ninimizing the amount of N applied and increasing N use efficiency. The grower can eliminate the need for side-dress N ıpplications, as well as potentially reducing the total N applied. Environmentally, the benefits are to minimize N losses from eaching, denitrification, and N use by non-crop plants. Our research over the past four years shows that CRU can be used uccessfully in field crops.

MESIC, M., A. BUTORAC, F. BASIC, and I. KISIC. Faculty of Agriculture, University of Zagreb, 10 000 Zagreb, Croatia.
Influence of nitrogen fertilization on NO_3- N concentration in lysimeter water.
The objective of our studies was to determine the optimal nitrogen rates for major field crops based on the yield and potential NO_3-N concentration in lysimeter water. A field trial with 10 treatments was set up in Central Croatia. Water leached through the soil to an 80 cm depth was collected by zero tension pan lysimeters. Crops were grown in the following crop sequence: 1996-maize (*Zea mays*),1996/97-winter wheat (*Triticum aestivum*), 1997/98-oil seed rape (*Brassica napus* var oleifera) and 1999-maize (*Zea mays*). NO_3- N concentration in lysimeter water varied application time, temperature, and the quantity and intensity of precipitation. In control treatments, the average NO_3- N concentration was relatively low (3.7 - 5.6 mg/L NO_3- N). Increasing rates (fertilization with 200, 250 and 300 kg N/ha) increased NO_3-N concentration in water (14.3 - 28.7 mg/L/NO_3-N).

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Factors affecting microbial formation of nitrate-N in soil and their effect on fertilizer-N use efficiency.
Mineralization of soil organic matter is governed by predictable factors with nitrate-N as the end product. Crop production, interrupts the natural balance, accelerates mineralization of N, and elevates levels of nitrate-N in soil. Six factors determine nitrate-N levels in soils. These are: soil-clay content, -bulk density, -organic matter content, -pH, -temperature and rainfall. Maximal rates of N mineralization require an optimal level of air filled pore space. Optimal air filled pore space depends on soil clay content, soil organic matter content, soil bulk density and rainfall. Pore space is partitioned into water filled and air space. A maximal rate of nitrate formation occurs at a pH of 6.7 and rather modest mineralization rates at pH 5.0 and pH 8.0. When the components are combined in a computer program, predictions of the soil nitrate-N concentrations with a relative precision of 1 to 2 ug N/g of soil are obtained. Predicting mineralization in this manner allows optimal side-dress N applications to be determined for site-specific soil and weather conditions.

SIMARD, R.R., **N. ZIADI**, M.C. NOLIN, and A. N. CAMBOURIS. Agriculture and Agri-Food Canada, Sainte-Foy, Qc, Canada, G1V 2J3.
Prediction of N fertilizer needs for corn by soil N mineralization indicators.
Nitrogen (N) is an important factor influencing corn (*Zea mays* L.) yield, but it can result in water contamination when used in excessive amount. Uniform application of N fertilizer may also result in either under or over-fertilization. The objective of this study was too predict the N fertilizer requirements of corn with different N mineralization indicators. Four indicators were used to determine N mineralization potential: organic matter (OM) content and three equations involving OM and Clay content. The study was conducted on a 15-ha field close to Montreal, Quebec, Canada. In the spring 2000, soil samples (n=150) were collected on a 30 m * 30 m grid and six rates of N fertilizers (0-250 kg N/ha) were applied. Kriged maps of particle size showed areas of clay, clay loam and fine sandy loam soils. The fertilizer rate to reach maximum yield (N_{max}), as estimated by a quadratic model, varied among textural classes and N mineralization indicators and ranged from 159 to 250 kg N/ha. The proportion of variability (R^2) and the standard error of the estimate (SE) varied among groups and N mineralization indicators. The R^2 ranged from 0.53 to 0.91 and the SE from 0.13 to 1.62. Textural classes can be used successfully to determine N max under our conditions. N mineralization indicator may also assist the variable rate fertilizer N application for corn.

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Alternate nitrogen amendments for organic fertilizers.
Organic fertilizers have great demand globally. The use of compost or manure in agriculture as organic source of nutrients is well practiced in many tropical developing countries like Nigeria. One of the drawbacks of such materials is a very low level of nitrogen, 1% or less. Farmers have a tendency of supplementing the soils with chemical nitrogen fertilizers such as urea, CAN and NPK formulations to obtain better crop growth and yield. These chemical supplements have a negative impact on the environment as they leach out nitrates and phosphates into soil and water leading to eutrophication of watercourses, erosion of soil, and also affecting public health. Gliricidia (*Gliricidia sepium*), a tropical fast growing hedge plant, perennial in nature was therefore tested as a source of organic nitrogen which may be effectively supplemented in the Organo-mineral fertilizer formulations. This plant has the composition (%): N, 3.78; P, 0.32; K, 1.83; Ca, 0.80; and Mg, 0.20. Using a sand culture and *Amaranthus caudatus* as a test crop, it was shown that amending the commercial composts with 30% Gliricidia prunings would benefit many farmers and control environmental pollution.