Winter 2001 Edition 18

BAAT

Bulletin of the NSW Association of Agriculture Teachers

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Inside BAAT

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Editorial

Welcome to the second edition of BAAT. This issue comprises mostly of teaching resources, which we hope you will find useful. There seems to have been an unintentional focus on poultry,- not that there's anything wrong with that.....

Once again, it appears the busiest time of year is upon us; subject selection, trails, Yr 12 reports and last minute revision seem to blur into one long process; lambing, kidding and their associated "joys" arrive, just to make life interesting. .....Anyone else got a poddy?....Junior Ag Camp has come and gone, and HSC marking is just around the corner. I don't know about you guys but I think we're due for a holiday!

Some important information from this issue: DET SCHOOLS- YOUR FUNDING RETURNS ARE DUE! Why miss out on free money? The dates for regional shows have also been included, however, it is advisable to contact the relevant society to ensure changes have not occurred. The "Primary Industries" issue has not yet been resolved, despite persistent efforts from the Association. A survey of those teaching the course has been performed by Peter Jones. The results of this have been included to allow you to make up your own mind about the general feeling out there.

As mentioned before, Junior Ag Camp 2001 has been. It was a resounding success, as usual. Students, decked out in oilskins, hats and regulation "jumpers" handled cattle, threw sheep and drove tractors with enthusiasm. They bambi-ed and collected currency; absorbed the very essence of equine reproductive management and environmental science; yet still had the energy to bush dance well into the evening and not miss milking in the morning. Timid, awkward individuals were woven into the framework of proud and confident units. Staff were serenaded, exploits swapped over lunch, firm friendships were born. Parents failed to recognise their fledglings, addresses were swapped...there were tearful goodbyes..... .....Then it was all over for another year.

But seriously...

Congratulations to all those teachers UWS-Hawkesbury staff and students involved in Junior AGCAMP this year! Once again this annual event was an undisputed success, with attending staff and students alike, having a most enjoyable and educational time. Special mention must go to those staff who were willing to give of their own time to organise and supervise the event. It is only their hard work and enthusiasm that enables this camp to take place. A more detailed report will be a feature of the Spring edition of BAAT.

Once again, a huge "THANKS" to all those who contributed to this issue- even those who were coerced. We hope this publication is of some use to you, though its content is really dictated by feedback or contributions from members. As we said before, please share any words of wisdom, useful resources or interesting events with us. It would be great to "visit" schools all over the state!

Have a nice break.....Ed.

Deadlines of Submission Dates for 2001:

Edn 19	**T4 W1**
Edn 20	**T4 W7**

Stuff to send:

School or Show Reports	Letters
Teaching Resources	Classifieds (ie Buy/Swap/Sell, etc)
AAT Branch Updates	Student Successes
Committee Reports	Upcoming Events
Inservice/ practical Ag info	Interesting Bits.....etc. etc.

e-mailed material in MS Word (pc) format, works best.
Pictures/photos in .jpg or .gif, if possible.

Contact or send material to the editor of your choice

President's Report, AUGUST 2001

Welcome to the second edition of BAAT for 2001.

Firstly I would like to thank Brigitte and her team for the first edition of BAAT, I am sure that all our members would be happy to extend thanks for all the hard work and effort that goes into getting BAAT out.

The conference committee headed by Ivan Gant is busy already in the organisation of the 2003 conference, which will be held at "Tocal" on the 13th to 17th January 2003. The aim of the conference will be to provide Agriculture and Primary Industries teachers with specific competency training in areas such as Tractor Operation and Maintenance, SMARTtrain Chemical training, OH&S training as well as gain skills in livestock, viticulture and horticulture areas. I am sure it will be one of the best conferences yet and I suggest you jot down and reserve these dates for January 2003 now.

As most teachers are probably aware there is a very detailed review occurring at present called The Ramsey Report, which is reviewing teacher Education in NSW. There are a number of issues that have been raised by the review.

One of the main issues raised by the review is the development of an Institute of Teachers whose aim would be to develop and coordinate a framework of professional standards and ethics for the teaching profession. The institute would also establish a public register of teachers as well as accredit pre-service and post graduate teacher training and professional development of practicing teachers. The institute would also be involved in providing advice to the government and the community on issues related to quality education, teacher quality and professional standards.

One of the main roles of the institute will be the development of a registration board, which will provisionally register teachers to teach after satisfying the requirements of an accredited teacher-training course. A teacher will then have a period of time (which his yet to be decided) to reach a required standard as determined by the institute to then be granted accreditation to teach. A teacher will then have the opportunity to progress to 2 higher levels of accreditation that roughly correspond to head teacher and assistant principal/ principal level.

