

Abstract

Grain legumes grown in rotation with annual cereal crops contribute to the total pool of nitrogen in the soil and improve the yields of cereals. However, the anticipated N benefits of the legume may be positive or negative depending on legume species and its interaction with the environment. Such erratic response may result from excessive water use by the legume phase, its symbiotic performance, effects of soil pH on legume growth and biomass returned N, harvest index and immobilization of nitrate during decomposition of legume residues. A review of the effects of legume–wheat rotation on residual moisture exploitation for enhanced soil N productivity of the tropical soils, including factors affecting the decomposition of incorporated residues are presented. Whereas soil water storage in the soil profile during the fallow period has been an important consideration in dry land agriculture where water is often limiting crop yields, the growing of a short-term legume in rotation with cereal in a humid climate, and its depletion of fallow water does not adversely affect yield of following cereal crop mainly because of adequate rainfall during the main season for wheat. Soil N is enriched by various grain legumes through biological N fixation which subsequently enhances wheat yields. Non-N benefit includes reduction of wheat root rot incidence which enhances added N uptake, wheat leaf disease and pests. The strategy of using legumes in rotation with wheat in the humid tropics for enhanced soil-N supply, and pest, disease, and weeds-break effects should therefore be encouraged. It is concluded that introduction of legumes such as chickpea, dolichos, field bean, faba beans in wheat-based cropping is a viable strategy for the reduction of inorganic fertilizer use for the resource poor small and medium scale farmers in Africa.