By

Salwa Ali Mohamed El-Touny

Submitted in Partial Fulfilment of
the Requirement for the Degree of

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in

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Department of Agricultural Science
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UTILIZATION OF WADI SUDER RESOURCES (SOUTH OF SINAI) FOR GROWING SOME FORAGE CROPS

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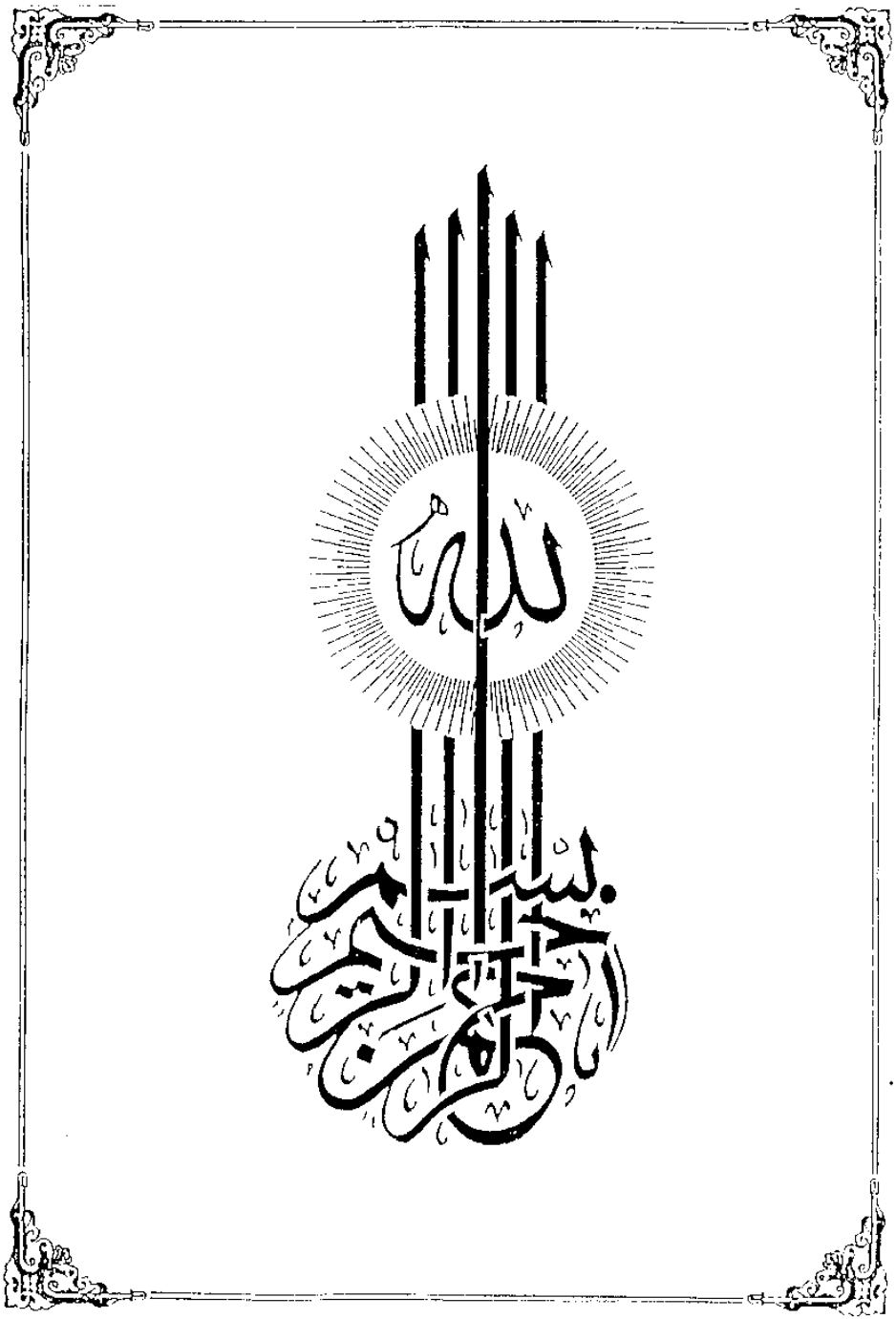

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APPROVAL SHEET

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INTRODUCTION

In Egypt, animal production is not enough to face the population demands because of many reasons; one of them, is the great lack in the forage production to face the animal feeding requirements.

The area of annual forage crops amounts to 2,785,000 feddan about 1,185,000 feddan are cultivated with temporary Egyptian clover berseem, 1,585,000 feddan are cultivated with permanent berseem, while 15,100 are devoted to winter forage crops such as grass pea.

