseling, silking, maturity and grain yield was found in control (0) kg Nitrogen ha^{-1} .hybrid maize H_1 (Pioneer - 30Y87) produced better grain yield and indirectly enhanced physiological traits when Nitrogen sources was applied in chemical (urea) @ 250 kg Nitrogen ha^{-1} as compared to other sources of Nitrogen.

Reference

Ahmad R; Naseer A; ZA; Zahir ZA; Arshad M; Sultan T; and **Ullah MA** (2008*) Integrate use of Recycled Organic Waste and Chemical Fertilizer for Improving Maize Yield.* Available at: http://www.academia.edu/4921213/Integrated_Use_of_Recycled_

Amanullah R; Khattak A; and **khalil SK** (2009) Plant Density and Nitrogen Effects on Maize Phenology and Grain Yield. *Journal of Plant Nutrition,* **32** (2): 246-260. Available at: http://www.tandfonline.com/doi/full/10.1080/01904160802592714

Egbe OM; and **Ali A** (2010) Influences of Soil Incorporation of Common Food Legumes Stover on the Yield of Maize in Sandy Soil of Moist Savanna Woodland of Nigeria. *Agriculture and Biology Journal of North America*, **1** (2):156-162. Available at: http://scihub.org/ABJNA/PDF/2010/2/1-2-156-162.pdf

Govt. of Pakistan (2011) *Economic Survey of Pakistan*. Finance and Economic Affairs Division, Govt. of Pakistan, Islamabad, Pakistan: pp1-21. Available at: http://www.finance.gov.pk/survey_1112.html

Hamid A; and **Nasab DM** (2001) The Effect of Various Plant Densites and Nitrogen Levels on Phenology of Two Medium Maturity Corn Hybrids. *Iranian Journal of Agriculture Sci*ence, **32** (3):857-874. Available at: http://www.sid.ir/en/JournalList.asp?ID=3952&Name=IRANIAN+

Khaliq T; Kamal J; and **Masood A** (2004) Influence of Poultry Manure and Nitrogen on Productivity of Maize. *Con. Journal of Agri*culture, **2** (3): 260-263. Available at: http://prr.hec.gov.pk/Chapters/1463S-AL.pdf

Martin CC (1981) Differences among Maize Hybrid in their Relation to Increases in Plant Densties. *Crop Production*, **10**: 153-155. & *Field Crop Absts*, **36** (1):960;1983.

Modarres AM; Hamilton RI; Dijak M; Dwyer LM; Stewart DW; Mather DE; and **Smith DL** (1998) Plant Population Density Effects on Maize Inbred Line Grown in Short Season Environments. *Crop Science,* **38** (1):104-108. Available at: https://www.researchgate.net/signup.SignUpAccountName.html

Rizwan M; Maqsood M; Rafiq M; Saeed M; and **Z. Ali.** (2003) Maize (*Zea mays L.*) Response to Split Application of Nitrogen. *International Journal of Agriculture and Bio*logy, **12** (1): 19-21. Available at: http://www.fspublishers.org/ijab/past-issues/.pdf

Sharif M; Ahmed M; Sharir MS; and **Khattak RA** (2004) Effect of Organic and Inorganic Fertilizers on the Yield and Yield Components of Maize. *Pakistan Journal of Agricultural Engineering. and . Veterinary Science*, **20** (1): 11-15.

Steel RGD; Torrie JH; and **Dicky DA** (1997) *Principles and Procedures of Statistics. A Biometrical Approach 3rd ed.* McGraw Hill Book Co. Inc. New York, USA, pp400-428. Available at: http://www.cabdirect.org/abstracts/19611601129.html

Sudhu B; and **Kapoor KK** (1999) Effects of Compost Prepared from Different Farm Wastes on Growth and N and P Uptake of Maize. *Environment and Ecology*, **17** (4): 823-826. & Field Crop Absts, **53** (5): 3314-3314.

Waseem M; Zamir SI; Ali A; and **Iqbal A** (2007) Influence of Nitrogen Sources on Quantitative and Qualitative Traits of Maize. *Pakistan Journal of life and Social Science*, **5** (1/2):11- 14. Available at: http://www.pjlss.edu.pk/sites/default/files/Waseem%20(11-14).pdf