CANTERBURY CHAMBER OF COMMERCE

AGRICULTURAL BULLETIN

TALL FESCUE

No. 403 FEBRUARY, 1963.

by R. H. M. LANGER, Professor of Plant Science,

Lincoln College.

There are few pasture grasses which have enjoyed a more variable reputation among farmers than tall fescue. In the United States it has been given the name of "wonder grass" by a few enthusiastic farmers, in New Zealand it has been regarded as a serious weed which can poison stock, while in the United Kingdom it is recommended as a special-purpose plant useful for early spring and possibly also winter production. In view of a renewed interest in this plant in New Zealand, both as breeding material and as a pasture species, it is of some importance to summarise the known facts about it.

Botanical Characteristics

The agreed botanical name of tall fescue is Festuca arundinacea Schreb., although until fairly recently it has been referred to as Festuca elatior var. arundinacea. By comparison with Italian ryegrass which it resembles, it is a fairly coarse, tufted perennial with large, dark-green leaves. The sheath is rounded. The auricles at the base of the leaves are prominent and bear minute hairs but the ligule is inconspicuous forming a small collar at the junction of leaf and sheath. At flowering a large, usually open, panicle is formed bearing several spikelets per branch. Each spikelet consists of 3-10 florets which separate at maturity. The seed which normally bears no awn is about ¼in in length and is very similar to that of ryegrass. There are about 14,000 seeds per one ounce. Tall fescue has 42 chromosomes.

A closely related species which is highly regarded as an excellent pasture grass in Britain is meadow fescue, Festuca pratensis Huds. (formerly Festuca elatior var. pratensis). This is a less coarse and smaller plant, not unlike Italian ryegrass, although perennial in habit. It has unfortunately failed to establish successfully in New Zealand.

Agricultural Characteristics

Unlike ryegrass, tall fescue is slow to establish, although its seed is of comparable size. During the early stages of development it is very sensitive to competition from more aggressive grasses and from weeds, and quite generally production in its first year tends to be low. However, once established tall fescue will persist vigorously for many years, provided grazing management is controlled.

Flowering occurs early in the season, the first heads of the S.170 strain appearing as early as mid-October. Because of this, tall fescue produces a lot of early growth. During the summer production does not appear to be particularly outstanding, although experiments at

Ashley Dene have shown that it is capable of responding fairly quickly to showers of rain, since the plant retains considerably more green foliage than perennial ryegrass during periods of drought. Autumn growth is usually good, and during the winter little frost burn or plant mortality is experienced.

As long as grazing is so managed as to prevent the plant from becoming coarse, tall fescue is palatable, although somewhat less so than Italian ryegrass. Palatability declines during the summer, as it does in other grasses, but even then the presence of green leaves makes it quite acceptable to stock.

Tall fescue is a very adaptable plant. It has been reported to grow successfully on both acid and alkaline soils ranging in pH from 4.7 to 9.5. As is well known from New Zealand experience, tall fescue is tolerant of poor drainage, while in the western states of the U.S.A. it has become a common component of irrigated pastures. In the same country it is also reputed to grow well on mountain slopes and to have some uses in soil conservation. Depending on strain, tall fescue appears to be reasonably resistant to drought.

Strains

Because of its wide range of adaptability, tall fescue has been singled out by plant breeders in many countries in an attempt to provide a pasture plant suitable for difficult conditions. Improved strains have been developed mainly in the U.S.A., Great Britain and in France.

(a) Alta. This strain, first registered in 1944, was bred at the Oregon Experiment Station, Corvallis, U.S.A., from plants most of which were introduced from Germany at the beginning of the century. The main attributes of Alta appear to be resistance to drought and ability to respond to irrigation.

(b) Kentucky 31. Winter greenness appears to be the main characteristic of this strain which was developed at the Kentucky Experiment Station, Lexington, U.S.A., from material originally selected by a farmer. Since then its use has spread widely, and such is its reputation that it is the only grass in whose honour a monument has been erected.

(c) S.170. The inbred progeny of a single plant obtained from Buckinghamshire with subsequent additions from plants with similar growth form gave rise to S.170 which was bred at the Welsh Plant Breeding Station at Aberystwyth. This strain which is not as coarse as other tall fescues has been selected for leafiness and a short flowering season. It is winter-hardy and grows vigorously in spring and autumn, while holding its own in the summer.

(d) Demeter. This selection from southern France has recently undergone satisfactory tests in Australia. A fair degree of drought tolerance and good winter production have been noted.

(e) Other strains. British agronomists and plant breeders have in recent years paid a great deal of attention to tall fescues growing in North Africa. Plants obtained from high-altitude regions in Algeria and Morocco have been shown to grow very well under British winter conditions, although production for the rest of the year was generally found to be inferior to that of S.170. Two synthetic lines derived from this material have been developed and are now under test at the Grassland Research Institute in England. Apart from thus attempting to produce an improved strain, plant breeders in New Zealand and elsewhere are investigating the potential of tall fescue in breeding programmes involving related species.

