

VEGETABLE MATTER in AUSTRALIAN WOOL



This page is intentionally blank

VEGETABLE MATTER in AUSTRALIAN WOOL

Compiled and Published by



“© **1986 AUSTRALIAN WOOL TESTING AUTHORITY LTD**, Incorporated in Victoria. All rights reserved. No part of this publication covered by copyright may be stored in a retrieval system, reproduced in any form including electronic, graphic, mechanical, photocopying, recording or otherwise, or transmitted, without the prior written permission of the publisher.”

ISBN 0 9588477 0 3

FOREWORD

To maintain its position in the world textile fibre market, wool is increasingly required to be specified in more objective terms. Processing machinery is more automated and runs faster than ever before. Hence, tighter tolerances for fineness, length and vegetable fault are necessarily being specified to ensure efficient production.

AWTA Ltd has been and remains a major contributor in this area, assisting in the development of sampling and testing techniques and Standards, and in providing impartial objective measurements for the Australian and international wool industries.

This booklet, produced by AWTA Ltd, provides a useful reference for the identification of the major Vegetable Matter Types which occur in Australian wool. The need for correct identification and standard nomenclature descriptions of vegetable matter is important and becomes even more so if the industry is to move to a system of selling based on measurement and standardised descriptions alone.

AWTA Ltd is to be commended for its initiative in producing this booklet, which will improve communication efficiency. I recommend its use by all sectors of the wool trade, as a standardising and educational reference.

Michael R. Lempriere
President
Australian Council of Wool Exporters

This page is intentionally blank

FOREWORD		iii
INTRODUCTION		
Identifying VM Types		1
Naming VM Types		2
VM Type Categories		2
DESCRIPTIONS		
Type Category B		
Burr Medic	<i>(Medicago denticulata)</i>	7
Small Burr Medic	<i>(Medicago minima)</i>	9
Cutleaf Medic	<i>(Medicago laciniata)</i>	11
Barrel Medic	<i>(Medicago truncatula)</i>	13
Subterranean Clover	<i>(Trifolium subterraneum)</i>	15
Type Category S		
Wire Grass	<i>(Aristida spp)</i>	19
Spear Grass	<i>(Stipa spp)</i>	21
Storksbill	<i>(Erodium spp)</i>	23
Barley Grass	<i>(Hordeum leporinum)</i>	25
Wild Oat	<i>(Avena spp)</i>	27
Carrot Seed	<i>(Tragus australianus)</i>	29
Bogan Flea	<i>(Calotis hispidula)</i>	31
Spiny Burr Grass	<i>(Cenchrus pauciflorus)</i>	33
Dock	<i>(Rumex spp)</i>	35
Saffron Thistle	<i>(Carthamus lanatus)</i>	37
Type Category H		
Bathurst Burr	<i>(Xanthium spinosum)</i>	41
Noogoora Burr	<i>(Xanthium chinense)</i>	43
Galvanised Burr	<i>(Bassia birchii)</i>	45
Caltrop	<i>(Tribulus spp)</i>	47
Ring Burr	<i>(Sida platycalyx)</i>	49
GLOSSARY		50

This page is intentionally blank

INTRODUCTION

Without doubt, vegetable matter (VM) is one of the most important wool contaminants encountered by buyers and processors of Australian wool. At a conservative estimate, the Australian wool clip each season contained some 10 million kilograms of VM. While many VM Types can be readily removed by machinery during processing, the overall world wide cost of obtaining clean wool fibre products is so large that processors must continue to investigate all technological techniques having potential for improved efficiency in VM removal.

Both the amount present and Type of VM contribute significantly to the price that will be paid for raw wool. The amount of VM directly influences the Clean Fibre Yield which can be obtained after processing the greasy wool, whilst the amount and Type of VM affect the method, speed and cost of processing.

In addition, the classification of a sale lot in terms of a standard Wool Type, and the description of that Wool Type, partly depend on the visual assessment of the VM species present, at least in the general terms of seed, shive and burr.

The quantity and Type of VM found in wool generally reflect the seasonal growing conditions, the district where the wool is grown and the farm management practices. Some Types of VM are confined to limited geographical areas, whereas others are distributed across Australia and are also found in other wool growing countries. The high rainfall, cropping and pastoral areas cover a diversity of pasture management and stocking rates, which can also affect VM species. Time of shearing also impacts on the VM content of the wool.

IDENTIFYING VM TYPES

The obvious difficulty in correctly identifying VM Types in wool is due to the fact that only a small part of the plant (usually a burr (seed-pod), a seed, a leaf, part of the stalk from a small plant, or a twig from a tree), normally attaches itself to the sheep. Standard botanical descriptions, whilst sometimes helpful, are not always appropriate for practical purposes.

In many cases, it is very difficult to identify a particular piece of VM, because of the many similar types and the variations within those same types reflecting different stages of maturity. In compiling this booklet, it has not been possible to include every VM Type found in wool, simply due to the large number of different types that occur throughout Australia. Nor would it have been desirable in such a guide, since the booklet would have lost much of its practical value, if it was cluttered up with the numerous rarer species which are encountered. The 20 VM Types illustrated herein represent the most common types of vegetable matter contaminating Australian wool.

NAMING VM TYPES

With increasing awareness among wool buyers and processors of the importance of VM Type, and with an industry gradually moving towards more specification, it becomes important to standardise a set of descriptive names for the main VM Types. A suggested common name is given for each Type included in this booklet, in addition to its standardised botanical name. For clarity, the botanical names have been simplified where possible. Only the group name (or genus) is given for those Types where similarity between species within the group makes it impossible to distinguish them during visual wool inspection. In most cases, such differences are irrelevant with respect to the problems of contamination.

Of course, there are cases where the differences between species are important from a processing point of view. For example, although Bathurst Burr and Noogoora Burr are both members of the same *Xanthium* genus, Bathurst Burr is easily removed during processing whereas Noogoora Burr presents some difficulties.

Where the VM Type has several common names, most of these are listed. The fact that different VM Types are sometimes given the same common name highlights the industry's need for a standard set of descriptive names.

It is hoped that this simplification will encourage the wool industry to become more familiar with the botanical names. Even though it may be easier to use the suggested common names in everyday circumstances, the botanical names have universal application and their use is desirable to avoid any confusion arising.

VM TYPE CATEGORIES

For some time now, the industry has recognised the importance of 3 broad categories of VM Type. These categories, coded simply B, S and H, are defined as follows:

B - clover & medic burrs;

S - seed material, shive, grasses & thistles; and

H - Hard Heads (bean burrs), sticks & twigs.

In predicting a combing Yield from raw wool measurements, high levels of VM from categories B and S can increase Yield loss significantly, since their removal causes fibre loss during processing. Category H vegetable matter does not have this effect, since the Types in this category involve less fibre entanglement. However, it is important to recognise that these 3 category definitions were not selected for their relative importance in processing, but rather because identification of these categories is an essential part of the International Wool Textile Organisation (IWTO) core test Yield procedure.

During the test procedure, the VM is separated from the wool by placing the scoured core sample in boiling 10% sodium hydroxide (a strong alkali), and dissolving it for 3 minutes. The insoluble residues, which comprise both VM and other alkali-insolubles, such as dag and skin pieces, are collected, dried and weighed. A side-effect of the controlled dissolving process is that small quantities of the VM itself also dissolve, because plant material is not completely resistant to alkali. However, sorting the dried residue enables the proportions of each category to be determined by weighing, so that the relevant standard recovery factors (to account for each of the portions dissolved) can be applied. These factors reflect the different effects of 10% sodium hydroxide on each of the 3 categories. For example, Hard Heads (Bathurst and Noogoora Burrs) are scarcely damaged by alkali, whereas grass material is severely attacked in the dissolving process.

In Australia, the use of this data has been extended to specifying the proportion of each category in sale lots. Information, for “Appraisal Purpose Only”, is provided by AWTALtd on all presale IWTO Test Certificates, from where it is transferred into sale catalogues as B/S/H.

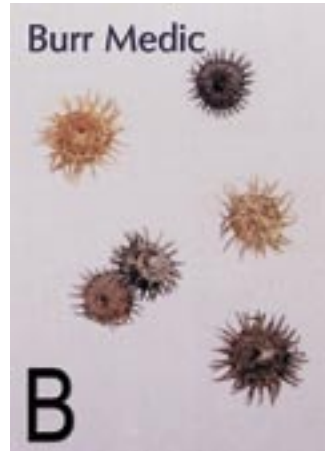
The VM Types described in this booklet include their specification as either B, S or H, as appropriate.