Berseem production during winter season is fairly enough to animals with there needs. More production is dried as hay to be used during the summer season beside the summer forage production. Nearly to 61,500 feddan are cultivated mainly by grass such as fodder corn, forage sorghum, sudan grass and sweet sorghum, which are not enough to face their demands.

One of the ways to solve the summer forage lack for animal feeding is to cultivate new reclaimed lands with forage plants. These lands are characterized by lack of irrigation water, salinity, unsuitable physical characters.

Ras Suder (south Sinai) is one of the representative areas can be invested by cultivating forage plants. Due to

its aridity and salinity, it needs to be cultivated with specific tolerant species to drought and salinity.

Blue panic grass and Rhodes grass prove well under such conditions in different locations of Egypt as Ras EL-Hekma and Mariut regions in the North Western Coast of Mediterranean sea (Hassanean, 1969 & 1975).

The aim of this study is to determine the productivity and quality of forage produced from blue panic grass (*Panicum antidotale*, Retz) and rhodes grass (*Chloris gayana*, Kenth) under Ras Suder location fertilized with different rates of nitrogen and phosphorus.

REVIEW OF LITERATURE

The review was divided into three main parts, each part is concerned with the influence on growth characters, yield, yield components and chemical composition of blue panic grass, rhodes grass and some other crops especially forage grasses crops.

The following is the main topics:

I. Effect of nitrogen fertilizer.

II. Effect of phosphorus fertilizer.

III. Effect of the interaction between nitrogen and phosphorus fertilizer.

I. Effect of Nitrogen Fertilizer:

A. Growth characters:

Results obtained by several investigators showed a clear trend for plant height in relation to nitrogen rates added.

Plant height was increased as nitrogen rates increased as obtained by Prine and Burton (1956) on coastal bermuda grass at rates of (0-900) pounds/acre annually; Lewis and Lang (1957) on common, lincoln and manchar bromegrass, ochard grass, timothy, intermediate wheat grass, meadow foxtial and reed canary grass at rates of 0, 80 and 160 pounds/acre; Honnas *et al.* (1959) on blue and hairy grama at

rates of 100, 250 and 400 pounds/acre; Lavin (1967) on intermediate wheat grass at rates of 0, 33, 66 and 99 Lb/acre; Abd El-Rahim (1975) on alfalfa, rhodes grass and harding grass at rates of 0, 75 and 150 kg N/fed.; Hassanen (1975) on blue panic grass at rates of 0, 100 and 200 kg/fed.; El-Hakeem (1981) on rye grass at rates of 0, 20, 40 and 60 kg N/fed.; Eriksen and Whitney (1981) on *Brachiaria brizantha, Brachiaria meliifermis, Digitoria decumbens, Panicum maximum, Pennisetum clandestinum and Pennisetum purpureum* at rates of 365 kg N/ha/yr.; Miyagi (1981) on *Pennisetum purpureum* at rates of 0 to 900 kg N/ha annually; Mohamed, Thanaa (1981) on *Pennisetum purpureum* at rates i.e. 41, 82 and 123 kg N/fed.; Miyagi (1982) on a *Panicum maximum* at rates i.e. 0, 300, 600 and 900 kg N/ha; Hegab (1983) on sorghum plants at rates of 30 kg N/fed., Koraiem *et al.* (1983) on *Pennisetum purpureum* at rates up to 60 kg N/fed./cut. Shenouda (1983) on *Pennisetum purpureum* at rates of 0 to 120 kg N/fed.; Abd El-Aziz (1984) on *Panicum antidotale* at rates of 60 kg N/fed., Jacob *et al.* (1984) on saline meadows at application of 200+150+100+200+150+100 kg N/ha over 6 years period; Michaels-on *et al.* (1984) on *Bromus inermis* at rate of 45 kg N/ha. and Gearge and Reigh (1987) on *Panicum virgatum* at rates of 0 to 90 kg N/ha.

Others revealed that plant height was not affected by adding nitrogen fertilization as fairbourn and Rauzi (1982) on crested wheat grass under the levels of 0, 22 and 34 kg

N/ha.; Hegab (1983) in Sinai region on Sorghum plants at rates ranging from 60 to 120 kg N/fed. Also, Abd El-Aziz (1984) in the same location at rates of 30 and 90 kg N/fed. on *Panicum antidotale*.

