

***Lotus uliginosus* – a potential pasture species for the Falkland Islands**

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ABSTRACT

Lotus uliginosus has been identified as a potential pasture legume for including in improved pastures in the Falkland Islands. Studies were undertaken to assess such factors as inoculation of seed, time of sowing, sowing rate, sowing method and fertiliser requirement. *L. uliginosus* could be successfully established under Falkland Islands soil and climate conditions, confirming its potential as a suitable pasture species.

KEY WORDS

Falkland Islands, *Lotus uliginosus*, lotus, legume, pastures.

INTRODUCTION

The Falkland Islands are situated approximately 480 km from the South American mainland, between latitude 51° and 53° S and longitude 57° and 62° W. The native vegetation is oceanic heath, and is dominated by shrubs and grasses, principally whitegrass (*Cortaderia pilosa*) and diddle-dee (*Empetrum rubrum*). The cool maritime climate of the Falkland Islands is characterised by a narrow temperature range (summer average maximum 13.2°C, minimum 5.6°C, winter average maximum 4.2°C, minimum 0.2°C), frequent strong winds, and a rainfall ranging from 300mm to more than 650mm annually (3). The soils of the Falkland Islands are predominantly peaty and acidic with an average pH (1:5 H₂O) of 4.5 (3).

Although the profitability of wool production has declined in the Falkland Islands, agriculture remains significant in terms of land use and employment. There are currently 724,000 sheep on the Islands, producing 2.79 million kg of greasy wool. Diversification of agricultural enterprises, and pasture improvement are seen as the keys to improving the profitability of agriculture, and the development of a number of well-adapted pasture legumes is recognised as essential for sustainable improved pastures. Challenges for legume establishment in the Falkland Islands include the soil conditions, lack of soil rhizobia, lack of pollinating insects, and climatic factors such as low summer temperatures, cold winter temperatures, high wind speeds, and limiting rainfall.

Lotus uliginosus, hereafter referred to as 'lotus', is recognised as a valuable pasture legume, particularly for wet acid soils in cooler regions of the world. Lotus has long been identified as having potential in the Falkland Islands as a pasture species (1), however limited research has previously been conducted to fully evaluate its potential.

MATERIALS AND METHODS

Various aspects of lotus establishment were assessed in a number of trials beginning in spring 1997. Although a number of different sites at various locations around the Falkland Islands were used, they were similar in terms of climate and the infertile acid organic soils. The results and discussion summarise these trials which include plants grown in pots, rows, small plots and paddock sized plantings.

RESULTS AND DISCUSSION

Choice of seed source

Cultivars 'Maku' and 'Sunrise' appeared promising, growing vigorously at various sites around the Falkland Islands, but cultivar 'Sharnae' was seriously affected by winter conditions. Plant material collected from the Faeroe Islands, which is strongly rhizomatous and winter dormant has shown some potential and requires further evaluation. In addition, hybrids of *L. uliginosus* and *L. corniculatus* are being tested, with the possibility of increased winter survival and drought tolerance.

Inoculation of seed

Increasing the inoculation rate to 5 times the normal rate of 6g/kg of seed, as recommended by Lowther & Littlejohn (2) resulted in plants with an abundance of nodules around the upper region of the primary root. As there are no background rhizobia to provide competition, normal and low inoculation rates may be successful, however compared with the high cost of lotus seed, the cost of inoculant is minimal. Some plantings of lotus failed to nodulate successfully, most likely due to factors associated with the quality of the inoculant and subsequent conditions at time of sowing.

Time of sowing

Spring sowings of lotus when soil moisture conditions are favourable have proven successful, and allow the maximum possible establishment time before the onset of winter. Late spring and summer sowings have also been successful, however the plants are not as vigorous as those sown in early to mid spring. Autumn sowings of lotus have been unsuccessful. This suggests that lotus seed should be sown as early as possible from mid August to late September, depending on seedbed and seasonal conditions, so that sufficient moisture is available for germination and early growth.

Sowing rate

A sowing rate of 2kg/ha at various sites has resulted in an adequate number of established plants. Although more investigation is needed to verify the optimal seeding rate, there is no justification at this stage for a higher seeding rate than 2 kg/ha, taking into account the high cost of the seed, and the possibilities of improving stand density with appropriate grazing management. It is possible that lower rates could be used, and the success of lower rates would most likely depend on having an excellent seedbed, sowing at the optimum time, and careful grazing management to improve the density of the stand.

Sowing method

Surface sowings of lotus were successful in some cases, however there were establishment failures due to lack of surface moisture for germination and nodulation failure. Light covering of the seed, either with an implement or by "hoof and tooth" is desirable. The most successful sowing method has been one pass with a rotary hoe, burning the large amounts of trash, spring sowing with a pneumatic seeder, and rolling. Other less intensive sowing methods are being examined.

Fertiliser requirements

Field and pot trials have shown phosphorus application to be essential for lotus establishment. The wet acidic soils of the Falkland Islands are well suited to the use of rock phosphate, and fertiliser response trials are being undertaken. Calcified seaweed, a local source of lime and trace elements has also been shown to greatly increase lotus production (Parsons, unpublished data).

CONCLUSIONS

Initial work has shown lotus to be a plant well suited to the soils and climate of the Falkland Islands, and relatively easy to establish. Areas that are normally associated with high moisture levels, such as valley greens and stands of *C. pilosa* have been successfully sown to lotus. Drier areas where *E. rubrum*

dominate were less suitable. Further work will be performed to refine establishment and management practices.

REFERENCES

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