This page is intentionally blank

VM TYPE CATEGORY B

- clover and medic burrs





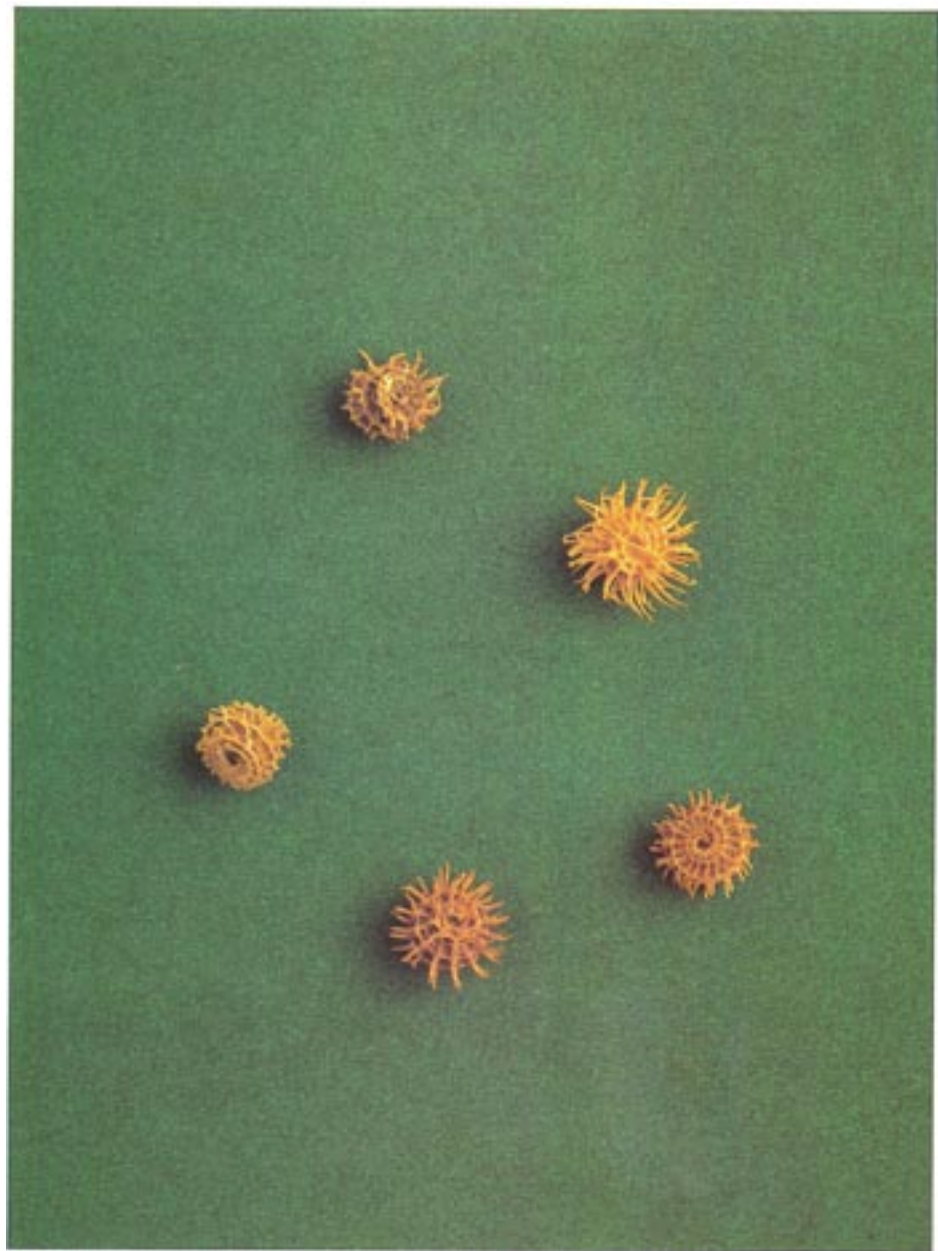
Burr Medic
(*Medicago denticulata*)

Type Category B

Also known as Trefoil, Spiral Burr or Clover Burr

The Burr Medic is a flat, round seed pod. It is typically about 4mm across but may be as small as 2mm or as large as 8mm. The pod consists of 2 to 3 spined coils, which enclose several light brown kidney shaped seeds.

Burr Medic is very common in Australian wools and is one of the most troublesome types to processors. Not only do its protruding spines catch in the wool, making them difficult to remove, but also, if broken up during carding, its coils tend to unwind into thin 'eyebrow' shaped pieces which are even more difficult to remove and can persist into the finished product.



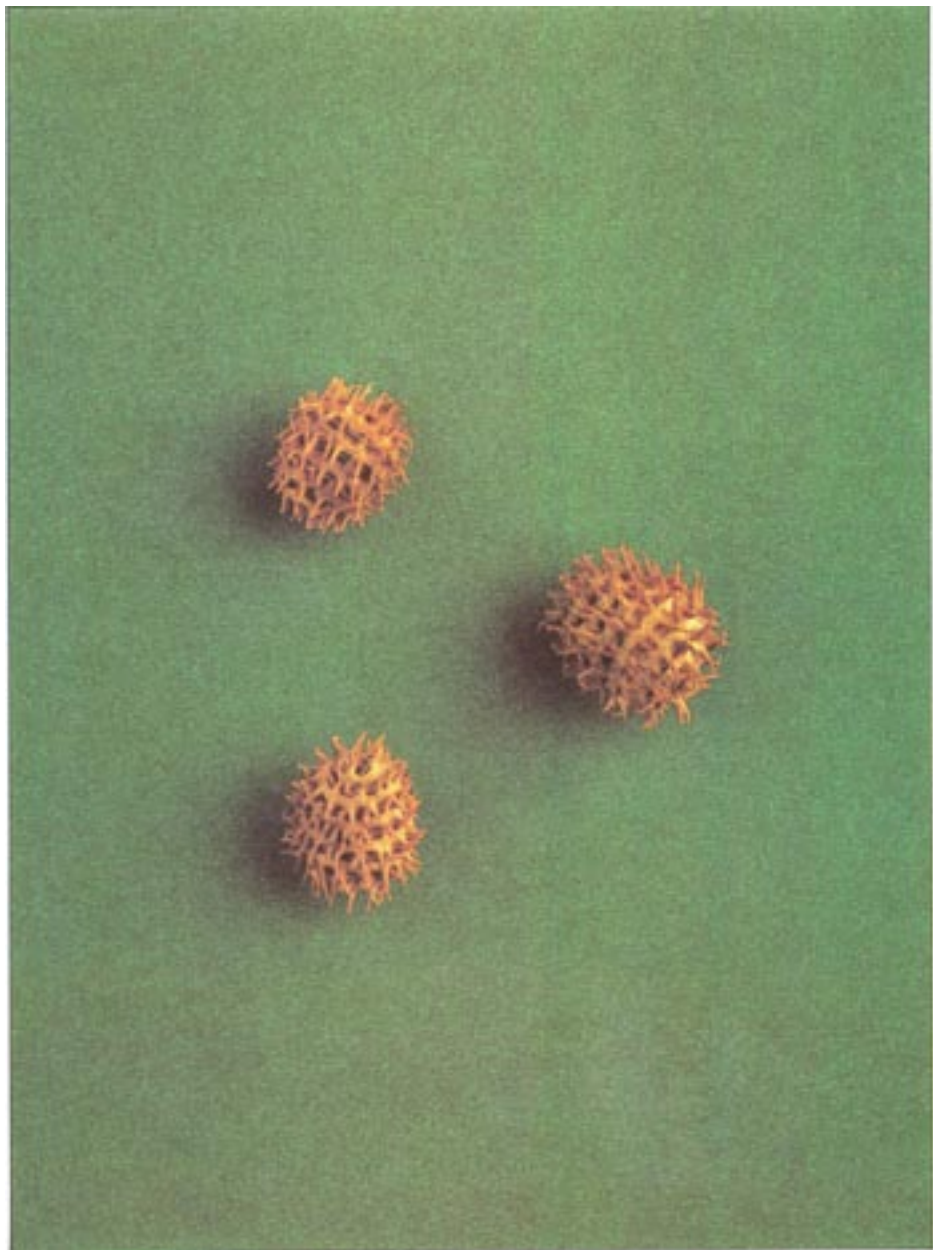
Small Burr Medic
(*Medicago minima*)

Type Category B

Also known as Woolly Burr, Trefoil or Clover Burr

The Small Burr Medic is similar in appearance to the more common Burr Medic, although it can be distinguished by its tighter coils and thinner spines. The thin spines break off easily, but when present they give the burr a hairy, or woolly, appearance.





