

Register of Australian Herbage Plant Cultivars

B. Legumes

8. Lucerne

a. *Medicago sativa* L. (lucerne)

cv. Hunterfield

Reg. No. B-8a-16

Registered June 1983

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Origin (1)

Bred at Northfield Research Laboratories, Department of Agriculture, S.A. by Ian D. Kaehne and A.W.H. Lake assisted by P.M. Burne, D. Hamilton, D. Bell, S. Jenkins and Ms B.H. Martin in a program jointly supported by the South Australian Government and the Australian Wool Corporation's Wool Research Trust Fund.

Hunterfield is the result of three cycles of selection within the Australian cultivar Hunter River (1) for resistance to spotted alfalfa aphid, *Therioaphis trifolii* (Monell) *f. maculata*, blue-green aphid, *Acyrtosiphon kondoi* Sinji and pea aphid, *Acyrtosiphon pisum* Harris. In the first cycle, selection was conducted separately to detect plants tolerant to spotted alfalfa aphid and blue-green aphid. Some 300 seedlings from each of 42 samples held in an Australian collection of certified Hunter River were exposed to spotted alfalfa aphid in a glasshouse. Twenty-eight tolerant plants were selected from 19 samples. All other seedlings died while exposed to the aphids. The States of origin of the tolerant plants were, Queensland 4, New South Wales 9, Victoria 1, South Australia 11 and Western Australia 1. In addition, 26 plants tolerant to blue-green aphid were isolated from c. 3000 seedlings grown from a mixture of randomly chosen South Australian certified Hunter River lucerne samples. Each plant in each aphid tolerant group was hand crossed to as many plants as possible in the alternate group and 480 of the possible 728 hybrids were produced.

In the second cycle of selection approximately 60 seedlings from each of the 480 hybrids were tested consecutively in the glasshouse for resistance to blue-green aphid and spotted aphid and 147 plants were selected for resistance to both aphids equal or superior to the most resistant plants in the control cultivar CUF 101. Seventeen spotted alfalfa aphid and twenty four blue-green aphid tolerant plants contributed to the second cycle selections. The proportion of the total genic content of the second cycle selections contributed by any selected plant from the first cycle was restricted to 15% to reduce inbreeding. Only one plant contributed 15%, 4 between 5 and 10% and the remaining 36 less than 5%. The 147 second cycle selections were intercrossed by honeybees and half-sib families were harvested from each plant. In the third selection cycle approximately 300 seedlings from each half-sib family were exposed consecutively to high infestations of blue-green aphid, pea aphid and spotted alfalfa aphid in the glasshouse and 500 plants resistant to the three aphids were selected from twenty eight families. To minimise inbreeding the maximum number of selections from any family was limited to 40. The average contribution was 27.9 plants per family. In each of the selection cycles only those plants which were in accord with the usual appearance of Hunter River plants of the same age were retained. The 500 selections from the third cycle were intercrossed in the glasshouse using honey bees. The seed was bulked and sown in an isolated field for production of breeders' seed.

Submitted by the South Australian Department of Agriculture and recommended for registration by the South Australian Herbage Liaison Committee. Breeders' seed will be maintained by the South Australian Department of Agriculture. Registered June, 1983.

Morphological characters

Hunterfield is morphological indistinguishable from Hunter River. It has a very low frequency of white flowers, rarely found in Hunter River.

Agronomic characters

Hunterfield is resistant at all growth stages to spotted alfalfa aphid, blue-green aphid and pea aphid. At the seedling stage, Hunterfield is equal to Springfield and Siriver in resistance to spotted

alfalfa aphid and pea aphid, but somewhat less tolerant than these cultivars to blue-green aphid (4). Since Hunterfield was derived from a relatively broad genetic base, little change from Hunter River has occurred in other agronomic characteristics. After a little more than one year of comparative trials Hunterfield has expressed a high level of persistence under rotational grazing management in a severely droughted site at Culburra, South Australia (4) and in an irrigated trial at the Northfield Research Laboratories, near Adelaide, South Australia (3). In particular the persistence in each site has not differed from the of Hunter River.

The seedling growth and regrowth after cutting of Hunterfield are equal to the most vigorous plants of Hunter River, possibly reflecting selection for seedling vigour during screening for aphid resistance. Neither seedling growth nor regrowth approach the extreme vigour of Siriver and Springfield. The seasonal growth pattern of Hunterfield is the same as for Hunter River. No difference between the two cultivars in seed-setting ability has been detected and grower experience indicated that Hunterfield is an excellent seed producer. Like Hunter River, Hunterfield is susceptible to anthracnose (*Colletotricum trifolii* Bain & Ess.) and to *Phytophthora megasperma* var. *sojae* Hilderbrand (2).

Hunterfield was bred as an aphid-resistant replacement for the susceptible cultivar Hunter River which, before the invasion by pasture aphids, was the predominant lucerne cultivar in Australia. It is expected to be useful in all areas to which Hunter River was formerly adapted, i.e. the well drained soils in the warmer parts of Victoria, South Australia, Western Australia and New South Wales, but not in Tasmania and those parts of Victoria where bacterial wilt is prevalent, or in southern Queensland and in other locations where *Phytophthora* root rot, *Colletotrichum* crown rot or both are damaging.

References

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