# The relationship between seed polymorphism and germination of *Acacia mellifera(Vahl)Benth*. Seeds

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***Abstract-*** Acacia mellifera is a widespread species, very common in many area, adaptable to sand and clay soil .and tolerate extreme drought .It has many uses ,it uses as fodder, honey plant, fuel wood., living hedge or fence, edible gum producer and as a medicine for stomach pains and treat colds, eye inflammation, diarrhoea and bleeding. This study was carried to investigate the seed color polymorphism of Acacia mellifera in relation to germination percentage .The result showed that the percentage of the brown greenish seeds almost about half of the bulk, the brown and green almost share the same percentage. The viability of the three colors almost had the same percentage, which means that the color of the seeds was not associated with seed viability further studies were need for demonstrating if this polymorphism associated with seedling performance or with seed storability.

***Index Terms***- Acacia mellifera, germination, seed, polymorphism

## I. Introduction

In plants showing seed polymorphism, two or more sharply defined distribution patterns are seen (Harper, 1977). Attributes such as seed size, shape, dormancy, or internal structures are some of the forms in which polymorphism may be manifested (Van Staden et al 1989). Seed coat color changes are often associated with the onset of impermeability during seed maturation and there is evidence that seed coat color is controlled by a single gene . (Egley 1989).

Acacia mellifera which Known as hook thorn is usually a multi-stemmed, much branched, obconical shrub up to about 2m tall. The canopy is widest at the top like an upside-down cone (Coates Palgrave 2002) and is dense and tangled with dark, rigid branches and twigs (Grant & Thomas 2000). The tree is usually branches low down and the crown has a substantial horizontal spread that often exceeds its height (Smit 1999) The fruit are pods , thin to almost papery, flat and oval shaped, narrowing at both ends (Smit 1999) .The seeds are 7-10 x 6-8mm in size, subcircular-lenticular, compressed with a small central areole which is indented and horseshoe shaped, they are olive green to brown in color (Ross 1975) . It is a very adaptable species occurring in dry bushveld where it is found in sand, clayey soils and on rocky substrates. (Schmidt et al. 2002) and this species can tolerate extreme drought (Roodt 1998). The pods, leaves, young twigs and flowers are nutritious and are eaten by cattle, goats and sheep. The fallen leaves are a valuable source of fodder, particularly for the smaller antelope species (van der Walt 2000) . Extracts of the roots and leaves are used to treat colds, eye inflammation, diarrhoea and bleeding (Grant & Thomas 2000) The wood is used extensively for fuel, It is a hardwood, slow and hot burning, producing ideal cooking coals and used for making charcoal(Dharani2002).

Form field observations Acacia mellifera seeds have seed color polymorphism within and among populations and with regard to poor germination percentage of this species, this study was carried to investigate the seed color polymorphism of Acacia mellifera in relation to germination percentage

## II. Materials and Methods

The seed collected in 2009. The seeds were sorting according to its color; green, brown and brown greenish seeds. The percentage of its present in the seed lot was counted. For each seed shape 100 seeds were used. These were divided into 4 replicates of 25 seeds each. Seeds were sown immediately in round aluminium dishes filled with moist sand. Dishes were watered daily with a fine shower . Germination was carried out in a controlled germination room at the National Tree Seed Centre – Soba 30oc, light for 12 hours from fluorescent lamps. Germination counts were done at 7 days interval and for a period of 6 for each seed shape. For cutting test Two hundred fruits were taken at random from the composite working samples taken from 10 trees of each species. Fruits were divided into 2 replicates of 100 fruits .Fruits were cut transversely one by one with the aid of a pruning shear. Cut fruits were visualized by naked eye and a hand lens to identify:

i-Sound fruits (normal, firm, fresh and full size).
ii- Empty fruits (Empty fruit coats, with no seeds).
iii- Dead fruits (fragile, dark, coloured and decayed or abortive).
The CRD (Complete Randomize Design) with four replicates was selected and the statistical analysis was done by JMP package (Programme improved form SAS Package) for analysis of variance, means were compared using Tucky - Kramer.

## III. Results and Discussion

The result showed that the percentage of the brown greenish seeds almost about half of the bulk, the brown and green almost share the same percentage. The viability of the three colors almost hade the same percentage, which means that the color of the seeds was not associated with seed viability. There were no

significant differences in germination percentages between the three color this results is in agree with Traveset et al(,2009) who showed that the Seeds of the two morphs of Myrtus communis had the same germinability (final percentage germination)as well as similar rates of germination under controlled conditions (in growth chambered greenhouse). Outdoors, seeds from blue berries tended to germinate slightly faster (which might give them an early advantage) but differences between morphs dis-appeared after several weeks of growth. On the other hand studies of two wild, fleshy-fruited species of wheat have demonstrated differences in seed germination rates among color morphs (Willson and O'Dowd, 1989).further studies were need for demonstrating if this polymorphism associated with seedling performance or with seed storability. May be it is a somatic polymorphism or it result from a cross pollination with species in same family and this was recoded by Ahmed (1982) who stated that there were cross pollination happened between A. mellifera and A. Senegal.

**(Table 1) the percentage of the different color in 100 seeds**

| Green seeds | Brown seeds | Brown greenish seeds |
|---|---|---|
| 25% | 20% | 55% |

**(Table 2) Effect of A. melifera seeds polymorphism viability using cutting test**

| | Green seeds% | Brown seeds% | Brown greenish seeds% |
|---|---|---|---|
| Healthy seeds | 93 | 94 | 92 |
| Empty seeds | 0 | 0 | 0 |
| Damaged seeds | 7 | 6 | 8 |

**(Table 3) The germination percentage of the different colored seeds**

| | Mean % | Rank |
|---|---|---|
| control | 73.3 | a |
| Green seeds | 63.6 | a |
| Brown seeds | 65.7 | a |
| Brown greenish seeds | 66.2 | a |

$p \geq 0.21$ SE±4.6

## IV. Recommendation

Studies on seed polymorphism associate with seedling performance or with seed storability..

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