
The production of dryland lucerne in the Swartland, Overberg and Heidelberg Vlakte

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Lucerne is the most productive pasture legume in the Rûens area of the Western Cape. It is widely used as pasture for wool/mutton type sheep, as well as a rotation crop for small grains and canola in the Overberg and Heidelberg Vlakte regions. The late prof J T R Sim, however, also found that lucerne was one of the most productive legume pastures he tested at Langgewens Experiment station near Malmesbury in the Swartland. Experimental research by Langenhoven (1975 to 1979) also showed that lucerne was equally productive at Langgewens and at Tygerhoek, near Rivieronderend in the Rûens.

With the exception of small areas between Malmesbury and Paarl, lucerne has never been used on a significant scale as a pasture in the Swartland and Boland regions. Originally, probably due to the fact that soil fertility and pH levels were to low and the focus was more on lupines. The use of bitter lupines as forage and rotation crop for wheat was, however, abruptly been brought to an end in the 70's due to diseases of these crops. Since the 80's medics and annual clovers have been extensively used as rotation crops for wheat and largely fulfilled this role.

The sharp increase in the cost of grain production, relatively lower grain prices and higher wool and mutton prices, however, resulted in a renewed interest in wool and mutton production on legume pastures the last number of seasons. Longer term pastures, have, therefore become an economically more viable option. Longer periods established to a perennial legume, such as lucerne, would also allow farmers to use more cost effective weed control practices. The objective of this research was, therefore, to test the potential of lucerne as dryland pasture in the Swartland area. These results were also compared to those derived from Caledon and Heidelberg.

Other more productive, grazing resistant and persistent lucerne cultivars have been identified recently. The second objective was thus to demonstrate the use of some of the new lucerne cultivars which may serve as a replacement for SA Standard. The data which was derived from these demonstration lucerne pastures, were therefore used as a basis to compare the production potential of lucerne at three sites.

Large scale pastures of various lucerne cultivars were evaluated at Roodebloem, Caledon, Uitsig, Heidelberg and Silwermyn, Malmesbury. These pastures were grazed as part of the commercial pastures on the farms. Five trials were conducted from 2005 to 2009 at Roodebloem and Silwermyn and one trial from 2001 to 2006 at Heidelberg.

Before sowing, the soils of the trial sites were fertilized with P, K and lime, based on soil analyses, and well cultivated. All seeds were inoculated with standard commercial lucerne root nodule bacteria before sowing. At Roodebloem the cultivars WL 414, WL 525, WL 357, PAN 4546, PAN 4764, SA Standard, SA Select, KKS 9595, KKS 3864 and Eureka were planted. In the trials at Silwermyn the cultivars ed.

TSA Standard, Alfagraze, Aquarius, Aurora, WL 320, WL 414, PAN 4546, PAN 4764, Sardi 7, WL 357, Eureka, KKS 3864, KKS 9595, SA Select, Super Siriver, Aurora, Magna 601, Sardi 10 and Magna 804 were plant. The trial site at Silwermyn was, however, on a very saline and waterlogged portion of the farm and this influenced the results. The cultivars Super Siriver, Sardi 10 and Magna 804 did not establish well, as they were allocated to a more saline area and could therefore not be monitored. The average annual and seasonal (NDJ (November to January), FMA (February to April), MJJ (May to July) and ASO (August to October)) lucerne DM production during the respective trial periods were compared at the three sites. The average annual rainfall (mm.annum^{-1}) during the trial periods at the three trial sites is shown in Table 1.

Uitsig (mm.annum^{-1})	Roodebloem (mm.annum^{-1})	Silwermyn (mm.annum^{-1})
378	556	476

Table 1. Average rainfall per annum (mm.annum^{-1}) at Uitsig, Heidelberg, Roodebloem, Caledon, and Silwermyn, Malmesbury, during the trial periods

The three sites differed in average annual rainfall. Roodebloem received the highest rainfall and Uitsig the lowest. One would therefore expect dryland lucerne to have the highest dry matter yield at Roodebloem.