One of the big advantages to this model is that it will enable a teacher to reach higher salary scales, which will be linked to these higher levels of accreditation, without having to leave the classroom, as is the case at the moment. How often have we seen a highly competent classroom teacher leave the classroom to achieve the

higher salary as a deputy where their high levels of classroom skills can often not be fully utilised.

The association has in the last couple of months send out a survey to all currently trained teachers of primary Industries, this survey was developed by Peter Jones in response to a number of issues that have been raised by members of the association in regard to the training, teaching and implementation of the Primary Industries course.

A number of issues were raised in regards to the SMARTchem chemical course, in particular the fact that it has not been mapped against the Primary industries core units of competencies. Another issue identified was that at the present there are few resources available to help in the teaching the SMARTchem course and a large number of teachers believe that their students have been disadvantaged in this years HSC due to the lack of resources.

The survey also raised the issue that many teachers find the Primary Industries course of more use to students than the traditional 2Unit Agriculture course and the majority are generally happy teaching the course. The problem of work placement is still a major concern for nearly all teachers and I feel that something needs to be done to help teachers in this area. A copy of the results of the survey are included in this copy of BAAT and if you have any questions in regard to the survey feel free to contact Peter Jones at Chiffley College, Mt Druitt campus on 02 96259750

A reminder that the National Association of Agriculture Educators (NAAE) is having their 2002 conference in Hobart from January 14th to 18th 2002 titled 'Educating for a clean and green Future'. I am sure that it will be a very enjoyable and informative conference. In the last edition of BAAT a flyer advertising the conference was included and I urge anyone considering going to the conference to get the flyer back to the conference secretary as soon as possible. At present no other information regarding price, etc has been passed on but when we receive it we will send it on as soon as possible.

It must be remembered that our role as executive members is to represent our members of our Association. If you as a member have any issues you would like to see addressed or in-services you would like to see ran please contact me at work on (02) 9816 1044, home (02) 9817 1212 or by fax or e-mail pamccann@bigpond.com.au It is my job as President to ensure that we are meeting the needs of every one of our members in every part of the state, so please give us some feedback so we can help you.

A reminder that BAAT is only as good as the contributions it receives. Please send submissions of any articles, resources, worksheets, programming ideas, and reports on your school or show results to Brigitte, John or Milton.

Patrick McCann

An Introduction To The Primary Industries Teacher Survey.

By Peter Jones
Chifley College - Mt. Druitt Campus.

During the last Biannual Conference, problems linked to the teaching of the Primary Industries course were clearly identified by teachers. These problems included the teaching of the chemical usage units of the course and also some aspects of the training and support process.

It has been over 9 months since problems were raised with the DET retraining section (Fran Maloney); TAFE (Michael Williams, at Orange); and Department of Agriculture staff at Yanco, putting the chemical course together. There has been a continual dialogue between teachers such as myself, pointing out problems and asking for answers. Most of our requests and questions have been answered with empty promises.

Resources to assist in the teaching the SMARTtrain course were promised "just after Christmas" and then again "around Easter ". The last I heard as to what was happening is that the resources had been sent down to Yanco to be burnt onto a CD and would be distributed very soon. That was over 8 weeks ago.

At the time of writing, (27/8/01), we still have no resources distributed to teach the SMARTtrain course other than the booklets.

I raised the issues again in May, at a meeting of the State Ag Teachers Executive at Murifield High School, and asked permission to run a survey to determine the thoughts of other primary industries teachers. This was done and collated. The results of the survey follow.

Pat McCann has written a letter to Bob Smith, Director of the Voc. Ed Directorate, asking for a meeting where issues identified in the survey can be discussed and hopefully solved. We are at the stage of waiting for a reply to that letter.

Please stay tuned for further developments.

Peter Jones

Primary Industries Teacher Survey
The Results

June 2001

Have you ever taught the Primary Industries course to Year 11 students? **65 Yes / 3No**

Have you ever taught the Primary Industries course to Year 12 students? **41 Yes /21No**

Please tick the appropriate box.

