Physiological studies on nitrogen nutrition on some economic plants

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The present study was carried out in pots during two successive seasons of 1997 and 1998 at The Experimental Station Of Agricultural Botany Department Fac. of Agric, Moshtohor Benha Branch Zagazig University. to study the effect of different nitrogen sources and levels on growth, yield and chemical composition of Wheat (Triticum aestivum, L. variety Sids 1) and Rapeseed (Brassica napes, L. variety N. A. 145). The three nitrogen sources (i. e. ammonium nitrate, calcium nitrate and urea were applied at three levels 50, 100 and 150 kg N/fed.) for wheat. Meanwhile, were applied at 30, 60 and 90 kg N/fed. for rapeseed as well as control (without N addition). The results could be summarized as follows:I- Wheat:1-Increasing different nitrogen sources (i.e. calcium nitrate, ammonium nitrate and urea) in their applied levels (0, 50, 100 and 150 Kg N/fed.) have significantly increased the different growth characters in most cases especially plant height, number of leaves and total leaf area as well as number of tillers/plant. at 70 and 110 days after sowing in both seasons (1997 & 1998).2-Application of nitrogen in 100 and 150 Kg N/fed. levels as nitrogen sources have significantly increased the dry weight of different plant organs. Meanwhile, dry weight of shoot per plant and the dry weight of root per plant showed more response to nitrogen levels.3-Increasing nitrogen levels increased the mean values of shoot per root ratio and assimilation rate compared with the control.4-With regard to the final yield of wheat under different sources, the obtained data revealed that: the maximum number of spikes per plant, spike weight, number of grains per plant, were obtained with the application of ammonium nitrate followed by calcium nitrate while urea ranked the last in this respect.5-Weight of 1000 grains, grain yield per plant and grain yield per pot, straw yield/ plant and straw yield per pot were increased by increasing nitrogen levels.6-Different applied nitrogen sources highly increased chlorophylls a and b as well as carotenoid contents. Also, total chl./ carot. ratio was increased with different nitrogen sources. The highest values of the two chlorophylls component or even carotenoids were assisted with ammonium nitrate followed by urea and calcium nitrate in descending order. In addition, N levels at 150, 100 and 50 kg/ fed. of calcium nitrate and urea respectively, were more effective than the other levels of each source.7-Different nitrogen sources showed variable effects regarding nitrate reductase activity (NRA) when measured 24 and 72 hours after nitrogen nutrition. Since, calcium nitrate showed maximum activity at 24 and 72 hours after 35 days of plant age and also at 24 hours after 75 days of plant age.8-N P K concentration and uptake ,Total carbohydrates, total free amino acids and sugars in leaves, were increased by increasing N levels in roots and leaves.9-In grains NPK concentration, total carbohydrates and crude protein were increased by increasing N levels.II-Rapeseed1-The different nitrogen sources (i.e. calcium nitrate, ammonium nitrate and urea) in their applied levels(i.e. 0, 30, 60 and 90 Kg N/fed.) have significantly increased the different growth characters in most cases especially plant height, number of leaves and total leaf area.2-The different nitrogen sources in their applied levels have significantly increased the dry weights of different plant organs and number of branches/plant.3-Chlorophylls a and b as well as carotenoids content, Nitrate Reductase Activity (NRA), N P K concentration and uptake, total carbohydrates, total free amino acids and sugars in leaves, were increased by increasing N levels at 60 Kg N / fed.4-In seeds NPK concentration, total carbohydrates and crude protein were increased by increasing N levels. But oil percentage decreased.5-Of interest to note that, ammonium nitrate was

the most active nitrogen source regarding the rate of response of different characters of either wheat or rapeseed. Also, it could be noticed that the level of 100 kg N/fed. of each nitrogen source was more pronounced in relation to its effect on wheat. Meanwhile, the level of 60 kg N/fed. in case of rapeseed was the most effective level of different applied nitrogen levels.6-Generally, the present study admit the use of ammonium nitrate as nitrogen source for chemical fertilization of both wheat and rapeseed plants. Since, the nitrogen source at different applied levels was preceded in order the other two nitrogen sources i. e. calcium nitrate and urea.Therefore, the present study strongly recommends the use of ammonium nitrate with levels 60 and 90 Kg N/ fed. or calcium nitrate with 60 Kg N/ fed. increased seed yield and oil yield in rapeseed plants.On the other hand, the use of ammonium nitrate with levels 50and 100 Kg N/ fed. or calcium nitrate with 100 Kg N/ fed. increased grain yield and straw yield in wheat plants.