The distribution of the rainfall is also of importance as we are dealing with a perennial legume, which is able to utilize rain for production through the whole year. The seasonal rainfall ($\text{mm}\cdot\text{season}^{-1}$) distribution is thus shown in Figure 1.

The seasonal rainfall distribution was very similar during the period May 2003 to October 2006 at Roodebloem and Uitsig, but, as in the case of the total rainfall, tended to be lower at Uitsig than Roodebloem.

During the period August 2005 and April 2009 the rainfall distribution was also very similar at Roodebloem and Silwermyl. If only the rainfall is considered, we would expect the Lucerne dry matter production to be highest at Roodebloem and lowest at Uitsig.

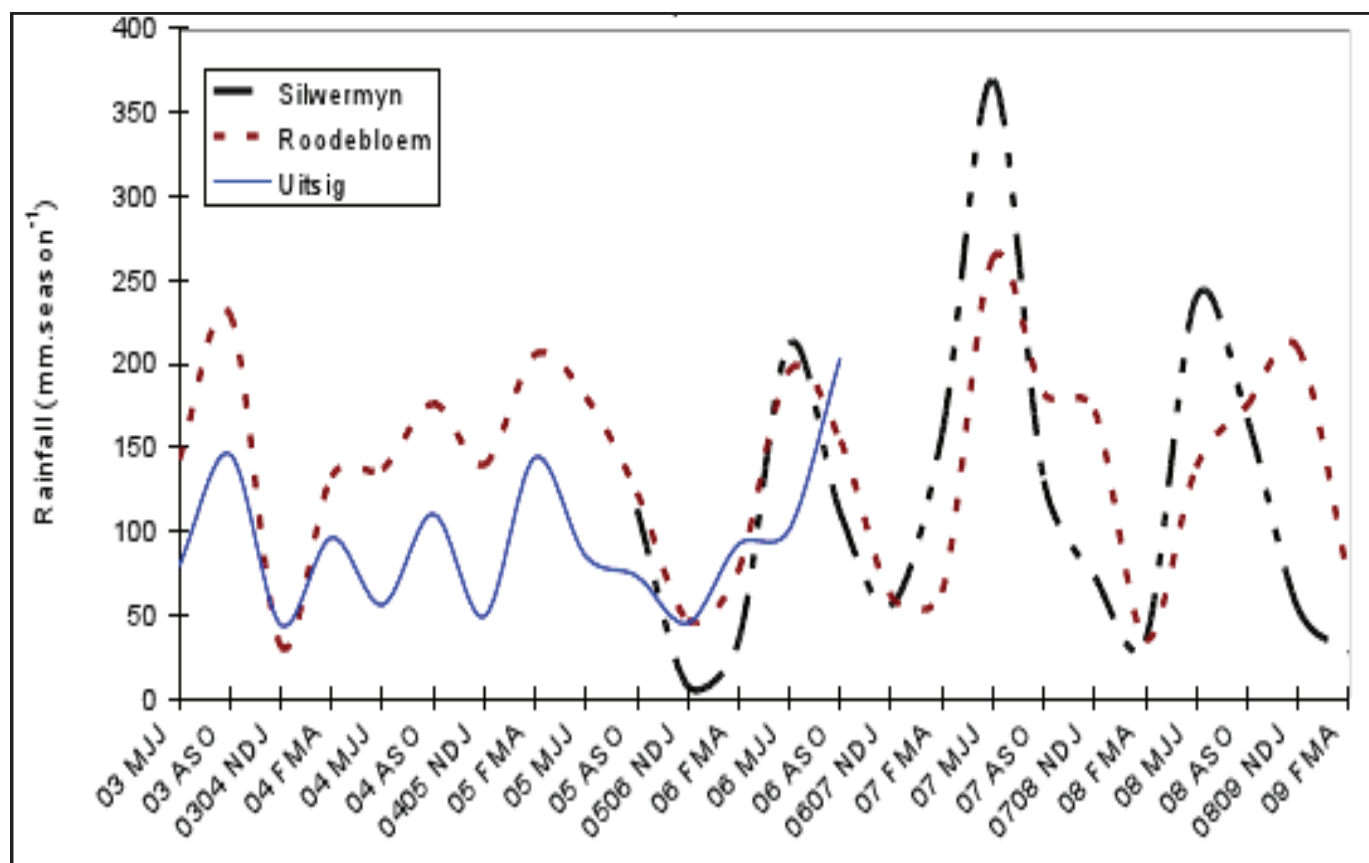


Figure 1. Seasonal rainfall ($\text{mm}\cdot\text{season}^{-1}$) during the trial periods at Silwermyl, Malmesbury, Roodebloem, Caledon and Uitsig, Heidelberg, during the period May 2003 to April 2009.

The cultivars in the trials at Roodebloem and Silwermyn were not replicated and they could not be compared statistically. The average data of the cultivars can, however, be used to compare the yield of lucerne at these two sites and at Uitsig. The average annual production of lucerne at the three trial sites during the trial periods is shown in Table 2.

The cultivars at Uitsig were replicated, but there was no significant difference in the yield of the cultivars and they could therefore also not be compared. The average annual production of lucerne at the three trial sites during the trial periods is shown in Table 2.

