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قال تعالى:

﴿ وَقُلْ رَبِّ زِدْنِي عِلْمًا ﴾

صدق الله العظيم

الآية ١١٤ من سورة طه

DEDICATION

To my parents souls

To those who are sharing my life

My dear wife and beloved children

With faithful love

F. Suleiman

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ABSTRACT

Two experiments were conducted during the period 2006-08 at the Experimental Farm of Shambat Research Station. The first experiment continued for two years (2006-08) whereas the second one covered one year (2008). The objectives were to investigate the performance of five Rhodes grass cultivars (Fine Cut, HayMaker, Katambora Australia, Katambora Zimbabwe and Top Cut) in comparison with four local cultivars comprising two perennial forage legumes: 'Alfalfa' (*Medicago sativa* L.); Clitoria (*Clitoria ternatea* L.) and two annuals forage sorghum (*Sorghum bicolor* L. Moench) 'Abu 70' and 'Garawi' (*Sorghum sudanense* "piper" stapf). The materials were arranged in RCBD with 3 replicates. The Rhodes and forage legumes cultivars were evaluated across 19 and 9 cuts in the first and the second experiment, respectively. The forage sorghum cultivars were evaluated for 4 cuts in both experiments.

The data collected include fresh and dry forage yield, days to 50 percent flowering and plant height. The proximate analysis was carried out for crude protein (CP), neutral detergent fiber (NDF) and acid detergent fiber (ADF).

The statistical analysis was performed as split plot considering the cuts as split in time imposed over the genotypes (main units) in a Randomized Complete Block Designed (RCBD). The Contrast analysis was performed for Rhodes cultivars as group vs each of forage legume and forage sorghum groups.

Mean squares from combined ANOVA indicated that differences between genotypes in forage yield were significant pointing to genetic variability existing among the studied materials

The contrast analysis indicated that Rhodes grass group significantly outyielded that of forage sorghum group (Abu 70 and Garawi) in all cuts other than the first cut.

The Rhodes grass group significantly outyielded 'Alfalfa and Clitoria throughout all cuts.

Quality wise, the results obtained indicated the inferiority of Rhodes grass compared to Alfalfa. However, compared to forage sorghums, percentages of protein shown by Rhodes grass in this study (11% - 13%) were quite comparable, if not better than those reported in the Sudan and elsewhere (6-10%).

The results obtained in this study, suggested the validity of introducing Rhodes grass as a new forage crop in

the Sudan as it lends itself to modernized systems of forage production (mechanized hay-making system) that help greatly in boosting fodder production. Being a perennial crop with high yielding capacity, good storability and transportability, Rhodes grass is expected to help in bridging the accidental gaps in forage production.

More studies are needed to evaluate Rhodes grass under rain-fed or at least partial rain-fed (with supplementary irrigation) conditions with the objectives of reducing cost of production.

الملخص

تم إجراء تجربتين خلال الفترة ٢٠٠٦-٢٠٠٨ بمحطة البحوث الزراعية بشمبات التجربة الأولى استمرت لمدة عامين (٢٠٠٦-٢٠٠٨) بينما استمرت التجربة الثانية لمدة عام واحد (٢٠٠٨) بهدف تقييم أداء خمسة أصناف من حشيشة الرودس (Fine Cut , HayMaker , Katambora Australia,) (Katambora Zimbabwe and Top Cut) ومقارنتها مع أربعة أصناف من محاصيل العلف المحلية، قسمت لمجموعتين: مجموعة أعلاف الذرة الرفيعة (Sorghum) والتي أحتوت على محصولي أبو سبعين والجرابي ومجموعة أعلاف البقوليات والتي أحتوت على محصولي البرسيم الحجازي والكلاتوريا حيث استخدم نظام القطاعات العشوائية الكاملة (RCBD) ذو ثلاثة مكررات في تنفيذ التجربة.

تم أخذ ١٩ و ٩ قطعات لتقييم حشيشة الرودس والبقوليات في التجريبتين الأولى والثانية على التوالي. بينما تم تقييم حشيشة الرودس وعلف الذرة الرفيعة بأخذ ٤ قطعات في كلتا التجريبتين.

البيانات التي تم دراستها بالنسبة للصفات الحقلية هي إنتاج العلف الاخضر (GMY) والعلف الجاف (DMY) - وعدد الأيام لـ 50% إزهار وطول النبات. تم إجراء التحليل التقريبي (proximate analysis) لتقدير نسبة البروتين الخام (CP) - ألياف المذبيبات المتعادلة (NDF) وألياف المذبيبات الحمضية (ADF).

التحليل الإحصائي تم باستخدام القطاعات العشوائية المنشقة (Spilt plot) باعتبار القطاعات كوحدات منشقة زمنياً منسوبة على الأصناف كوحدات

أساسية. تم إجراء تحليل المقابلة بين مجموعة حشيشة الرودس مقابل مجموعة أعلاف البقوليات ومجموعة أعلاف الذرة.

أوضح تحليل التبيان أن الاختلافات بين الطرز الوراثية كانت معنوية مشيراً إلى وجود اختلافات وراثية بين الأصناف قيد الدراسة.

تحليل المقابلة أوضح بأن مجموعة أعلاف حشيشة الرودس تفوقت معنوياً في إنتاج الأعلاف على مجموعة أعلاف الذرة الرفيعة في كل القطعات عدا لقطعة الأولى بينما تفوقت معنوياً على مجموعة أعلاف البقوليات في كل القطعات.

أوضحت الدراسة تفوق البرسيم الحجازي في نسبة البروتين الخام (22.5%) على حشيشة الرودس والتي تراوحت بين 11% إلى 13% وبمقارنتها مع الذرة الرفيعة تعتبر هذه النسبة متساوية إن لم تكون أفضل من تلك المذكورة في المرجعيات السودانية والعالمية (6-10%).

النتائج المتحصل عليها في هذه الدراسة تؤكد أهمية إدخال حشيشة الرودس كمحصول علفي جديد في السودان لما يمتاز به من خواص وقابلية للنظم الحديثة لإنتاج الأعلاف (ميكنة صناعة الدريس) والتي سوف تساهم كثيراً في نهضة إنتاج الأعلاف في السودان، وإن حشيشة الرودس محصول معمر ذو إنتاجية عالية يسهل تخزينه ونقله، عليه فإن علف الرودس يساعد على تخطي الفجوات الطارئة في إنتاج الأعلاف.

هنالك حاجة لدراسات أخرى لتقييم إنتاج أعلاف حشيشة الرودس تحت ظروف الزراعة المطرية الكاملة أو المدعومة بالري بهدف تقليل تكلفة الإنتاج.