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IS THE CLASSICAL NITROGEN CYCLE SCHEME TRUE ? PRACTICAL IMPLICATIONS FOR THE ENVIRONMENTAL NITRATE PROBLEM

F. Al Addan *, M.B. Bouché *, J. Cortez **, G. Ferrière ***, Ph. Granval* and R. Hameed ** (*Laboratoire de zooécologie du sol INRA, in **CEPE/CNRS, BP 5051, F-34033 Montpellier, ***Museum d'Histoire Naturelle, F-21000 Dijon)

The classical nitrogen cycle is described as a nitrate assimilation by plants, a production of organic compounds by these plants and a decomposition of these compounds by microorganisms which oxydes them to ammonia and then to nitrate in the whole soil. Such a conceptual simplification of the nitrogen cycle main stream led to support agronomical practices as fertilizer conception, mode of fertilizer spreading, or whole soil ploughing... These practices led themselves to environmental difficulties as nitrate pollution, eutrophication, erosion, ...

The improvment of ecological techniques has been allowed to look directly in non disturbed soils at some nitrogen cycle sections both as nitrogen flux and precise localization of processes into soil observed as a structurated system. These techniques reveal a short nitrogen cycle from plant to plant by an earthworm ingestion-digestion-assimilation of litter and an excretion on roots by these animals. This recycling and transfer are made every day, at day doses in form of ammonia and mucus (mucoproteins). Mucus is quickly degradated by proteolitic microorganisms : the transfer from litter to plants needs few days and avoids any leachable nitrogen accumulations. This important nitrogen way is observed into a space-time organization of the soil system including earthworm burrows and granules, root distribution, percolation and soil water filtration avoiding nitrate drainage. The possibility to avoid nitrate drainage and run-off erosion, thanks to this new knowledges, is proposed by the improvment of new bioefficient fertilizers and/or direct drilling.