



Pacific Seeds Oats Agronomy Guide 2006/07

CONTENTS

Soil Selection	2
Grazing Management	3
Yield and Forage Quality	4



PACIFIC SEEDS

Modern science - traditional values

OAT AGRONOMY

Soil selection

Oats is adapted to a wide range of soils and performance will be proportional to soil fertility and available moisture. Avoid shallow, hard setting soils and light soils which have a low water holding capacity. Oats are relatively tolerant of acid soil, being more tolerant than wheat or barley. Growth will be adversely affected when soil pH is below 5.3.

Soil salinity

Salinity, primarily caused by excess sodium chloride (NaCl or salt) in the soil, is a concern in many agricultural areas. Excessive soil salts can reduce the performance of oats.

By comparison oats is substantially less tolerant to salt than barley. However, oats is slightly more tolerant than sorghum. The reference text 'Oat Science and Technology' edited by Marshall and Sorrells (1992) quotes data indicating a 10% yield reduction when soil salinity reaches 5 dS/m. A 50% reduction in yield is likely when soil salinity reaches 8 -10 dS/m.

Sowing depth

Seed should be placed deep enough to give it adequate moisture, but in general should be shallower than 7.5cm (3 inches) particularly with small seeded varieties.

Row spacing

Winter cereals are traditionally sown on a narrow row spacing of 15cm (6 inches) or 23cm (9 inches) to promote ground cover and suppress weed growth. Some farmers and researchers are now questioning this tradition of relatively narrow rows and are trialling oats on wide row spacings.

In some trials a row spacing of 76cm (30 inches) has assisted in minimizing leaf rust on susceptible varieties. In areas where weeds are not a problem, or can be controlled, a wider spacing may be worth trying.

The advantages of wider rows are:-

- 1) Reduced trampling losses during grazing
- 2) A more open crop canopy that will be less favorable to rust development
- 3) Potential to reduce sowing rate

Sowing time

With the wide range of oat varieties available, it is possible to choose a variety suitable for sowing in the beginning of autumn. However, not all varieties can be sown this early and are suitable for sowing as late as early winter, although this may vary in Southern Australia. Avoid early sowings of leaf rust susceptible varieties and varieties sensitive to very warm soils.

Is soil temperature important?

Soil temperature at sowing time is important. If the soil is too warm, germination will be delayed and there may be a very poor plant establishment. Sensitivity to soil temperatures does vary between varieties but in general the ideal soil temperature for germination and establishment of oats is 15 - 25°C. Some varieties can be successfully sown into soil above 25°C, but it is important to find out and not just assume it will be right.

The photo below shows the result from a laboratory germination test using Barcoo. This test shows that sowing when the soil temperature is just a few degrees above the ideal range can severely reduce germination.

Soil temperature will vary during the day and for oats it is best to measure the maximum soil temperature. To establish the maximum, check soil temperature at mid to late afternoon.



This photo shows the result from a laboratory test, observing the effect of soil temperature on germination of Barcoo. The photo was taken six days after sowing. The cups were held at a constant temperature as follows
– Row 1 at 18°C; Row 2 at 20°C; Row 3 at 23°C; Row 4 at 25°C; Row 5 at 27°C; Row 6 at 30°C;
Row 7 at 33°C and Row 8 at 35°C.



Grazing management for oats

Grazing can commence as soon as plants are well anchored by their roots and less likely to be pulled out of the ground. After emergence, oats require some rain or irrigation to stimulate secondary root development. Using a starter fertiliser containing phosphorus will also assist root development and anchoring of plants.

Crops may be only 20 to 30cm tall but it is preferable to graze frequently rather than delay grazing.

How low can oats be grazed and still get regrowth?

This will vary with the variety, stage of the season, soil moisture and if plants have been grazed below the growing points. The growing points occur just above the highest node or joint on tillers. To promote crop regrowth, remove stock while plants still have most of their growing points.

On an individual plant there will normally be many tillers and the growing points will be at various heights above the ground. The oldest and largest tillers may have growing points quite high, compared to other tillers of a plant. In deciding how low to allow grazing it may be acceptable to graze below the growing point of older tillers, providing there is sufficient younger tillers whose growing points will remain intact. The photograph illustrates how to find where the growing points are. The growing point of each tiller will be above the highest node. Early in the season, the growing points may almost be at ground level and no nodes will be felt when tillers are checked by hand.

Use a spike type thermometer, placing the 'sensing' area of the thermometer at the anticipated sowing depth. Proceed with sowing when the maximum soil temperature, over a number of days, is within the acceptable range for the particular variety.

It is important to note that even with the combination of cool nights and daily maximum air temperatures of 30°C, germination for some varieties can be depressed due to high soil temperature (Marshall and Sorrells 1992).

The table below illustrates this further with some Australian autumn data clearly showing the large difference between morning and mid-afternoon soil temperatures. The soil temperatures listed were taken at a depth of 10cm. At a more common sowing depth of 5cm, the 3pm temperature would be expected to be even higher. Note also that the soil temperature, even at 10cm, can exceed the daily maximum air temperature.

Comparison of some air and soil temperature data measured over successive days.