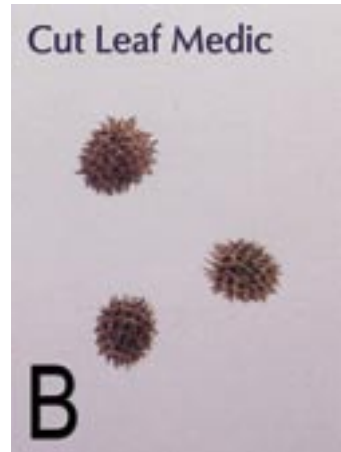
Cutleaf Medic
(*Medicago laciniata*)

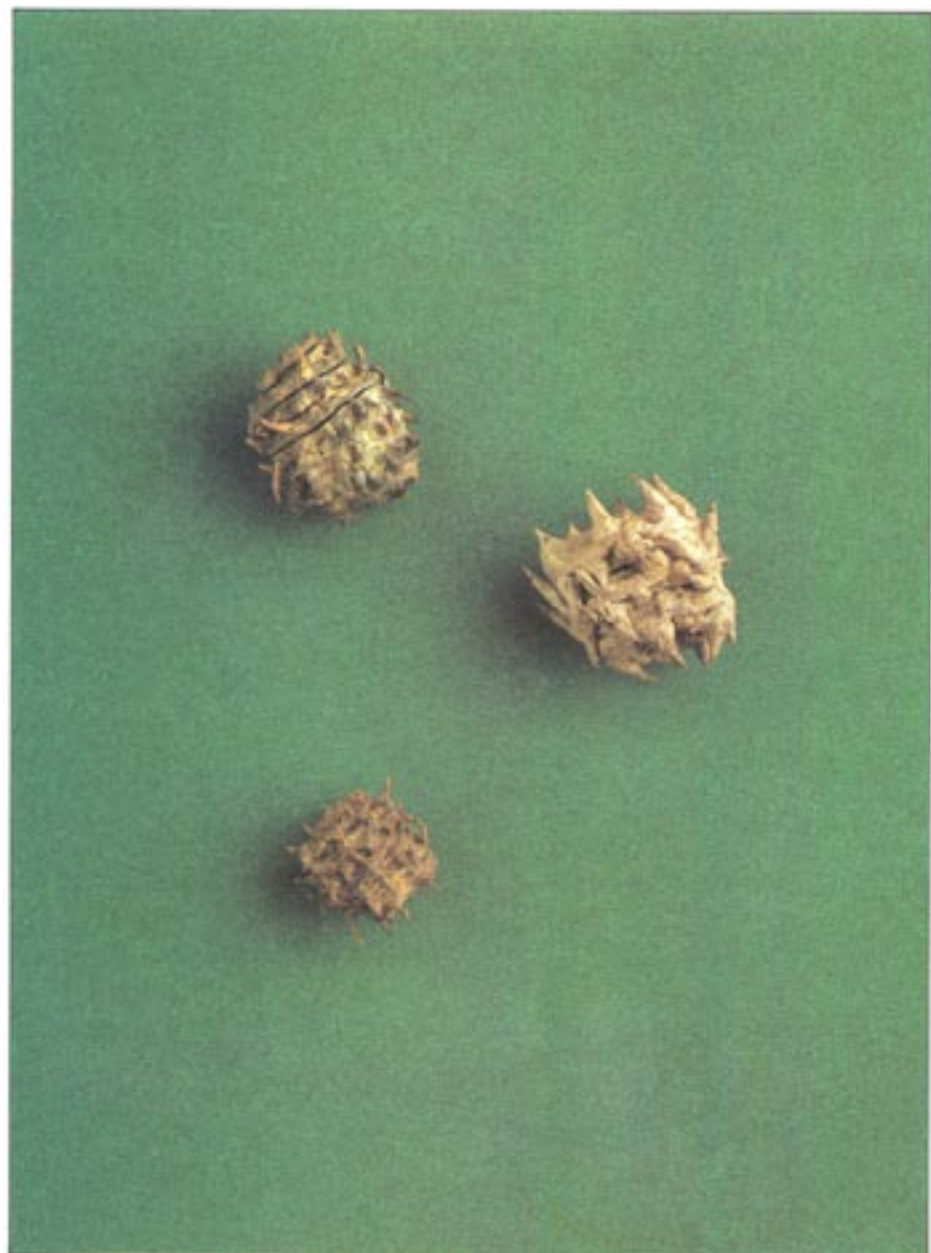
Type Category B

Also known as Barrel Medic, Clover Burr or Toothed Medic

The Cutleaf Medic is barrel shaped with 5 or 6 spined coils. The spines are shorter and stiffer than those of the more common Burr Medic.

Due to natural variations within Types it is often difficult to distinguish between Cutleaf Medic and Burr Medic in wool. The name is derived from the plant (not the burr), as the plant has serrated leaves.





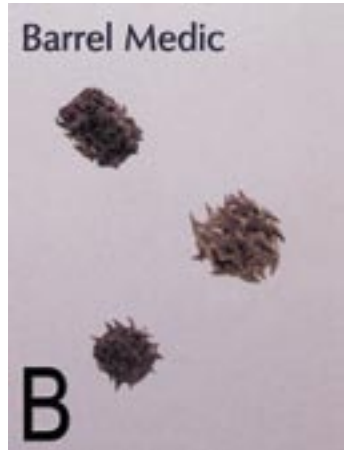
Barrel Medic
(*Medicago truncatula*)

