a comparative study of the use of normal and slow release n-fertilizers

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The study was aimed at comparing slow-release N-fertilizers with solubleN-fertilizers. A pot experiment was conducted in a greenhouse using earthenware potsof 12 kg soil capacity. The experiment consisted of 216 pots and was conductedin a Randomized Complete Block design, factorial in 3 replicates. Factorsstudied were 4 as follows : 1. FERTILIZER FORM: 4 forms were involved, two slow release and two soluble forms. They were: (1) urea formaldehyde ”UF” (2) sulphur-coated urea ”SCU” (both being slow-release forms); (3) ammonium sulphate ”AS”;!and (4) calcium nitrate ItCaN” (both b~ing soluble forms) % of N in theIfertilizers was 31 % N(UF); 28% (SCUi; 20.5% (AS); and 15.5% (CaN).II2. N-RATE: 3 rates were involved. They were as follows: 200, 300 and 450mg N/Kg soil.3. SOIL TYPE: Three soils were involv . They were (1) an alluvial clayloam soil (from Giza) (2) a calcareous s dy clay loam soil (from Noubaria)and (3) a sandy loam soil (from Tahre r). 4. SOIL MOISTURE REGIME: 2 moi ture regime were involved. They concerned levels soil moisture kept durjng watering of pots. They were as follows: (1) irrigation so as to keep moisture at 70% of water holdingcapacity (WHC) and (2) irrigation so aslto keep moisture at 100% of WHC.Therefore the 216 pots represent the Ivarious combinations of 4 fertilizersX 3 N-rate X 3 soils X 2 moisture regimes lin 3 replicates; i.e. (4 X 3 X 3 X 2)X 3. Slow release forms resulted in greater N uptake than the soluble formswhen considering the sum of N-uptake b~ the 3 sucessive crops; (2.18, 2.12,1.44, and 1.41 g N/pot for UF, seu, e~03’ and AS respectively).IConcerning N removal from soil bt means of uptake in plant stems andleaves (N-uptake by the 3 successive crops + leaching losses of N) in the highImoisture treatments, slow-release forms shfwed greater values (2.85, 2.81, 2.44,and 2.71 g N/pot for UF, SCU, CaN03, Rd AS respectively). The superiority of slow-release fo ns was most apparent in the light soil (the sandy loam). The slow release focrops compared with the soluble forms, produced higher dry-matter yield ofConsidering total yields during e three seasons, effeciency of thenitrogenous fertilizers was in that urea> urea formaldhide> ammonium sulphate> ium nitrate.Dry matter yields of the 3 successive crops were as follows 189, 183, 121,and 120 g/pot for SCU, UF, AS, and eaNjo3 respectively.Only in the first crop (wheat), that stow-release forms gave less yield and less N-uptake as compared with the soluble forms (yields of dry matter wheat were 69, 70, 75, and 76 g/pot for UF, scu, AS, and CaN03 respectively; Nuptake being 786, 776, 910, and 983 m~/pot for UF, sen, AS, and eaN°3 respectively) .As time went by, the residual effect of the slow-release forms wasapparent, and they were superior to thel soluble forms. In the 3rd crop insuccession (barley) the slow-release form~ gave far greater yields and N-uptake(yields of dry-matter barley were 50,48, 114,and 13 g/pot for UF, SCU, CaN03,and AS respectively; N uptake being 578t 556, 161 and 145 mg N/pot for UF,SCO, AS, and CaN03 respectively).The alluvial soil showed the highe t yields and N-uptake, followed by the calcareous soil then the sandy loam soil. alcium nitrate lost the largest quantity of N followed by ammonium sulphate.Slow-release of N from seu woul save nitrogen from excessive leaching.Slow-release N fertilizer lost I S8 N by leaching throughout the 3 successive growth seasons (351, 383, 40, and 1164 mg N/pot were lost by leaching from UF, SeD, AS, and CaN03 treatments respectively), and Ca(N03)2being the one of the highest lossess followed by AS: and both lost about 3 timesas much N as losses from the slow-release forms.The recommendations which could ~e conclud.ed are : Urea formaldhide and sulphur-coated urea may be used as N fertilizers for grain crops, particularly

in light soils. Als?, SeD may be a good N-source forcalcareous soils due to existence of sulphur ~ Economic consideration, however,may decide on the best rate and the most appropriate conditions of use, smaller volume bread.