

Register of Australian Herbage Plant Cultivars

A. Grasses

18. Wheatgrass

Thinopyrum ponticum (Podp.) Z.-W. Liu & R.R.-C. Wang (tall wheatgrass) cv. Tyrrell

Reg. No. A-18a-1

Registered September 1981

Published in the Journal of the Australian Institute of Agricultural Science 47(3): 179-80 (1981), and 48(3) 184-86 (1982).

Origin (1,8,10,11,12)

A seed collection from Turkey in the early 1930s was introduced to the U.S.A. under the identification number PI 109452. It was tested in Utah, Arizona and other States under this number. In 1937 a selection made in New Mexico was released as A-1876. In 1950 this was renamed Largo and breeders' seed was sent to the Plant Introduction Station, Beltsville, Maryland (8).

Seed sent to Australia as Largo was assigned the number W296 and included in tests by Rogers and Bailey (11) in Western Australia from 1954 to 1959. Reports of this and later work (1), and subsequent comparative tests indicate that selection pressure had changed the genetic constitution of the line in Western Australia.

The selected line was referred to by Rogers and Bailey as the best adapted and was tested by the Soil Conservation Authority of Victoria from 1961 (12). In 1966 c 2.5kg of seed of the best line derived from W296 was supplied to the Soil Conservation Authority of Victoria by Bailey of CSIRO in Western Australia for the purpose of establishing seed production areas. The seed was sown at two sites of equal area near Alexandra, Vic. In 1966 all the plants from one site were transplanted to a site adjacent to the other stand to form a consolidated block of 0.6ha. This block produced basic seed until 1979.

At the time seed was supplied to Victoria, a sample was also returned to the U.S. Plant Introduction Station, where it was assigned the number PI 368851 to distinguish it from PI 109452. This was done because of the chance of a genetic shift having occurred because of selection pressure (10). In a subsequent comparison of PI 368851 and authentic Largo carried out at Bridger Plant Materials Centre, U.S.A., it was found that the two lines were agronomically different (10).

The name Tyrrell is taken from the salt lake and the parish of that name located in north-western Victoria. The parish of Tyrrell includes areas of salt affected land typical of areas for which this cultivar will be recommended.

Breeders' seed has been obtained by up-grading basic seed harvested in January 1979 from the original stand at Alexandra. Breeders' seed will be maintained by the Victorian Department of Agriculture.

Recommended for registration by the Victorian Herbage Plant Liaison Committee. Registered September 1981.

Morphological description (2,3,7,8,9,13)

The species is described (2,9) as a rather coarse, densely caespitose or tufted, and tussocky perennial; culms erect, stout, hard and glabrous to 1m tall or more; rootstock thickened but not rhizomatous. Leaves grayish green or glaucous, involute, rather harsh and stiff, thick veined, scabrous or glabrous on upper surface (but much softer if kept closely grazed); ligule scarios. Inflorescence a simple erect spike 10-30cm long; lower internodes of rachis 1.5 - 3.0cm long, upper ones shorter and all internodes flat or nearly so on the side facing the spikelet.

Spikelets solitary, sessile, large, 1.4 - 2.5cm long, remote, 5-9 (-11) flowered, more or less compressed with flattened side toward the rachis, appressed before flowering, and divaricate at anthesis. Glumes almost equal, oblong, obtuse, subtruncate, 7 - 11mm long to 2.5 - 3.0mm broad, 5 - 7(-9)-nerved, indurate, smooth and shorter than lowest floret. Lemmas broadly lanceolate, 1.0 - 2.0cm

long, 5-nerved and with a shallow transverse furrow and a small naked callus at base. The rachilla disarticulates above the glumes and between the lemmas. Palea slightly shorter than the lemma. The lemma and palea adhere tightly to enclose the caryopsis, which is linear oblong with a deep groove on the inner side, and has a filiform hilum as long as the grain (9). Approximately 132 - 154,000 seeds/kg. Chromosome number $2n = 14$ (12).