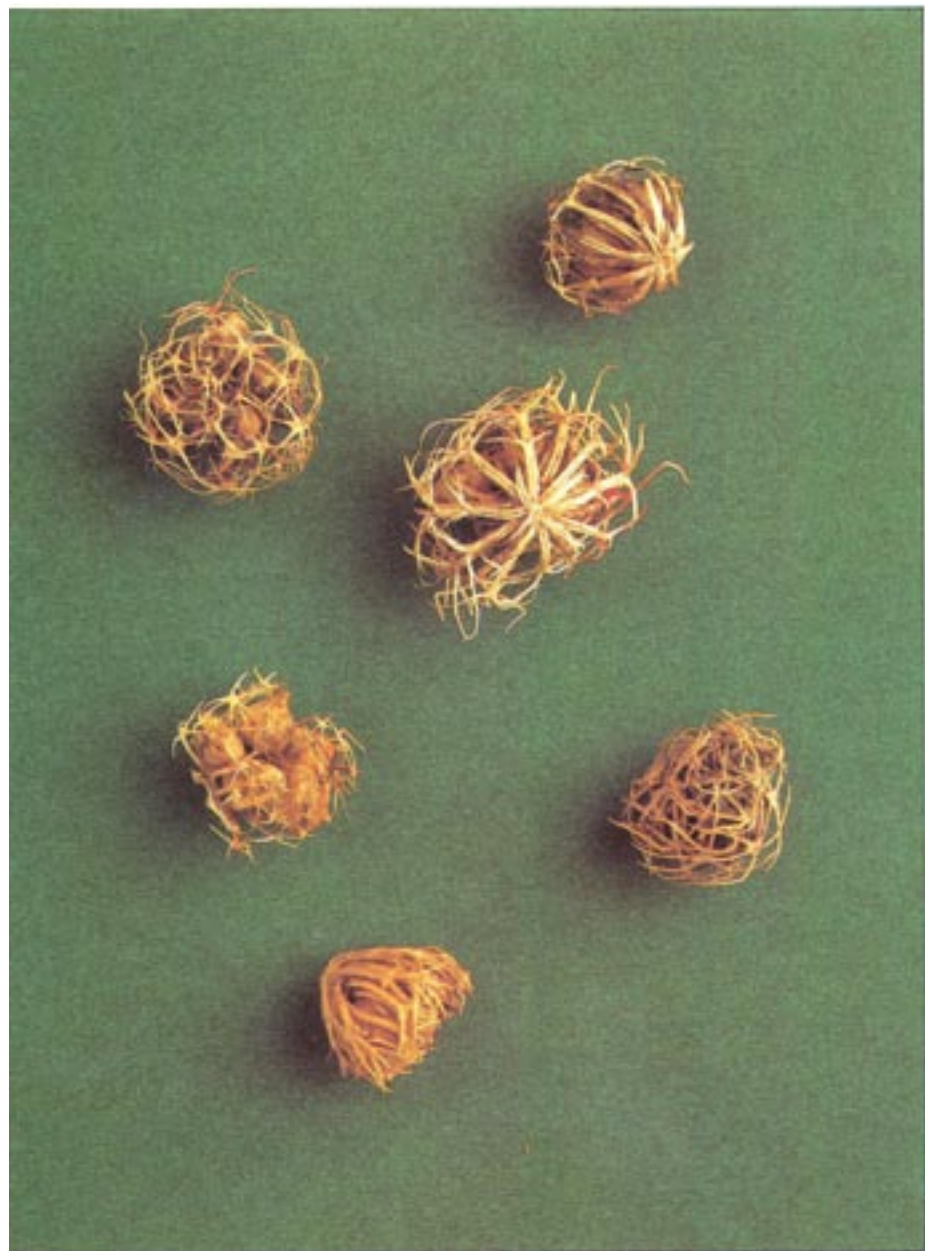
Type Category B

Also known as Clover Burr or Barrel Clover

Barrel Medic is barrel shaped with 4 to 6 spined coils. The spines are thick and lie flat against the coils.

This burr is easily distinguished from Burr Medic and Cutleaf Medic by its hard, woody appearance.





Subterranean Clover **(*Trifolium subterraneum*)**

Type Category B

Also known as Sub-Clover, Basket Burr or Barrel Burr

Subterranean Clover has a small spherical seed pod. It is typically about 4mm in diameter, but may be as small as 2mm or as large as 8mm. The pod holds up to 5 smooth black seeds and is usually found intact.

Although Subterranean Clover is classified as Burr for testing purposes, its processing characteristics are not like those of the other Burr types. It tends to remain loose in the wool and is easily removed by carding. If damaged during processing, it breaks up into short pieces rather than unwinding into long 'eyebrows' like other Clover Burr and Medic types.

The plant originated in Mediterranean countries and, because it provides a high protein feed and raises the fertility of the soil, it has been important in improving the quality of Australian pastures.



This page is intentionally blank

VM TYPE CATEGORY S

- seed material, shive, grasses and thistles



Wire Grass (*Aristida spp*)

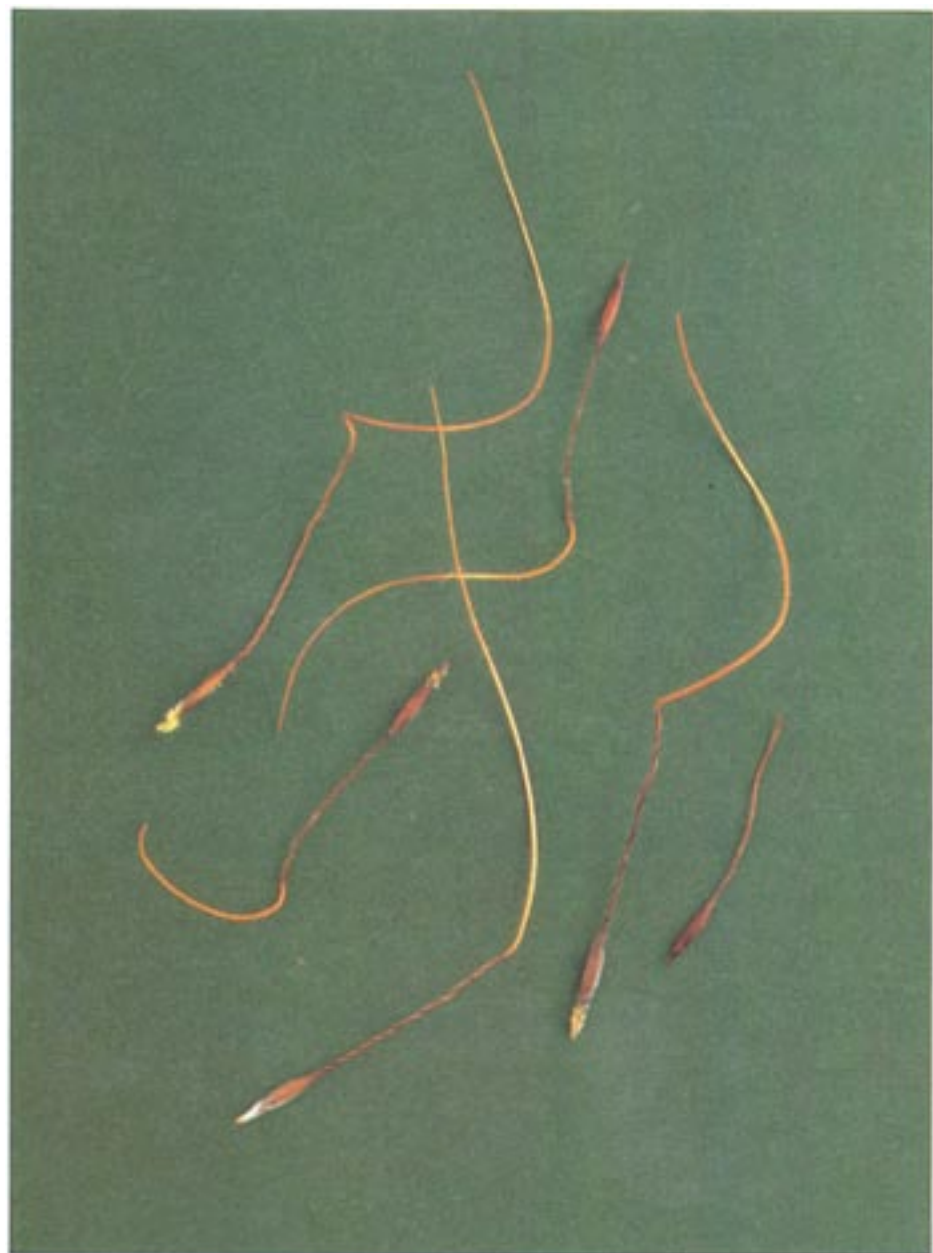
Type Category S

Also known as Shive, Spear Grass or Feathertop Wire Grass

Wire Grass is a long, thin grass seed. The head has a narrow groove and very fine barbs at the tip. It can be identified by its 3 awns, which no other major type has. The awns may be twisted into a long column rather than being separate as in the examples shown here.

Wire Grass is one of the most troublesome VM Types to processors. Its long, slender awns easily break off and, because of their fineness, are very difficult to remove during processing.







