

Register of Australian Herbage Plant Cultivars

B. Legumes

9. Annual Medics

(a) *Medicago truncatula* Gaertn. (barrel medic) cv. Caliph

Reg. No. B-9a-13

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Originators: A. W. H. Lake and Staff

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Origin

Caliph (Cyprus AR) was selected from a backcrossing program designed to produce a barrel medic with field performance very similar to the barrel medic cultivar Cyprus but with good resistance to blue-green aphid [*Acyrtosiphon kondoi* Shinji (BGA)]. Cyprus and Caliph are both resistant to spotted alfalfa aphid [*Theerioaphis trifolii* (Monell) f. *maculata* (SAA)].

The need for a BGA-resistant replacement for Cyprus was identified from field trial data in several States, but particularly as a result of the extensive work of R. R. Young and R. S. Wetherall in central and western NSW.

The backcrossing program used Cyprus as the recurrent parent, while the aphid-resistance donor parent was a hybrid selection of complex origin. The ultimate source of the BGA resistance gene in this hybrid was the barrel medic SA1499, but 4 other lines contributed germplasm to the original donor selection. Seed of SA1499 was supplied and is maintained by the Australian Medicago Genetic Resource Centre. BGA-resistant plants in each backcross generation were hybridised with Cyprus.

At the second backcross stage, about 20 F₂ plants with resistance to both SAA and BGA were selected. These were individually harvested and progeny-tested for aphid resistance segregation. Three non-segregating lines were isolated, and these were then seed-increased for further selection and testing.

Field testing of these lines was carried out in all mainland southern States of Australia against a range of medic cultivars and lines. Among these were several other selections derived

from Cyprus crosses and backcrosses. From these trials, Z-602 was found to have the best overall performance in areas that have traditionally grown Cyprus, and it was selected to constitute the cultivar Caliph.

The breeding of Caliph was part of the National Annual Medic Improvement Programme. Major collaborators for trial and other work in the development of the cultivar included J. H. Howie, R. J. Saunders, and J. Crosby (South Australian Research and Development Institute), R. R. Young and R. S. Wetherall (NSW Agriculture), R. Latta (Victorian Department of Agriculture), and D. J. Gillespie, C. Revell, and B. Nutt (Western Australian Department of Agriculture).

Submitted by the collaborators of the National Annual Medic Improvement Program through the South Australian Research and Development Institute and recommended for registration by the South Australian Herbage Plant Liaison Committee. Breeders' seed will be maintained by the South Australian Research and Development Institute. Protection for this cultivar under Plant Variety Rights legislation is being sought (Anon. 1993).

Morphological description

Caliph is morphologically very similar to Cyprus, its recurrent parent. The morphological description of Cyprus contained in the Register of Australian Herbage Plant Cultivars (Oram 1990) is, therefore, applicable to Caliph, except that Caliph has no plants with leaflets having a small yellow blotch as in Cyprus.

Agronomic characters

Caliph is quite similar to Cyprus agronomically, except that it has resistance to BGA (the level of which is similar to that of the barrel medic cultivars Sephi etc.). In comparative glasshouse tests on 3-week-old seedlings infested with BGA, Cyprus plants rapidly developed damage symptoms such as stunting and distortion of developing leaflets. After 2 weeks, some Cyprus plants had died, while all survivors were severely damaged. In contrast, Caliph plants were virtually undamaged after the same period under BGA attack. During the subsequent 2 weeks, the remaining Cyprus plants died, and BGA numbers declined dramatically. Throughout the experiment, many Caliph plants had 1 or 2 BGA present (particularly immediately after nearby Cyprus plants died), but no large scale multiplication was evident, and these aphids were almost invariably found only in very close proximity to the shoot apex. In contrast, BGA multiplication on Cyprus plants was rapid, and aphids quickly spread across the whole plant.

Like Cyprus, Caliph is susceptible to a range of other insect pests such as cowpea aphid (CPA) (*Aphis craccivora* Koch), redlegged earthmite (*Halotydeus destructor* Tucker), and lucerne flea (*Sminthurus viridis* L.).

The flowering characteristics of Caliph are also similar to those of Cyprus. Comparative trials of several cultivars over several years showed that Caliph and Cyprus both flowered at about 87–95 days after an early June germination, or up to 7 days earlier than Parabinga and Harbinger AR, and 2 weeks earlier than Paraggio and Jemalong. While these differences may fluctuate from year to year, there was a closely comparable pattern of flowering in Caliph and Cyprus; differences in time to first flower of 2–3 days have been observed, but the order of flowering has not been consistent between experiments.

The field performance of Caliph is also similar to that of Cyprus, except when BGA are prevalent, in which case Caliph shows significant superiority. For example, at a trial site near Jamestown, South Australia, in 1989, the seed yield of Caliph was nearly double that of Cyprus. Although mostly only in low numbers, BGA were present at this site virtually throughout the growing season. An even greater disparity was obtained under infestation of both BGA and CPA in a 1990 trial near Merredin in Western Australia, where the seed yields of Cyprus and Caliph were 7 and 158 kg/ha respectively (C. Revell pers. comm.). In contrast, a trial at Mundoora, South Australia, in the same year failed to reveal any significant differences between the herbage and seed yields of Caliph and Cyprus; BGA were not found at this site during the growing season.

In other major trials in Western Australia, South Australia,

and, in particular, western New South Wales, the dry matter production, seed yield, and regeneration plant density and production of Caliph was usually greater than that of Cyprus. Comparisons have also been made of Caliph with Parabinga and Paraggio. In general, Caliph is superior in herbage and seed yields to Paraggio in most earlier districts and is usually at least equal to, and often better than, Parabinga, except on very sandy soil types. This is a reflection of the adaptability of Caliph's recurrent parent Cyprus to low rainfall and medium and heavy textured soil types, a trait that has been successfully retained in Caliph. Caliph is, therefore, suitable for sowing in areas where Cyprus has been recommended.

Acknowledgments

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References

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