

Register of Australian Herbage Plant Cultivars

B. Legumes

1. Clover

(k) *Trifolium resupinatum* L. var. *resupinatum* Gib. and Belli (Persian clover) cv. Nitro Plus

Reg. No. B-1k-3

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Origin

Nitro Plus originated from the accession CPI 98474, which was collected 32 km south-west of Idlib, Syria, in 1977 by E. J. Crawford. This accession was introduced to the Australian Medicago Genetic Resource Centre, Adelaide, South Australia, as SA 14430. Successive selections were made within this material for upright growth habit and vigour (SA 19448) and early flowering (SA 20004).

Nitro Plus (SA 20004) was obtained by the Australian Trifolium Genetic Resource Centre, Perth, Western Australia, and underwent preliminary evaluation and characterisation in rows at Medina, Perth, Western Australia, in 1987 (Snowball 1993). It was selected by Richard Snowball from a group of 26 accessions of Persian clover on the basis of winter and spring vigour, seed yield and hardseededness. It was grown in 1989 and 1990 at Medina for further preliminary evaluation and seed increase. It underwent limited field evaluation at Harvey and Goomalling, Western Australia in 1989 and 1990 (Snowball 1991). Extensive field evaluation was undertaken in the Katanning region of Western Australia, between 1992 and 1994 in a program to develop cultivars for mildly saline, waterlogged soils of the 400–600 mm rainfall zone (Evans 1995). Kyambro, which is better suited to rainfall regions of 600 mm or higher (Anon. 1989), was the only appropriate commercial cultivar of Persian clover included for comparison.

Nitro Plus was recommended for registration by the Western Australian State Pasture Industry Advisory Committee. Seed certification will follow OECD protocols. Nitro Plus has provisional protection under Plant Breeders Rights legislation (application no. 97/035). Agriculture Western Australia will maintain breeder's seed.

Morphological description

Nitro Plus is a prostrate to semi-upright, glabrous, winter annual. Basal rosette formed in winter; stems develop rapidly in spring. Stems 3.3 mm thick at full flower (3.7 mm in Kyambro and Persian Prolific). Leaflets rhomboid, oval or obovate, 23 mm long by 13 mm wide. Petioles shorter and thinner than Kyambro, 82 mm long, 1.3 mm thick. An average of 91% of plants have leaf marks of some description (74% in Kyambro and 77% in Persian Prolific). Among plants with leaf markings, the frequency of silvery-pink leaf marks (35%) and silvery pink bands (31%) are similar to their frequencies in Kyambro but are more frequent than in Persian Prolific. A silver band (10% of plants with leaf markings) or a silver band with a green crescent (8%) is present in Nitro Plus but absent in Kyambro. Leaf flecking occurs in 80% of plants (80% in Kyambro and 66% in Persian Prolific). Inflorescence 15 mm wide. Seed colours occur in the following proportions: brown 11%, light brown 7%, yellow 13%, green 54%, and dark green 15%. Seeds are small, with about 1 754 000 seeds/kg (range 1 408 000–2 273 000 seeds/kg).

Agronomic characters

Nitro Plus is a vigorous, early maturing cultivar. Rhizobium specific for Persian clover is commercially available. Nitro Plus flowers between 68 and 142 days after sowing at Perth, Western Australia (average 114 days), compared with a range in flowering time for Kyambro of between 120 and 148 days (average 133 days), and for Persian Prolific of between 68 and 127 days (average 105 days). Its early maturity will allow it to grow in areas receiving between 350 and 500 mm annual rainfall.

In medium rainfall areas Nitro Plus was similar to or better than Kyambro and Persian Prolific for most parameters measured. On average it produced 18% more dry matter than Kyambro and 28% more than Persian Prolific in winter, and 12% more than Kyambro and 19% more than Persian Prolific in spring. It produced about 7-fold more inflorescences than Kyambro and 13% more than Persian Prolific in October, and yielded 51% more seed than Kyambro and 8% more seed than Persian Prolific (Evans 1995). Nitro Plus regenerated 2 years after its initial establishment due to its moderate to high level of hard seedness at maturity (71%), and its moderate to low rate of seed softening (32% soft seed after 4 months in a fluctuating temperature cabinet). Regeneration is also secured by virtue of the small seed size (about 0.6 mg), allowing passage of seed through the grazing animal. Successful regeneration depends on the removal of dry matter from swards. In

summer this allows some seed softening to occur and in autumn seedling growth is not inhibited by dead litter.

Nitro Plus can be grown over a wide range of soils from moderately acid to alkaline (pH 5.5–9.0) as a companion with Paradana Balansa clover and Persian Prolific Persian clover, or as an alternative to annual medics. It performs particularly well on winter waterlogged sites or mildly saline soils. At the Jingalup experimental site in Western Australia, Nitro Plus outperformed Paradana Balansa clover, producing 40% more forage.

From 1 year of field testing at Denmark, Western Australia, Nitro Plus showed resistance to clover scorch disease caused by *Kabatiella caulivora* (Kirchn.) Karak (D. J. Gillespie pers. comm.). It contains traces of formononetin, genistein and biochanin A (P. G. H. Nichols pers. comm.). Nitro Plus is sensitive to red-legged earth mite (*Halotydeus destructor* Tucker).

Acknowledgments

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References

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