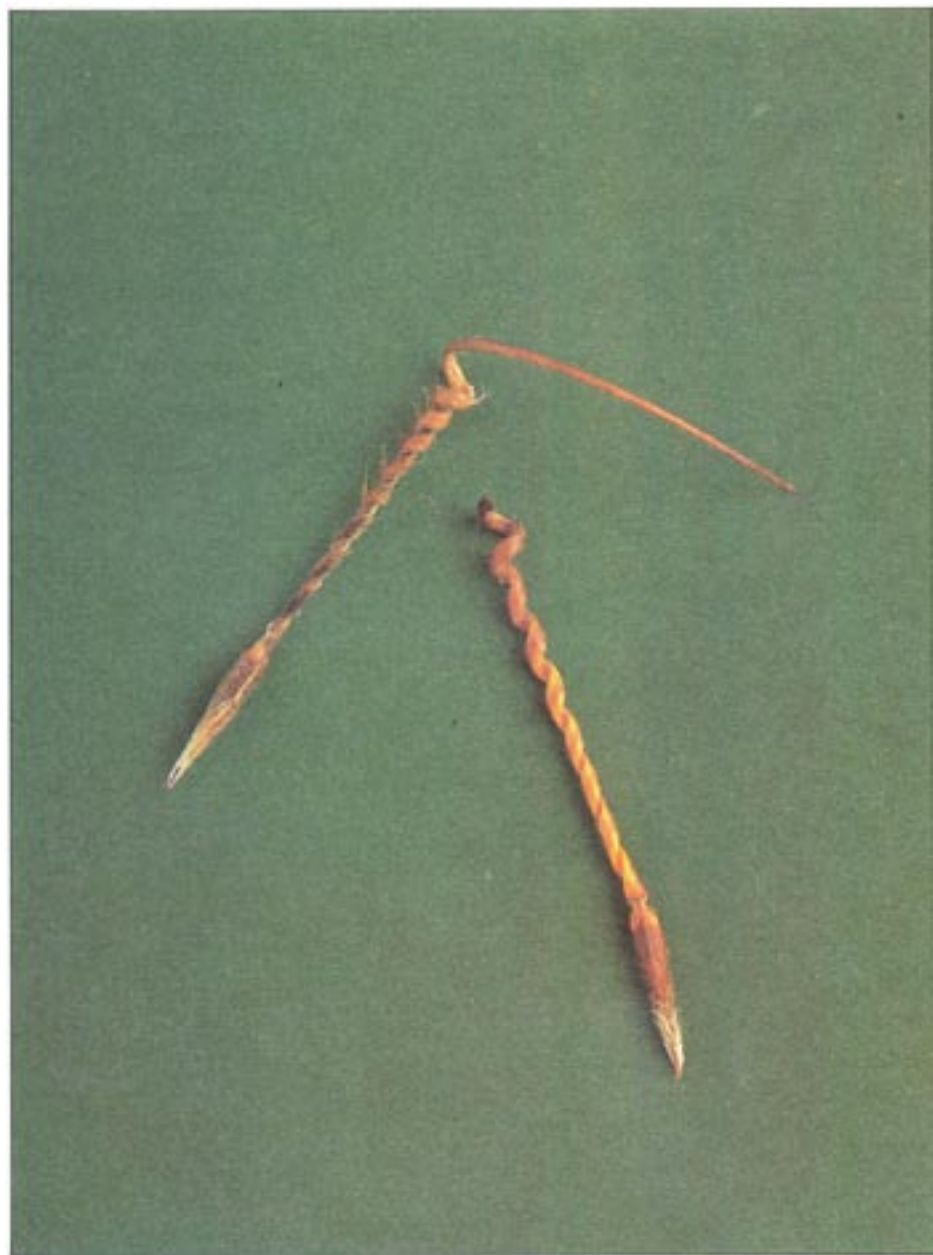
Spear Grass **(*Stipa spp*)**

Type Category S

Also known as Corkscrew Grass, Shive or Plains Grass

Spear Grass is a long, thin grass seed. The head is covered with fine hairs and has fine barbs at the tip. It has a single awn, which is usually twisted for part of its length. The corkscrew effect enables this grass seed to penetrate deep into the fleece.

Because of its similarity, Spear Grass causes the same types of problems during processing as does Wire Grass.



Storksbill
(*Erodium spp*)

Type Category S

Also known as Crowfoot, Wild Geranium or Corkscrew

Storksbill is a long, thin grass seed. Similar in appearance to Spear Grass, it has a covering of fine hairs and a single twisted awn. However, it is easily distinguished by its overall larger size and, in particular, its thicker awn.

Because Storksbill is generally thicker and stronger than Wire Grass and Spear Grass, it is more readily removed during processing.





Barley Grass
(*Hordeum leporinum*)

Type Category S

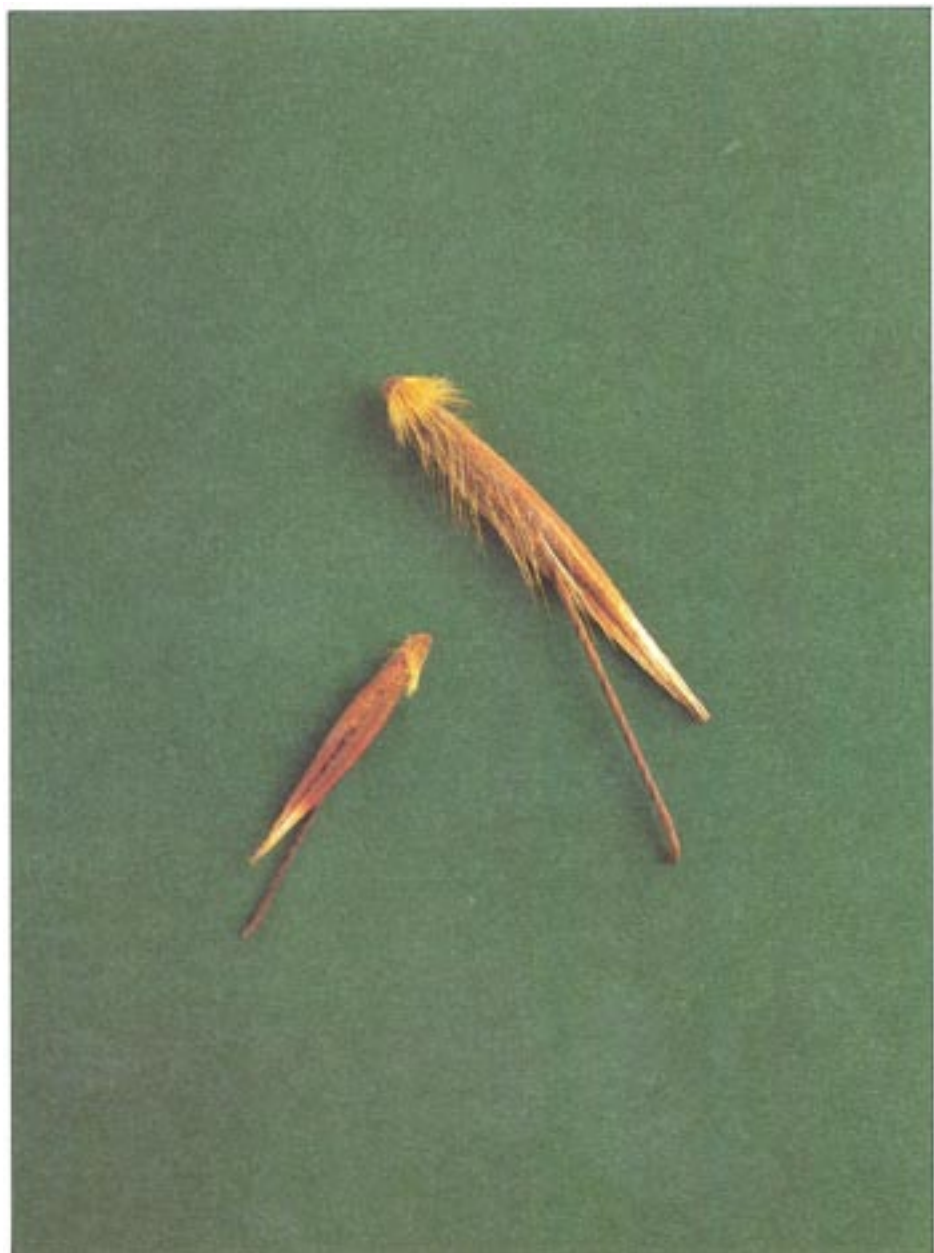
Also known as Oats or Shive

Barley Grass consists of 3 similar spikelets joined at a spoon shaped tip. Each spikelet has 3 long, slender bristles that often break at some point along their length.

Barley Grass is one of the most common VM Types in Australian wool and is also one of the most troublesome to processors.

This seed penetrates deep into the fleece and sometimes through the skin, causing injury to the sheep.





