ROTATIONAL BENEFITS OF LEGUMES TO SUBSEQUENT RAIN-FED WHEAT IN A LOW N SOIL

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ABSTRACT

Legumes can play an increasingly important role in rain-fed wheat production in low N soils through enhanced water use efficiency (WUE) and additional N and other soil benefits. This hypothesis was tested in a field experiment at farmer's field in Urmar area of Peshawar valley during 1998-2002. The influence of lentil (Lens culinaris) and chickpea (Cicer arietinum) was assessed on the following or companion wheat. The experiment was consist of three main treatments i.e. wheat-after-wheat, wheat-after-legume, and wheat-intercropped with legume, arranged in a randomized complete block design with three replications. The results indicated that legumes (lentil, chickpea) involved in annual crop rotation or in intercropping improved the grain and straw yield of the following or companion wheat by 19-32%. On the average, the maximum grain yield of wheat of 2233 kg ha^{-1} was obtained in the intercropped treatment followed by 2020 kg in the legume-wheat system relative to 1694 kg in the wheat-wheat sequence. The wheat straw responded similarly to the previous or companion legume. The inclusion of legumes (lentil and chickpea) in the cropping system caused a net average increase in grain yield of wheat by 326 kg ha^{-1} in legume-wheat rotation and 539 kg in legume-wheat intercropping system with similar increases in straw yield. Such increases in wheat yield by legumes were equivalent to around Rs 3788 ha^{-1} for legume-wheat rotation and Rs 6232 ha^{-1} for legume-wheat intercropping system. These results suggested that incorporation of legumes in cropping sequences improved the N economy of the cropping system and enhanced wheat productivity probably through increased WUE and the additional N and other soil benefits in the prevailing rain-fed environment.