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1. I feel confident that I have been trained to the required standard to ensure that my students are taught and assessed to the required levels.	8	29	12	18	2
2. There are areas of content I feel I would like to undergo more training in so as to teach this course better to my students.	28	17	2	13	0
3. I fully understand the requirements and procedures to seek RPL to teach units outside the General Agriculture strand.	0	23	14	17	7
4. I feel that the Certificate IV in Assessment and Workplace Training is adequate in teaching me assessment strategies ensuring I am assessing students appropriately	4	23	25	11	6
5. I feel confident my records, programs and registers are completed to the required standard.	0	23	20	22	5
6. I am generally happy in teaching the Primary Industries course.	12	30	8	14	3
7. The Primary Industries course is of more use to students than the traditional 2 unit ag. Course	9	21	13	15	9
8. The Primary Industries course is an easy course to organise and teach.	0	2	1	35	29
9. Based on teachers witnessing student achievement, the statement: "The Primary Industries course is a rewarding course to teach.", is a true statement.	3	16	8	29	13
10. I have considered not teaching this course but instead directing students towards the 2 unit Agricultural course	3	16	8	29	13

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
11. A problem in teaching the Primary Industries course is:					
a) the expectations from 'above" to jump through hoops.	17	34	8	7	2
b) a lack of support from inside the school	12	9	5	26	5
c) a lack of support from "outside the school gate".	14	26	3	22	3
12. Organisation of work placement is an easy task.	0	9	6	28	26
13. I use an external person (outside of the school) to organise work placement.	4	22	5	16	18
14. I have been supplied with sufficient physical assets to teach this subject	1	12	1	29	23
15. Any teaching resources that I lack at my school are easily accessed locally.	1	20	10	31	9
16. I feel "isolated" when I am teaching this course	12	18	6	33	0
17. I would like to be able to talk to someone else teaching close by about problems I am facing when teaching this course.	13	41	7	5	0
18. I know the name of the nearest ag. teacher outside "my school gate".	33	31	0	2	3
19. I know the name of the nearest teacher located "outside of my school gate" who is teaching the Primary Industries course	32	24	4	7	3
20. I regularly communicate with other ag. teachers who work outside "my school gate"	9	32	3	20	5
21. A network of ag. teachers from across the State teaching this course would be useful to me	32	34	1	0	2
22. I do not want any more help in teaching this course. Everything is OK. Leave me alone.	0	1	0	27	38
23. Communications linked to changes in the course structure from "outside the school gate" to me (the teacher) is excellent.	0	4	15	32	19
24. My District Voc. Ed. consultant does a great job in supporting me.	10	27	11	12	5
25. My District Voc Ed consultant fully understands my subject.	1	17	28	16	6
26. There needs to be a central person in the State who teachers can make direct contact with.	23	26	17	2	1
27. A regular means of communication from those who make decisions "outside the school gate" to me would be of benefit.	17	41	5	0	0

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
28. The SMART train chemical course is suitable for students in my class.	1	23	16	12	12
29. I need more resources supplied to me so that I can teach the SMART train course effectively.	34	22	7	3	1
30. The SMART train chemical course is really only an assessment tool.	5	15	18	24	3
31. I am happy teaching the SMART train chemical course the way it stands at the moment.	0	12	18	22	11
32. The SMART train course covers all of the syllabus areas linked to the teaching of the core chemical units in the Primary Industries Syllabus.	0	12	24	14	2
33. I feel I would be better off teaching the core chemical units on my own using other resources that I have rather than following the SMART train course.	11	9	27	12	4
34. HSC Students at my school were disadvantaged in their HSC due to the late development of resources linked to the SMART train chemical course I had to teach.	10	16	21	4	2
35. I feel I am "burning out" trying to reorganise myself due to all of the new courses and procedures thrust upon me from "outside the school gate".	29	21	5	4	1
36. My principal supports me fully in the teaching of the Primary Industries course.	20	18	15	11	3
37. My Principal understands my increased work load due to the teaching of this course.	7	11	21	13	15

Attention DET teachers:

FREE MONEY

FOR YOU !

The funding form from the State Agricultural Advisory Group and the Schools Financial Support Unit should be hitting your school in week 5 term 3. The return date is by the end of week 9. Please keep a look out for it and get it back ASAP.

Remember: no return - no funding for next year.

Part A of that form asks for student numbers who study Agriculture. Teachers are reminded that they should include only the agricultural component of any DAT studies. The State Agricultural Advisory Group cross references school information with Board of Studies enrolment information as well as compulsory curriculum study patterns. It is a waste of time fudging figures.

Part C asks for information on changes of equipment over the past year. There are several schools that were granted money to change tractors and associated equipment. All of these schools were asked to notify the State Agricultural Advisory Group

(via fax to:
Peter Jones at Chifley College - Mt. Druitt Campus)

of what they got rid of and what was purchased to replace it. Only a few schools have done this. It is appropriate this information be included on part C.

JUNIOR AGRICULTURE COMPETITION

Do you enjoy meeting people?

Would you like to make new friends?

Ever felt you'd like to give a little more back?

Would you like something interesting to put on a resume?

