

THE EFFECTS OF STORAGE PERIOD ON THE GERMINABILITY OF RHODES GRASS (*CHLORIS GAYANA*)

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ABSTRACT

An experiment was initiated to investigate the post harvest changes in the seed quality of Rhodes grass (*Chloris gayana*). The aim of the study was to find out the causes of poor germination of locally produced Rhodes grass seed. Random samples (72) were taken from a seed lot grown at Golden Valley Research Station. Seventy-two random samples were subdivided into groups of twelve and were stored at six locations. Half the samples were stored at room temperature and the other half were stored in the refrigerator for a period of one to six months. The germination test was conducted on one sample packet each from the two temperature regimes. The Irish and strong germination test procedures were followed. The treatments were arranged in a split plot design with temperature as the main plot and germination test method as subplot. The treatments were replicated six times. In both the Irish and Strong germination test methods, temperature and storage period affected germinability of Rhodes grass. There was a curvilinear response with the germination reaching a peak at four months of seed storage. The results suggest that Rhodes grass should be tested 4 months post harvest and that in the short term should be stored at room temperature to enhance germination.

INTRODUCTION

Rhodes grass (*Chloris gayana*) is the most widely planted pasture grass in Zambia. The availability of good quality seed is the major constraint limiting increased production of Rhodes grass by both smallholders and the commercial sectors (Kaonga et al., 1990; Kulich, 1993). Recently, the quantity of Rhodes grass seed production has improved. Despite the increased seed production, the quality of the seed has continued to be low (Silwimba and Mwansa. Personal Communication). This has created a further seed shortage on the market. The reason for the poor seed quality is not known. The objective of this study was to find out the causes of poor germination of Rhodes grass.

MATERIALS AND METHODS

Cultural practices. A six hectare seed crop of Rhodes grass (cv. NIRS Boma) was established at Golden Valley (GV) on 21 January 1993. The soil at the experimental site is a fine mixed thermic eustrustox. Twenty, 40 and 20 kg ha⁻¹ of N, P and K respectively was applied at establishment. The crop was maintained under rain fed conditions and was weeded regularly during the growing period. Harvesting was done by hand in May 1995. The seed was dried and cleaned after which seventy two samples were taken for quality analysis.

Treatments and experimental design. The 72 samples were stored at six locations. At each location, six samples were stored at room temperature and six were stored in the refrigerator for a period of one to six months. Each month, one randomly selected sample packet from both temperature regimes was taken for germination testing.

The treatments were arranged in a split plot design with temperature as the main plot and germination test method as the subplot. The treatments were replicated six times.

Seed quality test. Seed purity and germination tests were carried out at the Seed Certification and Control Institute (SCCI) in Chilanga. The International Seed Testing Association (1985) purity (Irish) and

germination test procedures were followed. The germination tests were evaluated using the Strong method. In this method, the florets with calyopsis were taken as pure seed while those that did not have calyopsis constituted inert matter.

RESULTS AND DISCUSSION

Purity. The Strong method gave a lower ($P < 0.05$) purity result than the Irish method (Table 1). This result was expected since by definition the Strong method eliminates all of the empty florets while the Irish method does not.

Longer storage period increased ($P < 0.05$) germinability of Rhodes grass (Fig. 1). There was a curvilinear response with the germination reaching a peak at four months of seed storage. The results of this trial were high compared with the result of most commercial samples tested at SCCI previously (Table 2). The low germination of Rhodes grass tested at SCCI previously was thought to be a problem of seed dormancy, a phenomenon that is reported in other grasses (Hopkinson et al., 1988). These results confirm the existence of dormancy in Rhodes grass (Fig. 1). The 40% germination result obtained in this trial is higher than that obtained from commercial seed lots in Zambia. The temperature at which the seed lots were stored did not affect ($P > 0.05$) germination. Therefore for short time storage (< 6 months) Rhodes grass seed can be stored at room temperature without substantial reduction in germinability.

The data obtained in this experiment suggest that Rhodes grass should be stored for a minimum of four months post harvest before carrying out germination tests. Further more, the seed should be store at room temperature to accelerate the break of dormancy.

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Table 1

The percentage purity of Rhodes grass as determined by the Irish and Strong purity test.

Storage Temperature			
Fridge		Room	
Germination Test Method			
Irish	Strong	Irish	Strong
86	72	88	75
88	78	89	80
87	74	89	76
77	52	70	53
83	63	84	73
81	71	84	86

Table 2

The quality (germination %) of Rhodes grass tested at SCCI between 1988-94.

Year	Mean	Range	Sample passed* (%)
1988	26	0-74	29
1990	19	2-95	5
1991	38	0-85	37
1992	10	0-36	0
1993	17	0-35	0
1994	15	0-24	0

* samples with germination percent ≥ 50