Number of tillers was increased as nitrogen rates increased as obtained by Davis (1971) on rye grass at rates of 4 kg N/ha/day; Hassanen (1975) at rates of 0, 100 and 200 kg N/fed. on *Panicum antidotale*; El-Hakeem (1981) on *Trifolium alexandrinum* with *Lolium multiflorum* at rates of 0, 20, 40 and 60 kg N/fed.; Mohamed, Thanaa (1981) on *Pennisetum purpureum* at rates of 0, 41, 82 and 123 kg N/fed.; Miyagi (1982 a) at rates of 0, 300, 600 and 900 kg N/ha on *Panicum maximum*; Shenouda (1983) on *Pennisetum purpureum* at rates of 0, 30, 60, 90 and 120 kg N/fed., Abd El-Aziz (1984) on *Panicum antidotale* at rates of 30, 60 and 90 kg N/fed. and George and Reigh (1987) on *Pnaicum virgatum* at rates of 0 to 90 kg N/ha.

However, number of tillers was not affected by adding nitrogen rates shown by Abd El-Rahim (1975) on alfalfa as well as rhodes grass at rates of 0, 75 and 150 kg N/fed. and Miyagi (1981) on calcareous soil at rates from 0 to 900 kg N/ha. on *Pennisetum purpureum*; while Hassanen (1975) revealed that nitrogen application at rates of 0, 100 and 200 kg N/fed. decreased the number of tillers of *Panicum antidotale*.

Increasing leaf area was shown to different rates of nitrogen for different plant species i.e. Prine and Burton (1956) on coastal bermuda grass at rates of 0 to 900 pounds/acre; Lavin (1967) on intermediate wheat grass at rates of 0, 33, 66 and 99 lb/acre; Hassanean (1975) on *Panicum antidotale* at rates of 0, 100 and 200 kg N/fed.; Droushiotis *et al.* (1977) on Italian ryegrass by adding 0, 262 and 525 kg N/ha.; El-Hakeem (1981) at rates of 0, 20, 40 and 60 kg N/fed. on *Lolium multiflorum*; Miyagi (1981) on calcareous soil with *Pennisetum purpureum* by adding 0, 300, 600 and 900 kg N/ha./annually, Mohamed, Thanaa (1981) on *Pennisetum purpureum* at rates of 0, 41, 82 and 123 kg N/fed.; Shenouda (1983) on the same plant under rates of 0, 30, 60, 90 and 120 kg N/fed. while, Davis (1971) demonstrated that leaf area was not affected by applying nitrogen rates on perennial rye grass at rates of above 4 kg N/ha./day.

Leaf area index was increased as nitrogen rates increased as shown by Daaust and Tayler (1969) on Italian rye grass at rates of 100, 200 and 400 units N/acre; Hassanen (1975) on blue panic grass at rates of 0, 100 and 200 kg N/fed.; Miyagi (1981) on *Pennisetum purpureum* under calcareous soil by adding 0, 300, 600 and 900 kg N/ha; Miyagi (1982 a) on *Panicum maximum* at rates of 0, 300, 600 and 900 kg N/ha.; while Droushiotis *et al.* (1977) demonstrated that number of leaves which emerged on marked

tillers was not affected by nitrogen fertilizer at rates of 0, 262 and 525 kg N/ha. with Italian ryegrass. Opposite results in relation to increasing nitrogen rates for leaf percentage was obtained by Prine and Burton (1956) on bermuda grass at rates of 0, 100, 300, 600 and 900 pounds/acre. Increasing tiller weight and decreasing leaf weight ratio were obtained by Miyagi (1981) on *Pennisetum purpureum;* Miyagi (1982 a) on *Panicum maximum* at rates of 0, 100, 300, 600 and 900 kg N/ha. and El-Hossini (1990) on *Cajanus cajan* at rates of 40 and 80 kg N/fed.

B. Yield and Yield Components:

The literature dealing with the effect of nitrogen fertilization on grass species are extensive. Several investigatores obtained the same trend of increasing fresh and dry yield and its components i.e. leaves and stems by increasing nitrogen fertilization rates. Ramage *et al.* (1958) on orchard grass and reed canary grass at rates from 50-400 pounds/acre; Lookkin and Mackenzi (1970) on brome grass at each increment of 112 kg N/ha.; Reid (1970) on rye grass sward at rates from 0-300 Lb/acre; Monson *et al.* (1971) on Coastal bermuda grass at rates from 56 to 672 kg/ha; Robinson and Henderson (1980) on bermuda grass as nitrogen from 0 to 800 Lb/acre; El-Hakeem (1981) on berseem and ryegrass mixture at rates of 0, 20, 40 and 60 kg N/fed.; Eriksen and Whitney (1981) on *Panicum maximum and Pennisetum purpureum* at rates of 365 kg N/ha/yr.; Mani and