Observations by Cade (3) of the Tyrrell cultivar growing in fertile conditions near Alexandra, Vic., indicate that it varies from the species norm in the following characteristics. A proportion of leaves are pubescent on one or both surfaces, mainly on the lower half of the blade. Occasionally the pubescence extends the whole length of the blade and down the sheath as well. The spike can be up to 50cm in length with the lowest internode of the rachis ranging up to 5.5cm. The lower internodes of the rachis are deeply recessed on the side facing the spikelets but become progressively shallower until they become flat or nearly so towards the tip. The glumes of Tyrrell tend to be narrower with 85% ranging in width from 1.5 - 2.0mm. Also present is a pronounced auricle (3). There are *c.* 190,000 seeds/kg (5).

Agronomic characters (4,6,7,8,9,12,14)

Thinopyrum ponticum is well adapted to poorly drained and saline or alkaline soils. On non-saline soils in a Mediterranean climate Tyrrell grows satisfactorily only in spring and autumn and does not yield as well as phalaris. It is later maturing and more productive in areas with moist summers and autumn. It is dormant in winter. It germinates well but is rather slow in early development. Once established it persists well.

It is cross fertile and gives good seed yields, although mature spikes shatter easily. It is only moderately palatable.

Its main virtue is its high salt tolerance and its ability to grow and persist on highly alkaline soils and salt-seepage areas. Roger and Bailey (11) report that it is best suited to the marginal areas of salt patches, which still carry some vegetative cover, where it can be established under a cover of barley grass; *Menemen puccinellia* is better for sowing on the badly salted and bare areas and hence complements tall wheatgrass. Zallar and Mitchell (14) report that, although *Thinopyrum* yielded moderately well in 'wet pan' situations, its principal merit lies in its higher production and persistence under 'hard pan' conditions, i.e conditions in which the salted areas are typically wet in winter but dry out rapidly and form a hard impermeable crust in summer.

References

1. Bailey, E.T. (1968). Quoted in Barnard (2).
2. Barnard, C. (1969). *Herbage Plant Species*. Div. Plant Ind., CSIRO, Canberra, pp1-4.
3. Cade, J.W. (1981). Personal communication. Vic. Dep. Agric., Melbourne.
4. Cameron, D.G. (1959). Grasses tested for soil conservation. Results to April 1958. *J. Soil Conserv. N.S.W.* **15**, 281-93.
5. Felfoldi, E. (1981). Seed counts. Numbers of seeds per unit weight. Tech. Rep. Ser. No. 32, Vic. Dep. Agric. Melbourne.
6. Fleck, B.C. (1967). A note on the performance of *Agropyron elongatum* and *Puccinellia* spp. in revegetation of saline areas. *J. Soil Conserv. Serv. N.S.W.* **23**, 261-9.
7. Fryxell, P.A. (1957). Mode of reproduction of higher plants *Bot. Rev.* **23**, 135-233.
8. Hanson, A.A. (1965). *Grass Varieties in the United States*. Agric. Handbook No. 170 (revised 1965), Agric. Res. Serv. U.S.D.A., Washington, DC.
9. Kamarov, V.L. (1934). *Flora of U.S.S.R.* Vol. 2 (Eng. Trans. by N. Landau, Israel Programme for Scientific Translations, Jerusalem, 1963.)
10. Lohmiller, R.G. (1976). Personal communication to Welbert, D. Soil Conserv. Serv. U.S.D.A., Bozeman, Montana, USA.
11. Rogers, A.L. and Bailey, E.T. (1963). Salt tolerance trials with forage plants in south-western Australia. *Aust. J. Exp. Agric. Anim. Husb.* **3**, 125-30.
12. Wang, R.R-C., Marburger, J.E., and Hu, C.-J. (1991). Tissue culture facilitated production of aneupolyhaploid *Thinopyrum ponticum* and amphidiploids of *Hordeum violaceum* × *H. bogdanii* and their uses in phylogenetic studies. *Theor. Appl. Gen.* **81**, 151-56.
13. Whyte, R.O., Moir, T.R.G., and Cooper, J.P. (1959). *Grasses in Agriculture*. (FAO Agric. Studies No. 42, FAO, Rome.)
14. Zallar, S. and Mitchell, A. (1970). Pasture species for non-irrigated salt-affected land. *In: Proc. 11th Int. Grassld. Congr.*, ed. M.J.T. Norman,