TOWARDS LOW-INPUT CONTROL OF SLANGBOS (*SERIPHIUM PLUMOSUM*) – QUALITY AND GRAZING INTERACTION HYPOTHESES

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BACKGROUND

Slangbos (*Seriphium plumosum*) is a shrub, indigenous to South Africa, that has colonised significant proportions of the semi-arid grasslands of the country. Its ingress reduces the carrying capacity of veld to an extent approximately proportional to its abundance, through the mechanism of out-competing palatable grasses and appropriating available resources (light, nutrients, and water) (Snyman, 2009). Slangbos is considered to be highly unpalatable to livestock (Snyman 2009).

The eradication or control of the species is important to farmers. A common approach has been to poison the plants with herbicides, although this may be economically unfeasible or may cause long-term damage to veld through the mortality of non-target grass plants (du Toit & Sekwadi, 2012). Additionally, herbicide effects are probably temporary, with re-invasion occurring (Krupko & Davidson, 1961). The effects of mechanical approaches (e.g. hoeing) are also temporary (Krupko & Davidson, 1961; Jordaan, 2009).

Fire is a well-known driver of vegetation structure, generally reducing woody biomass and cover, although not necessarily density, in savannas and grasslands (e.g. Bond & Keeley 2005). Small plants are particularly susceptible to topkill by fire as they are caught in the 'fire trap' (Bond & Keeley 2005). It is plausible, therefore, that fire should provide a useful control option for slangbos. However, it is generally recommended that fire should not be used. Reasons are that fire increases the germination of slangbos seeds (Jordaan 2011; Snyman 2011), that fire causes unwanted shifts in grass composition (Snyman 2002; Jordaan 2011), and that adult plants are not killed by fire (Snyman 2011). It has been found, however, that slangbos seedlings succumb to fire (Snyman 2011). In contrast, Krupko & Davidson (1961) found fire to be an effective control strategy for slangbos.

THE ISSUE OF PLANT DENSITY VS. PLANT BIOMASS

That fire does not kill adult slangbos plants, and that fire may increase the germination of slangbos seeds, is not necessarily of importance. This is because the issue of importance is the *biomass* of above-ground slangbos, not the *density* (number of individuals). Many grasslands contain significant numbers of non-graminoid plants, which may well be unpalatable, but the bulk of the above-ground biomass is grass, which is available as food for livestock. For example, the woody grasslands of eastern South Africa can support large numbers of grazers despite having a high density of woody species. There, fire plays a crucial role in maintaining the grassland structure (Været et al, 2009).

Regarding seed germination, although many seedlings may emerge from under a burnt or otherwise removed adult slangbos plant (Snyman 2009), the above-ground physical space that is available for pre-emption remains constant. Therefore, at worst, the slangbos seedlings will re-grow to the same volume as before the fire. In contrast, if fire causes the germination and establishment of seedlings around grass plants where it was previously absent, this would potentially allow slangbos biomass to increase over time. However, it is known that fire can kill slangbos seedlings, so a controlled burning program may well reduce slangbos abundance as well as biomass.

THE ISSUE OF FORAGE QUALITY OF SLANGBOS AND OF GRASS

It is stated fairly unequivocally that slangbos plants are unpalatable to livestock (Snyman 2009). While this may well be the case for mature growth, it is common that the young regrowth of otherwise unpalatable plants may well be acceptable to animals (e.g. du Toit et al. 1990; Gadd et al. 2001). In the case of slangbos, there is some observational evidence for this. On the farm Leeuwfontein in the Zastron district of South Africa (30.339511°S; 27.020561°E), cattle were seen (and photographed) consuming slangbos plants that had been burnt about a year previously (Figure 1). The slangbos plants, investigated a few minutes later, had clearly been browsed and reduced to approximately half its original volume (Figure 2). Similar effects were observed and photographed in the Jamestown district during November 2012 (31.131020° S; 26.826692° E).

These observations were made during autumn, when the nutritional value (especially protein level) of the available fodder is likely to have been low. Most veld grasses of the region follow the C_4 photosynthetic pathway, and consequently drop in quality significantly following frost. In

contrast, slangbos follows the C_3 photosynthetic pathway, and remains green and possibly palatable after frost.

Figure 1. A cow selectively browsing a slangbos plant. Leeuwfontein farm, Zastron.

Figure 2. A slangbos plant recently browsed by cattle. The bush was reduced to approximately half its original volume. Leeuwfontein farm, Zastron.

HYPOTHESES

Two hypotheses emerge:

1. Burnt slangbos produces regrowth that is selected by livestock if the quality of other available forage is low.
2. The growth rate of browsed slangbos plants will be lower than that of unbrowsed slangbos plants.

IMPLICATIONS OF THE HYPOTHESES

Experiments need to be conducted to test these hypotheses formally. Informally, farmers and other land users can use this method as an attempt to control slangbos. If the hypotheses are correct, then this will allow farmers and other land users to control slangbos in a cost-effective manner, without the need for expensive and labour-reliant herbicide control.

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