Day	Air temperature (°C)		Soil temperature at 10cm	
	Max	Min	At 9am	At 3pm
1	36	22	31	38
2	30	20	31	35
3	31	19	26	33
4	30	16	26	33
5	31	15	26	32



Finding the nodes (joints) on a tiller in order to know how high the growing point is. The growing point will be above the highest node.

Oats can be grazed rotationally or under a continuous method, the choice depending on intensity of management. For continuous grazing of erect and intermediate types, maintain crop height of between 5cm and 25cm. Useful grazing should be obtained from oats right through until the onset of hot weather, provided the crop has adequate moisture and soil nutrients.

Management of crops for both grazing and grain is basically the same, until late winter. In early spring stock should be removed, allowing time for crop recovery and grain production. It is particularly important not to graze too low or too late, especially for erect or upright varieties, which tend to have higher growing points.

For more information on oat agronomy, including sections on diseases of oats, fertiliser requirements, weed control and sowing rates refer to 'The Forage Book' Chapter 9 – Forage Oats. 'The Forage Book' is available from Pacific Seeds – log onto the website for an order form www.pacificseeds.com.au or fill in the tear out order form available with this yearbook.

Yield and forage quality

Oats continue to be an important source of winter forage because of their high yield potential and very good feed quality. Under favourable conditions oats can provide quality forage from late autumn through to mid spring. The capacity of oats for regrowth can be quite surprising if conditions allow and the crop is well managed.

The performance of individual oat varieties varies from region to region. This needs to be kept in mind if a variety is being chosen based on performance data from another region or another state. When growing a new variety for the first time, it is advisable to only grow a small area and check its local suitability.

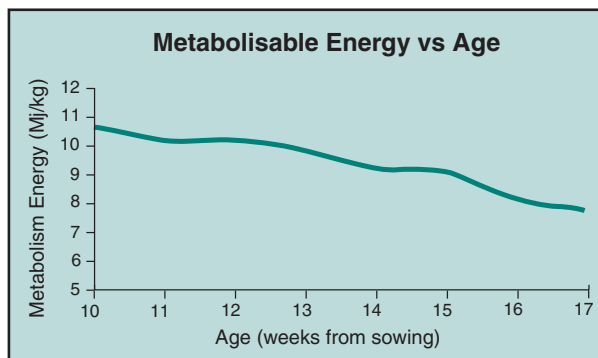
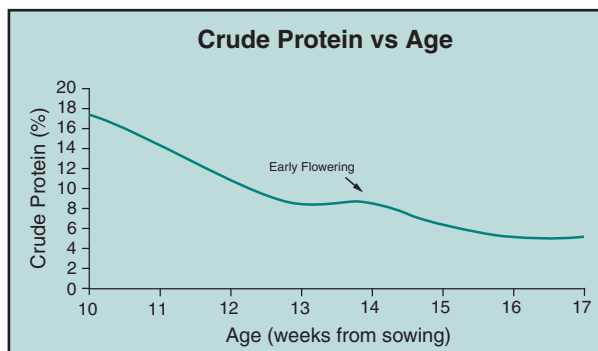
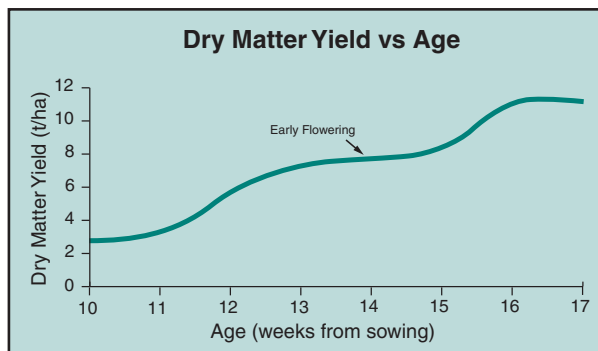
Performance data will be influenced by the height of the crop when cut.

The graphs following illustrate the effects of increasing crop age and height, on protein and energy values in the variety Barcoo. It can be seen that when this crop was at 40cm, which is a common height for grazing with cattle, crude protein was over 17% and metabolisable energy was 10.8MJ/kg. This puts it in the class of a high quality feed, sufficient to meet the needs of either milk production or fattening stock. It is important to note that two weeks later the protein level had dropped to just under 11% although energy was still 10.3MJ/kg. This trend continued with protein continuing to drop relatively fast but energy content declining slowly.

The oat hay crop is usually cut during flowering stage or milk stage of grain set. This is a good compromise between yield and quality. If the hay is to be sold it is important to find out from the intended buyer the hay quality specifications required, including any minimum protein and energy levels. Knowing these protein and energy targets will help in deciding when to cut.



Results from an irrigated Pacific Seeds trial, in the Lockyer Valley, Queensland, showing height, yield and feed quality of the variety Barcoo, as it ages. The trial was sown on June 14, which is quite late for oats. This explains why the crop was only 41cm high at 10 weeks after sowing.



All of the information in this document is subject to copyright. No part of this document may in any form or by any means (whether electronic, mechanical, or otherwise) be copied, reproduced, stored in a retrieval system, transmitted or provided to any other person without the prior written permission of Pacific Seeds Pty Ltd, who owns the copyright. The information provided in this brochure is intended as a guide only. Various factors, including planting times and environmental conditions may alter the characteristics of plants.