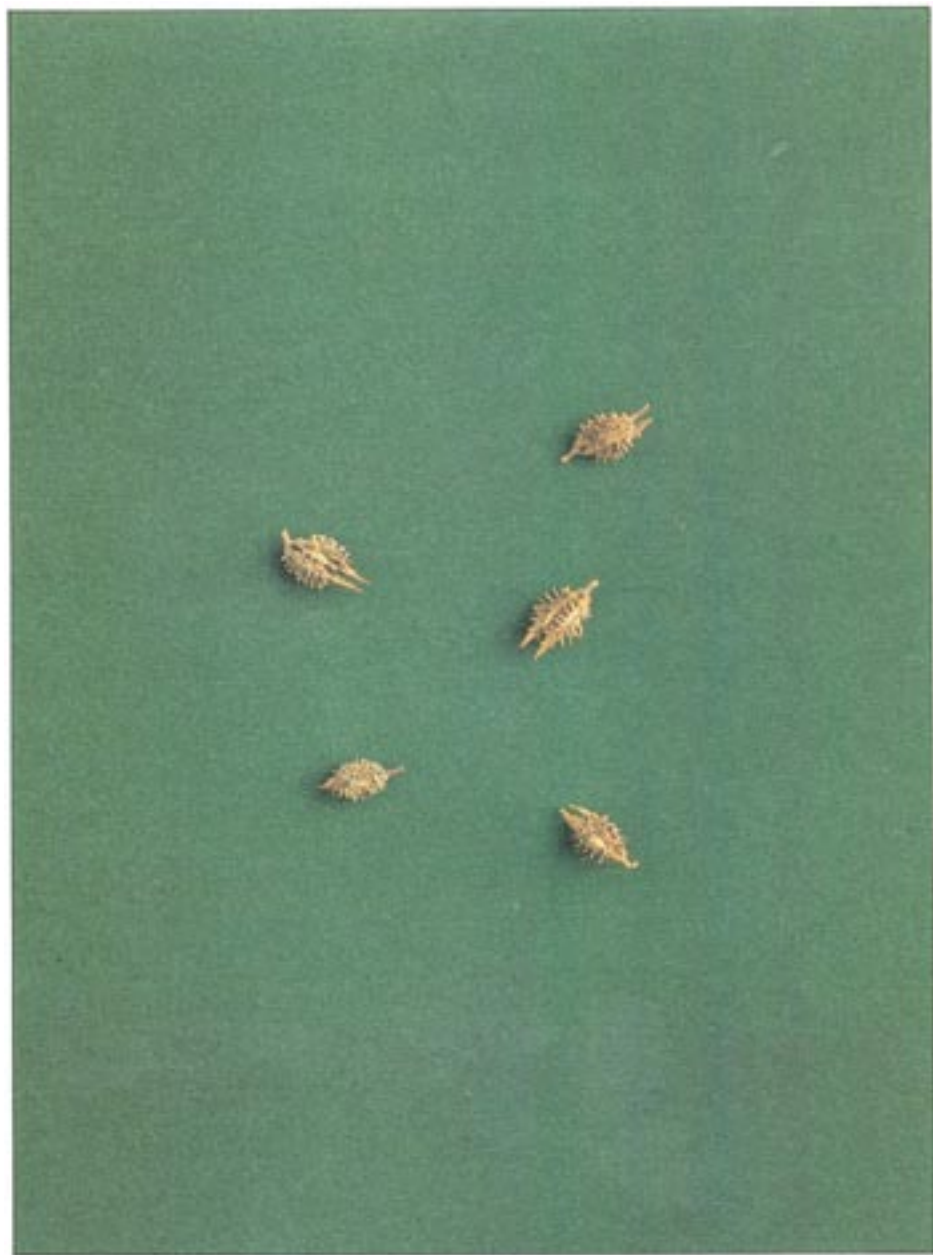
Wild Oat
(*Avena spp*)

Type Category S

Also known as Black Oat or Shive

Wild Oat is a hard, thick grass seed. It is covered with fine hairs and has a twisted awn protruding at an angle from its centre. The hairs and awn break off easily leaving a smooth seed.





Carrot Seed
(*Tragus australianus*)

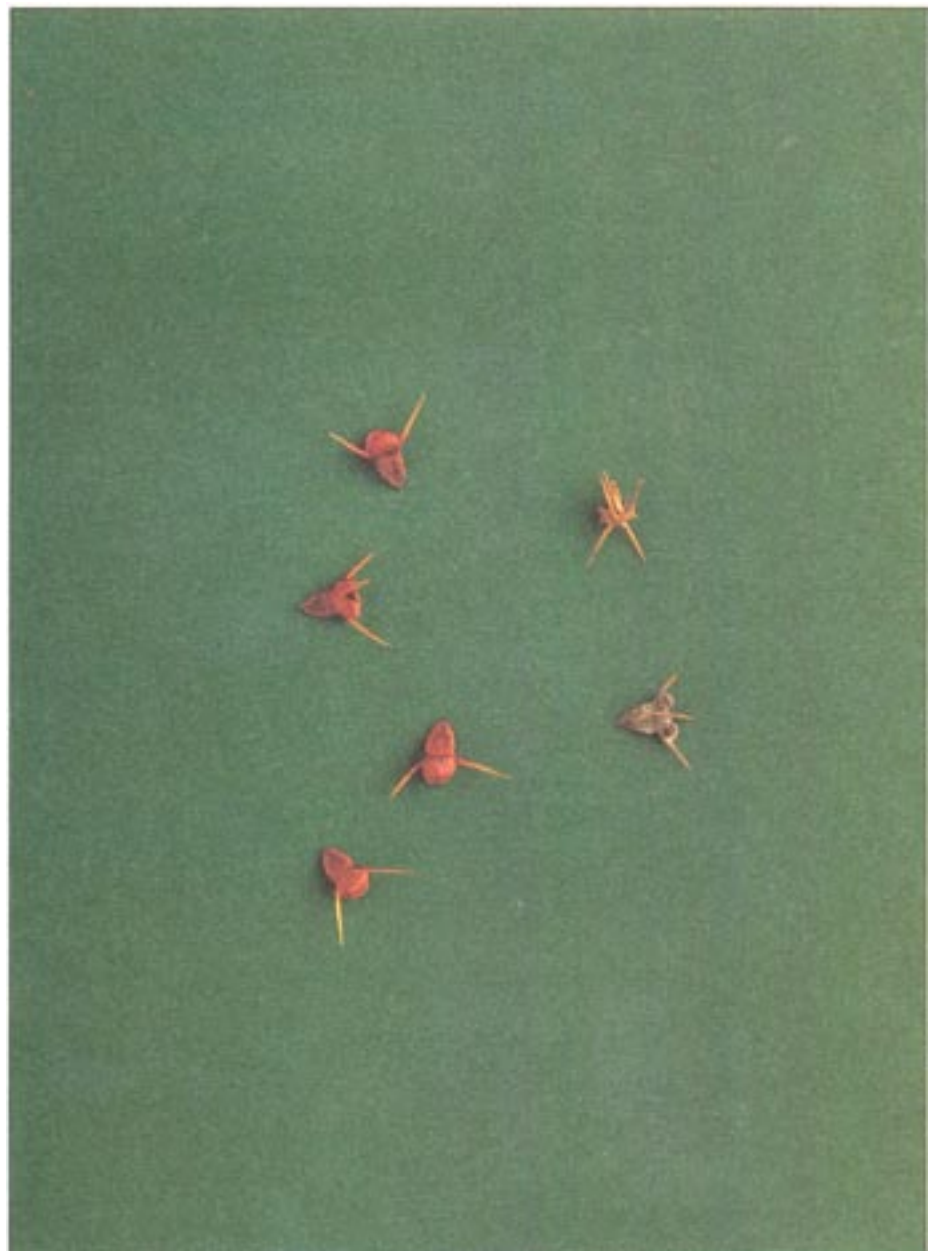
Type Category S

Also known as Small Burr Grass or Marthaguy Burr

Carrot Seed is a small grass seed. It is divided into 2 parts which are pointed at the tip. Each part is covered with short, thick spines.

Because of its spines, Carrot Seed is difficult to remove during processing. In large numbers, it tends to form a mat of seed in the tips of the wool.





Bogan Flea
(*Calotis hispidula*)