(f) New Zealand tall fescue. Since tall fescue and meadow fescue are extremely difficult to distinguish, their early history in New Zealand is somewhat confused. It is probable that both plants were freely

introduced from Europe, in common with other species, during the latter half of the last century. Seed of what was reputed to be tall fescue was even exported from Hawke's Bay to London in the 1880's. The present position appears to be that the only plant of widespread occurrence is tall fescue itself, which has occupied considerable areas, notably badly drained ground in the North Island. The feed produced is considered to be neither palatable nor nutritious, and for this reason alone attempts to eradicate it have been made. Drainage and thorough cultivation have given good results; chemical control is also possible although not always entirely satisfactory.

Fescue Poisoning

One of the reasons why New Zealand tall fescue is considered to be a serious weed is that it is reputed to contain a harmful principle, which affects cattle grazing on it continuously. The animals cease to thrive, and some may develop lameness or even lose a foot and part of a leg. At one time this trouble was associated with the fungus ergot (Claviceps purpurea), which infects this plant, but more recent experimental evidence has shown that fescue poisoning can occur in the absence of any visible fungus infection. Cattle appear to be the only livestock which may be susceptible and not all of them are affected. Furthermore there are areas in which cattle are known to graze tall fescue without any ill effects, so that one is dealing here either with different strains of this plant or with differences induced by growing conditions such as mineral supply or degree of drainage.

Although there are occasional reports that similar troubles may arise in improved strains of tall fescue, very few, if any of them, have been verified. The fact that American farmers are grazing over four million acres of tall fescue does not indicate any lack of confidence, and in Great Britain this trouble appears to be unknown. Even though the last element of doubt can thus not be removed, there would seem to be next to no risk involved in growing improved strains of tall fescue under conditions of good farming.

Use of Tall Fescue Overseas

(a) U.S.A. Since the introduction of Alta and Kentucky 31 tall fescue has become popular in the western states of the U.S.A., where it is valued for its long growing season and high productivity. Good management is essential. Although tall fescue, once established, tolerates heavy grazing for short periods, continuous close grazing soon weakens the plant. A rotational system is thus advocated. Tall fescue is grown together with white clover (Ladino), subterranean clover, or lucerne, a typical grazing mixture including about 12-15 lb/acre of tall fescue. Alternatively cocksfoot or ryegrass are added to the mixture, although under New Zealand conditions ryegrass would be expected to be too competitive. Tall fescue pastures are used mainly for cattle and to lesser extent only for sheep. Heavy hay crops have been reported followed by very good aftermath production.

(b) Great Britain. Because meadow fescue grows so well in Great Britain, not a great deal of attention has been given to tall fescue, except that recently its ability to withstand winter conditions have brought it into prominence. By and large it is regarded as a special-purpose plant, although simple mixtures including tall fescue, meadow fescue and white clover have been recommended. Rotational or strip grazing is thought to be best. For winter production a system of alternate rows of tall fescue and lucerne both sown at 5 lb/acre has been advocated. The main value of tall fescue is considered to be its ability to offer an early spring bite, one or more silage cuts in the summer, followed by autumn grazing and some winter keep.

Seed Production

Overseas experience has shown that best seed yields are obtained by growing tall fescue in rows approximately 2ft apart. The seed rate must be low and should not exceed 5 lb/acre. The crop responds to application of nitrogen but appears fairly tolerant of winter grazing. Ryegrass must not be present in seed crops of tall fescue, because the seed of these two species cannot be separated. Another problem is the extreme susceptibility of tall fescue to shattering before harvest, as a result of which 35-40% of the crop may be lost. Depending on prices and costs, harvesting is done by binder or direct header.

Prospect of Tall Fescue in New Zealand

Despite its several weaknesses tall fescue is a valuable plant. It excels in some properties in which pasture grasses at present available in New Zealand are somewhat deficient. From overseas work it would appear that tall fescue is unlikely to compete with ryegrass in a mixed pasture, unless the latter is restricted by drought or other unfavourable conditions. Thus at Ashley Dene S.170 tall fescue has done well in a mixture and has more than held its own in competition with cocksfoot and ryegrass. It may well be that a suitable strain of tall fescue could make a material contribution towards pasture production under drought conditions. In more favoured areas, however, tall fescue should be considered as a special-purpose plant which could be of value for winter and early spring grazing, particularly on farms producing liquid milk. Energetic steps should be taken to test the various strains which are available in order to establish whether tall fescue could play a useful part in New Zealand agriculture.

Copies of this Bulletin may be obtained from the Secretary, Canterbury Chamber of Commerce, P.O. Box 187, Christchurch.