Uitsig (kg.ha ⁻¹ .annum ⁻¹)	Roodebloem (kg.ha ⁻¹ .annum ⁻¹)	Silwermyn (kg.ha ⁻¹ .annum ⁻¹)
2182	1670	3519

Table 2 . Average lucerne yield per annum (kg.ha .annum) at Uitsig, Heidelberg, Roodebloem, Caledon, and Silwermyn, Malmesbury, during the trial periods



Rain in Africa—Courtesy: Wikimedia Commons

Contrary to the rainfall statistics, the lucerne production was highest at Silwermyrn and lowest at Roodebloem. The lucerne yield was in fact more than twice as high at Silwermyrn as at Roodebloem and this is also reflected in the seasonal DM production of lucerne at the two sites which is shown in Figure 2. The seasonal lucerne production pattern ($\text{kg DM}\cdot\text{ha}^{-1}\cdot\text{season}^{-1}$) was very similar at Roodebloem and Uitsig, but production was lower at Uitsig during the period May 2003 to October 2006.

The seasonal lucerne DM production had a very similar pattern at Roodebloem and Silwermyrn during the period August 2005 to April 2009, but production was much higher at Silwermyrn than at Roodebloem. The fact that the lucerne yield at Uitsig and Silwermyrn was higher than at Roodebloem resulted in a much lower rainfall effectivity, in terms of lucerne production ($\text{kg DM}\cdot\text{mm}^{-1}$) and grazing capacity ($\text{sheep}\cdot\text{mm}^{-1}$) per mm rain at Roodebloem than at the other two sites. This is shown in Table 3.