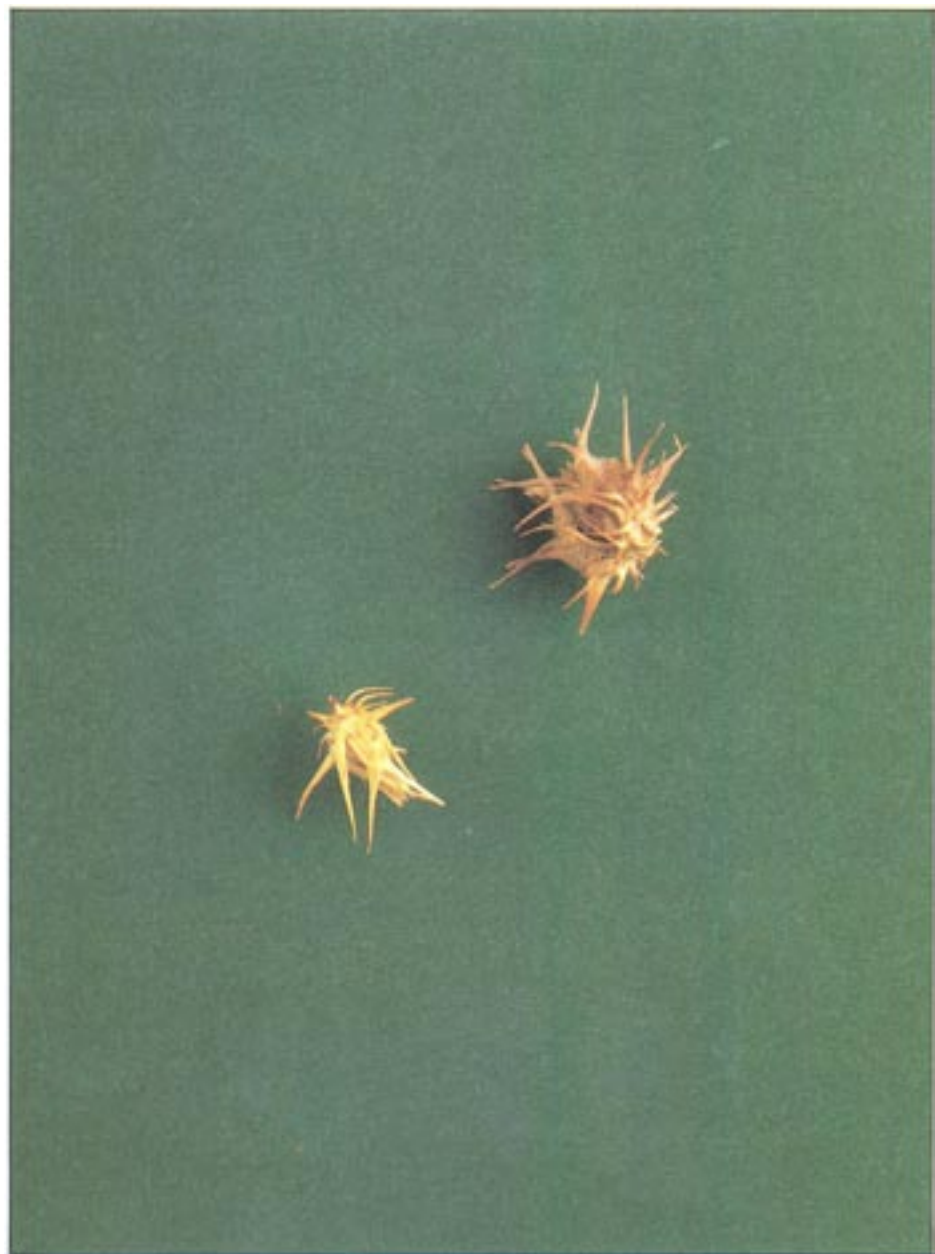
Type Category S

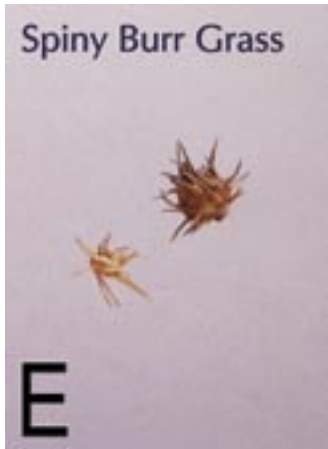
Also known as New England Crusher or Marthaguy Burr

Bogan Flea is a small flea shaped seed. It has a woody appearance with several spreading awns.

Bogan Flea initially forms as a spherical cluster of many seeds, about 5mm in diameter. Once on the sheep the cluster usually breaks up causing dense matting of the wool.





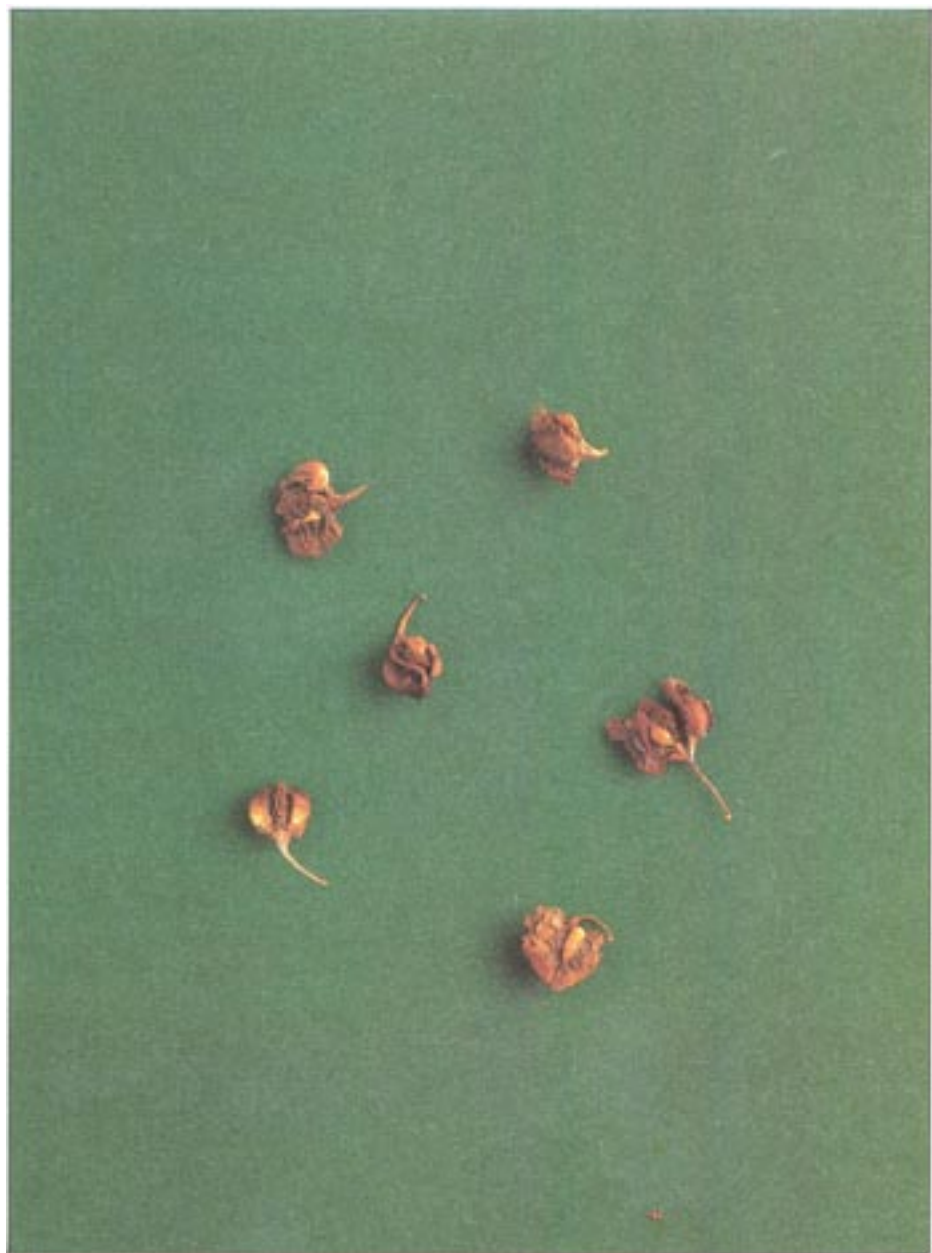


Spiny Burr Grass
(*Cenchrus pauciflorus*)

Type Category S

Spiny Burr Grass is a small seed pod. It consists of 2 outer sections which are covered with long, stiff spines and are joined at the base to partly enclose a third central section. Each section contains one small seed.

Spiny Burr Grass is a less common type and does not cause problems during processing.



Dock
(*Rumex spp*)

Type Category S

Also known as Clustered Dock, Swamp Dock, Red Dock or Sorrel

Dock is a small seed which forms in clusters. The individual seeds break off and catch in the wool, often with their short stems remaining attached.

Dock is easily removed from wool during processing.





Saffron Thistle
(*Carthamus lanatus*)

Type Category S

Also known as Thistle

Saffron Thistle has a small, hard seed. It can be recognised by its flat, spreading bristles which are usually found intact. In wool, the seeds are often associated with the sharp spiked leaves which surround the seed pod. It is common in wheat growing areas.

Saffron Thistle is easily removed from wool during processing.



This page is intentionally blank

VM TYPE CATEGORY H

- Hard Heads (bean burrs), sticks and twigs





Bathurst Burr **(*Xanthium spinosum*)**

Type Category H

Also known as Beans or Cockle Burr

Bathurst Burr is a hard, bean shaped seed casing. It is covered with numerous hooked spines, which are slender and break off easily once the burr is dry. The burr holds 2 long seeds.

