

DEDICATION

To soule of my parents, my family,
and my friends with respect.

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ABSTRACT

A field experiment was conducted for two consecutive summer and winter seasons (2010/11 and 2011/12), at Demonstration Farm of College of Agricultural Studies, Sudan University of Science and Technology at Shambat, to study the effect of rhizobium and mycorrhiza inoculation and diammonium phosphate (DAP) on growth, nodulation and yield of soybean *Glycine max* (L.) Merrill, (cultivar E01). The treatments consisted of control (C) (without any fertilizer and inoculation), inoculation with Bradyrhizobium alone (R), and combinations of inoculation with Bradyrhizobium + mycorrhiza (RM), Bradyrhizobium + mycorrhiza (VAM) + 100 kg /ha diammonium phosphate DAP (RMD1), and Bradyrhizobium + vesicular arbuscular mycorrhiza (VAM) + 150 kg /ha diammonium phosphate DAP (RMD2). A completely randomized block design with four replicates was used. The results showed that the combination of Bradyrhizobium and mycorrhiza (RM) significantly increased nodule number/plant and mycorrhizal infection%. Relative growth rate was significantly higher in (RMD1). Maximum plant height, branches number/plant, pods number/plant, 100 seed weight, protein% and grain yield were significantly affected by combination of Bradyrhizobium, mycorrhiza and 150 kg /ha DAP (RMD2). Winter seasons recorded higher relative growth, yield components and grain yield than summer seasons. It can be concluded that cultivar (E01) of irrigated soybean produced significantly higher growth and yield when combination of rhizobium with mycorrhiza and diammonium phosphate (DAP) was used during winter season under Khartoum conditions.

الخلاصة

اجريت تجربة حقلية فى موسمين متتاليين فى الشتاء والصيف فى موسمي (١١/٢٠١٠ و١٢/٢٠١١) فى المزرعة التجريبية لكلية الدراسات الزراعية بجامعة السودان للعلوم والتكنولوجيا (شمبات) لدراسة اثر التلقيح ببكتيريا الرايزوبيوم وفطر المايكورايزا وسماد ثنائي فوسفات الامونيوم (د ا ب) على العقد البكتيرية ونمو وانتاجية نبات فول الصويا (الصنف E01). المعاملات التى استخدمت هي: التلقيح ببكتيريا الرايزوبيوم فقط والتلقيح ببكتيريا الرايزوبيوم وفطر المايكورايزا والتلقيح ببكتيريا الرايزوبيوم وفطر المايكورايزا باضافة ١٠٠ كجم من سماد ثنائي فوسفات الامونيوم للهكتار والتلقيح ببكتيريا الرايزوبيوم وفطر المايكورايزا مع اضافة ١٥٠ كجم من سماد ثنائي فوسفات الامونيوم للهكتار وتركت معاملة بدون اضافة لقاح او تسميد كشاهد واستخدم تصميم القطاعات العشوائية الكاملة باربعة مكررات.

اظهرت النتائج ان تفاعل بكتيريا الرايزوبيوم وفطر المايكورايزا زاد معنويا عدد العقد البكتيرية فى النبات والنسبة المئوية للاصابة بفطر المايكورايزا. اعلى معدل نمو نسبي احرز عند التلقيح ببكتيريا الرايزوبيوم وفطر المايكورايزا باضافة ١٠٠ كجم من سماد ثنائي فوسفات الامونيوم للهكتار.

اعطى التلقيح ببكتيريا الرايزوبيوم وفطر المايكورايزا مع اضافة ١٥٠ كجم من سماد ثنائي فوسفات الامونيوم للهكتار زيادة معنوية فى طول النبات وعدد الافرع وعدد القرون فى النبات و وزن ١٠٠ بذرة ونسبة البروتين فى البذور والانتاجية فى الهكتار عند المقارنة مع المعاملات الاخرى. سجل فصلي الشتاء اعلى نتائج فى النمو والانتاجية ومكوناتها مقارنة مع فصلي الصيف. واستنتج من ذلك ان الصنف (E01) يعطى نتائج افضل فى النمو والانتاجية اذا استخدمت ببكتيريا الرايزوبيوم وفطر المايكورايزا و ١٥٠ كجم من سماد ثنائي فوسفات الامونيوم خلال فصل الشتاء فى مناخ الخرطوم.