

# NASSELLA TUSSOCK

by M.J. WELLS, Botanical Research Institute  
and HILDEGARD DE BEER, Plant Protection Research Institute

Nassella tussock, *Stipa trichotoma* Nees, family Poaceae, is a tremendous threat to natural grazing in South Africa. Due to its vigorous growth and the large amount of seed produced, it spreads very rapidly in disturbed environments and overgrazed areas to form dense stands. It is harmful to livestock and infests lands.

Nassella tussock was formerly known as *Nassella trichotoma*, hence the common name. It is also sometimes called serrated tussock. The popular Afrikaans names are "nassella-polgras" or "saagtand-polgras".

## MORPHOLOGY

Nassella is a perennial tussock, usually less than 500 mm tall, with a crown cover of about 600 mm. The basal diameter is about 150 mm, resulting in a low basal cover.

The leaves are narrow, hard and tightly rolled and roll easily between thumb and finger. When the leaves are stroked downward they are rough to the touch. The blades are erect or nodding at maturity,

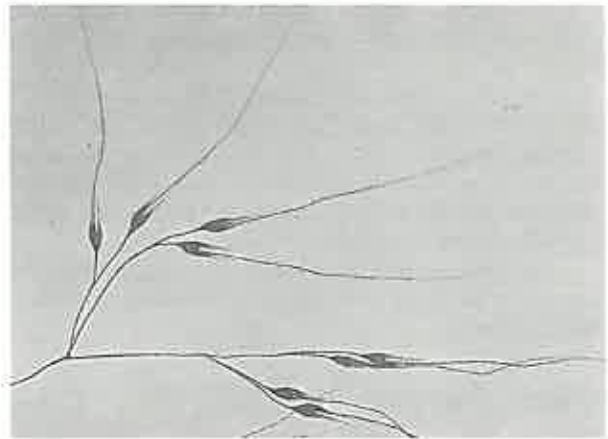


FIG. 1 - Nassella tussock seeds are characterised by an awn



FIG. 2 - The early stages of a nassella infestation



FIG. 3 - Nassella tussock can form dense stands that oust all natural grasses

wiry, smooth or serrate. The leaf blade is linear with a pointed tip and is 80 to 500 mm in length. The leaf sheath is up to 160 mm long, rounded and smooth, but serrate on the ligule where the leaf blade and sheath meet. In autumn and winter the tussocks look untidy and floppy as in a lair. The base of the tussock is whitish and easily breaks up into separate, compact tussocks.

Flowering time is usually November to December. The inflorescence is an open, branched panicle, usually 50 to 180 mm long, but reaches a length of more than 700 mm, standing well clear of the leaves. The spikelets are 5 to 6 mm long and purplish-brown with conspicuous, straight or slightly bent awns 20 to 30 mm long. Each inflorescence can produce about 50 seeds characterised by a long awn. The flowering stalks soon break off so that for the greater part of the year the plant bears no inflorescences. Most of the old flowering stalks are blown away and collect in furrows or against obstructions. Those that remain form a mat between the tussocks.

Nassella tussock has a tremendously strong root system and even young plants are very difficult to uproot.

It is easiest to detect the tussocks in mid-summer when they are in flower, or during autumn, because they fade earlier than the other grasses. The whitish tussocks of this weed and also those of the white tussock, *Stipa tenuissima* Trin., are then easy to identify.

*S. tenuissima* Trin., which is closely related to nassella tussock, has also been proclaimed a weed in South Africa.

## ORIGIN AND DISTRIBUTION

Nassella tussock is of South American origin, where it occurs mainly on the damp pampas of Argentina and Uruguay between latitudes 30° and 40°S.

Apart from South Africa, nassella tussock also assumes pest proportions in Australia, New Zealand and Italy.

It is suspected that nassella tussock entered South Africa during the Anglo-Boer War (1899-1902) with hay imported from Argentina. Port Elizabeth and East London were two of the distribution points of the hay.

According to a survey made in 1985, the total area then infested with nassella tussock came to 70 000 ha. Of this about 4 700 ha was moderately infested and 4 500 ha heavily infested. The incidence of this weed is restricted to the eastern Cape, Karoo and Winter Rainfall Regions. Infestations occur in the Swellendam, Cape Town, Somerset East, Cathcart, Graaff-Reinet, Pearston, Bedford, Happy Valley, Sterkstroom, Barkly East, Molteno, Stutterheim, Queenstown, Dordrecht and Thomas River districts. There is, however, also a danger of infestation down-wind from the existing infestations near Barkly East and Boesmanshoek, and the Amatola and Winterberg Mountains. Altogether 36% of the total area of South Africa - 44 million ha,

which constitutes the greater portion of the eastern and southern highlands - has climatic conditions and vegetation that make it suitable for infestation by nassella tussock. If it is not controlled, it could infest an area of 2 million ha in South Africa within the next 40 years.