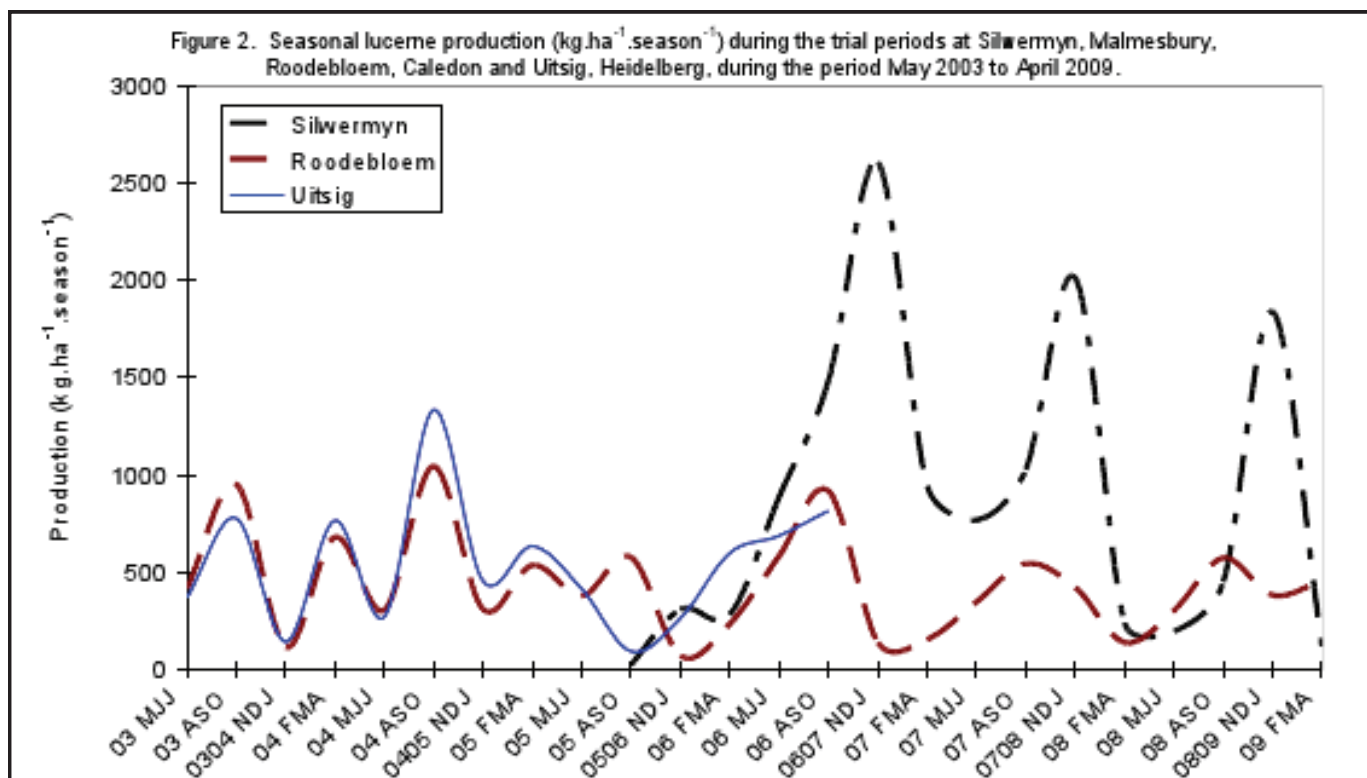


Figure 2. Seasonal lucerne production ($\text{kg}\cdot\text{ha}^{-1}\cdot\text{season}^{-1}$) during the trial periods at Silwermyrn, Malmesbury, Roodebloem, Caledon and Uitsig, Heidelberg, during the period May 2003 to April 2009.

Parameter	Uitsig	Roodebloem	Silwermyn
DM yield (kg.mm ⁻¹)	5.8	3.0	7.4
Grazing capacity (sheep.ha ⁻¹)*	2.99	2.29	4.82

* At 60 % effectivity of dry matter utilisation and a dry matter requirement of 1.2 kg/dry sheep unit/day

Table 3 . Rainfall effectivity in terms of lucerne DM yield per mm rainfall (kg.mm⁻¹) and the grazing capacity (sheep.ha⁻¹) at Uitsig, Heidelberg, Roodebloem, Caledon, and Silwermyn, Malmesbury, during the trial periods

The seasonal pattern in the DM production of lucerne was very similar at the three sites, Uitsig, Roodebloem and Silwermyn. Silwermyn, intermediate at Uitsig and lowest at Roodebloem, resulting in a much lower rainfall effectivity at Roodebloem than at the other two sites. The high production of lucerne at Silwermyn showed that the particular area of the Swartland does have potential for the production of dryland lucerne, as was envisaged by Simm.

Practical problems, however, occurred with the lucerne trial at Silwermyn. Due to the fact that the trial was planted on poor soils which were waterlogged and very saline in parts these limitations accentuated the dry summer of the area and caused many Lucerne to simply die out.

The contention is therefore that if the trial was planted on a better and on a southern slope the results would have been even better. Lucerne in this area should also be rotationally grazed and especially in winter this would prevent it being overgrown with annual grass and broadleaved weeds. Strict grass control measures should also be used annually to prevent the ingress of kweek. If these measures are applied there should be no problem to use lucerne in the Swartland