The hooked spines strongly attach the Bathurst Burr to wool. However, the burr is easily removed during processing because the spines break off. In many cases, these burrs float off in the scouring process.



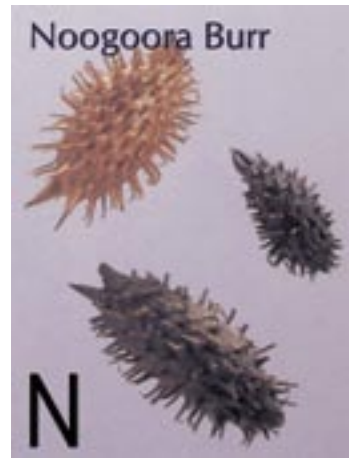
Noogoora Burr (*Xanthium chinense*)

Type Category H

Also known as Nog or Noogs

Noogoora Burr has a hard, bean shaped seed casing. Similar to Bathurst Burr in appearance, although longer, it can be identified by the 2 enlarged spines at its tip. Overall, its spines are stronger and more difficult to break off.

Noogoora Burr causes problems in processing, due to its hardness and size rather than causing any fibre loss. In carbonising, it is difficult to crush because it does not readily absorb acid like other vegetable matter. In carding, it can catch in the card teeth, blocking and sometimes damaging them.



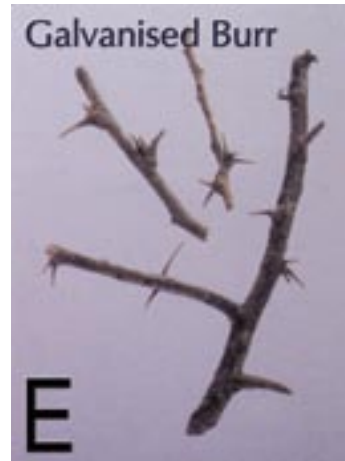


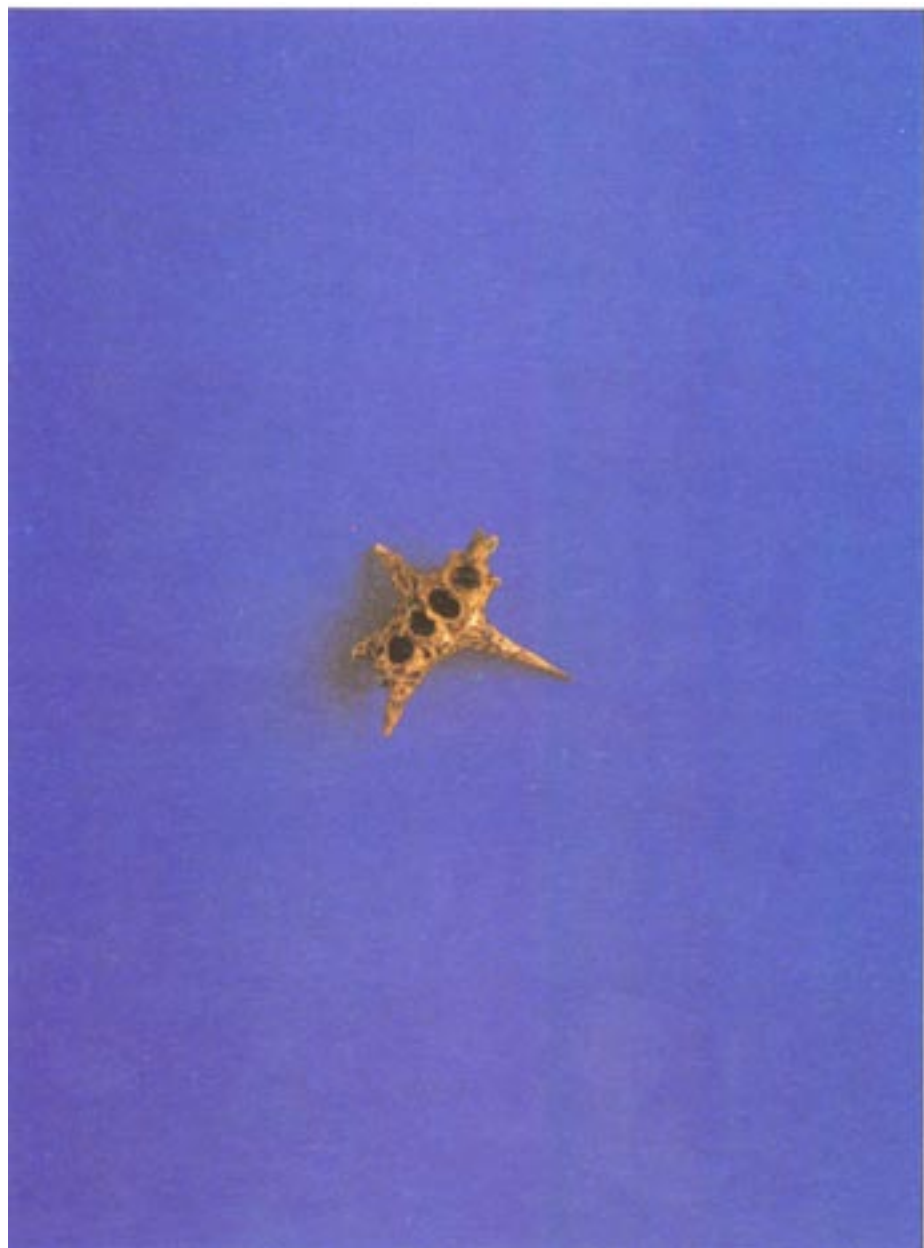
Galvanised Burr
(*Bassia birchii*)

Type Category H

Also known as Roly Poly, Bindy-eye or Stick

Galvanised Burr is a hardened plant stem with spines protruding in clusters at intervals along its length. The stem resembles a small stick or twig and, apart from the spines, has a smooth surface.





Caltrop
(*Tribulus spp*)

Type Category H

Also known as Bindi

Caltrop is a small, hard seed casing. It is divided into 5 sections and each section has a sharp spine. In the example shown here, 4 spines have been broken off.

There are many other small, hard types resembling Caltrop and it is often difficult to identify them with any degree of certainty. In general, these types cause no problems during processing.





Ring Burr
(*Sida platycalyx*)

Type Category H

Also known as Monkey's Ring or Lifesaver Burr

Ring Burr is a large distinctive seed pod. It consists of many hard, flat segments joined to form a continuous ring. Each segment has several stiff spines and contains one small kidney shaped seed.

Ring Burr is not a common type, being normally found in wool from certain areas of Queensland only. However, due to its hardness it causes problems similar to Noogoora Burr in carbonising.



GLOSSARY

Alkali

Chemical (10% sodium hydroxide in water) used in core testing to dissolve away the wool sample material in which VM is contained.

Alkali-insolubles

Material remaining after a sample of scoured wool has been placed in boiling alkali and dissolved for 3 minutes (includes VM, skin pieces, dermatitis, dag and insects).

B

VM Type Category for clover and medic burrs.

Carbonising

Industrial chemical process to remove VM from wool, using a weak sulphuric acid solution to alter the structure of the VM so that it can be crushed to a fine powder when dry, without damage to the wool.

Carding

Mechanical process used to remove VM from wool as it opens up staples into a web of fibres prior to combing.

Core Test

Measurement of Wool Base, VM Base and Mean Fibre Diameter, using representative core samples drawn from sale lots or deliveries of raw wool.

H

VM Type Category for Hard Heads, sticks and twigs.

S

VM Type Category for seeds, shive, grasses and thistles.

VM

Vegetable Matter.

VMB

Vegetable Matter Base. The weight of pure VM expressed as a percentage of the greasy wool weight.

Wool Base

The weight of wool fibre, free from all impurities, expressed as a percentage of the greasy wool weight.

This page is intentionally blank

To maintain its position in the world textile fibre market, wool is increasingly required to be specified in more objective terms. Processing machinery is more automated and runs faster than ever before. Hence, tighter tolerances for fineness, length and vegetable fault are necessarily being specified to ensure efficient production.

This booklet, produced by AWTa Ltd, provides a useful reference for the identification of the major Vegetable Matter Types which occur in Australian wool. The need for correct identification and standard nomenclature descriptions of vegetable matter is important and becomes even more so if the industry is to move to a system of selling based on measurement and standardised descriptions alone.

ISBN 0 9588477 0 3