Although nassella tussock prefers high-rainfall areas and rarely occurs in areas with an average rainfall below 500 mm, it grows easily in a wide range of climatic conditions, soil types and topographical situations. It can tolerate extreme conditions, e.g. floods, drought, exposure to salt spray and repeated, heavy frost.

Nassella tussock first invades damp areas, and areas where the natural veld cover has been disturbed, e.g. by over-grazing.

## PROPAGATION

Nassella tussock is exceptionally prolific - a single tussock produces as many as 100 000 seeds a year. These seeds could remain viable for at least 15 (possibly 20) years.

Consequently a tremendous seed bank builds up in the soil under the nassella plants. In heavily infested areas 1 200 million or more seeds per hectare have been found, which implies that 15 years after the weed has been eradicated new nassella plants can still emerge.

The most important methods of seed distribution are by wind, animals, man and water. The mature seed heads break off and can easily be blown 30 km or more by the wind so that even remote mountain tops can become infested. The seeds adhere to the wool or hair of game or livestock and to clothing and are carried to uninfested areas in this way. The dung of animals that have grazed in infested areas could still contain viable nassella seeds days later. Seeds can also be dispersed by clinging to mud or vehicles, agricultural implements or sheep skins, be carried away by flood-water or transported with soil.

## DANGERS

Because of its vigour and the large number of seeds formed, nassella tussock spreads in any disturbed area, e.g. old lands, veld in a poor condition, burnt veld or areas where other invader plants have been eradicated. It forms dense stands that oust the natural grasses, and also contaminates agronomic crops and cultivated pastures.

Because nassella tussock is very unpalatable, animals will not readily graze it. It therefore multiplies at the expense of the more palatable grasses, thereby reducing the carrying capacity of the veld. If animals are compelled to eat nassella, they soon lose condition because of the low nutritional value of the tussock and its high fibre content. The compressed fibres often obstruct the alimentary canal of the animals and could even cause their death. The awned seeds irritate the skin of lambs and the seeds drastically reduce wool quality.

## LEGISLATION

Under the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983), nassella tussock is a proclaimed weed. It may therefore not be distributed or be permitted to be distributed by anyone. No nassella tussock may occur on farms in Natal, the Transvaal and the OFS, and where it does occur on farm units in the Cape, it must be effectively controlled.

## CONTROL

Three herbicides are registered for the control of nassella tussock, namely glyphosate which is applied at 4 l/ha in winter, proprop at 15 kg/ha and tetrapion at 2 l/ha. The latter two chemicals must be applied when the plants are growing actively. It has also been established that even at 1 l/ha tetrapion gives effective nassella control.

Of the three herbicides mentioned, tetrapion gives the best control. Although it takes about 15 months to kill the plants completely, it has the advantage that the germination and establishment of nassella seedlings are delayed for a considerable time. Light infestations can be controlled by hoeing them out.

When the mature plants are destroyed by spraying or burning, ideal conditions are created for germination and the establishment of pure stands of nassella tussock, because of the considerable seedbank. The presence of strongly competitive plant species does, however, drastically reduce the germination and establishment of nassella seedlings. That is why the re-establishment and recovery of natural grazing in sprayed areas are as important as the spraying itself.

To damage as few as possible of the usable

natural grass species, the concentration of herbicide applied must not exceed the recommended dosage. When tetrapion is applied at 1 l/ha, it effectively controls nassella tussock while not harming the natural grass species that can out the nassella seedlings.

Where dense infestations are sprayed it is desirable to over-sow a vigorous pasture crop to ensure a good vegetal cover for suppressing the nassella seedlings. Establishment of these pasture crops can be promoted by burning the sprayed areas and, where possible, the land can also be ploughed. Burning could destroy as much as 18% of the nassella seed and, by ploughing, the seed is buried so deeply that few seedlings will emerge.

Pasture grasses that have so far performed well in over-seeding trials include *Dactylis glomerata* (cocksfoot), *Phalaris aquatica* (phalaris grass), *Lolium multiflorum* (Italian ryegrass), *Lolium perenne* x *L. multiflorum* (short-rotation ryegrass, e.g. Ariki), *Agrostis tenuis* and *Festuca arundinacea* (tall fescue).

Nitrogen fertilisation of these grasses will enhance their competitive abilities against nassella. Overseeding with suitable legume pasture crops would be ideal, since they do not require nitrogen fertilisation, but do improve the quality of the grazing. Promising results have already been obtained with *Vicia villosa* (hairy vetch), *V. dasycarpa* (woolly pod vetch) and *Trifolium pratense* (red clover). However, much research remains to be done about the effective over-seeding of nassella-infested veld in different areas.

Farmers whose land is still free from nassella tussock must take strict precautions to prevent the weed from entering their farms with livestock or fodder from infested areas. The farm must be regularly inspected for possible infestation and immediate action must be taken to eradicate single tussocks before they can produce seed.