Have you ever thought to yourself: "I could do that (better)"?

If you have answered YES to one or more of these questions, this may be the relationship for you:

Longing for Friends

High profile born-again competition seeks intelligent, fun-loving individuals with an interest in Agriculture, who enjoy helping others. Is looking forward to getting together occasionally, as well as quiet nights at home. Must be willing to commit to a relationship. Experience is not essential. Genuine responses only please

But seriously....

The Junior Ag Competition is looking for a new home: -

ideally, a sub-committee of people who would like to be involved in helping write, organise and run the competition in 2003. This is a valuable educational resource which helps lift the status and profile of our subject.

If you are interested in helping keep this worthwhile event going, contact Tony Reddan at Pendle Hill High School on: Fax: 9896 3093

THE UNI-SCHOOLS' STEER CHALLENGE 2001

The Uni Schools' Steer Project is an initiative, which aims to :

Foster closer alliances between The School of Environment and Agriculture at the University of Western Sydney Hawkesbury Campus and staff and students of Agriculture, at Local High Schools.
Motivate students about agriculture.
Provide a "project" style activity through which positive values can be encouraged.
Provide opportunity for students :

a. to succeed,
b. to be recognised for effort,
c. to develop cattle management skills and knowledge,
d. to learn about themselves and their peers as members of a team,
e. to enjoy healthy, stimulating competition,

Provide schools with opportunities for self promotion.
Provide opportunities for students to learn about animal care and ethics, as well as occupational health and safety.
Provide students with an opportunity for learning about animal:

a. growth and development
b. behaviour
c. nutrition
d. health
e. husbandry and duty of care

* Bolster the overall image of "agriculture" in the school, and in the eyes of the general public.

The Uni Schools' Steer Project Web Site is located at:

http://www.uws.edu.au/sea/ard/ussp.htm

It contains a full record of the project data, including:

- Photos of staff, students and steers, from all of the visits,
- Comments made by staff and students,
- A graph of the steer weight change,
- Details of the rations used

The Project

Each school took responsibility, for the gentling to leading, the training and preparing for showing, of each of their Uni School steers. Steers were balloted at the UWS Hawkesbury Campus Cattle Yards at 3.00 pm. on Friday 4th May.

Staff and students were present during this allocation period. Steers were within one month in age, and approximately 20kg weight of each other, at the point of allocation. Steers were fattened on each school's chosen ration for three to four months (approximately 120 days). Each school received three visits from University staff and students, who weighed (weighing equipment to be supplied by UWS-H) and digitally photographed each of the steers.
It was agreed that each School's ration should comply with normal "show guidelines for steer competitions", in that **no inappropriate "additives" such as growth promotants**, will be included. The cost of the ration is borne by the individual school.



Following the weighing visit, results and photos were displayed in the School of Environment and Agriculture's "Agriculture and Rural Development" page within the University of Western Sydney Web Site. It is understood that the school is responsible for the steer's health and well being, for feeding the steer appropriately in order to achieve weight gains necessary for inclusion in the "Specialist Local Trade, Fat Category 2 – 3.5, Market", given the available time. All five Schools are required to present their steer for judging, weight gain etc, at Ag Craft (26th August) and The Central Coast Schools' Prime Beef Show (13th September). They are also required to select students representing 5 age groups, <13, 14, 15, 16, 17+, to compete in paraders and junior judging events.

The School of Environment and Agriculture will supply Perpetual Trophies and awards. The animals will be sold, at the conclusion of the Central Coast Show and after marketing costs are paid, The School of Environment and Agriculture will receive half of the remainder, the other half is paid to the High School.

The project will conclude at an afternoon tea, held at the Campus Woolshed on the 21st of September (3.45pm). All perpetual trophies and awards will be presented at this ceremony. Staff and student project participants, as well as parents and other interested parties, are invited.



First Year Rural Tourism and Community Development students utilized the Uni School's Steer Project as the experience base for a self initiated "Farm Practice", project on "Cattle Growth and Development". Jane Mason and Tanya Henry – both studying for the Graduate Diploma in Education, have utilised this project for networking with staff and students. Both Tanya and Jane delivered a brief presentation at each weighing session.

There are five schools involved:

- **Richmond High School, Richmond**
  Teacher Mr. Charlie Cassels Ph. 0245781177
  Steer Number: 008, Name: **"Qantas".**

Students Involved:
Matthew (Reg) Rand, Renee Graham, and Rachel Parkes, in Yr. 11, and Melissa Henry of Yr. 10, Christopher Schubert, Kelly Ellwood, Amanda Bills, Scott Smith, Adam Tuckwell, Alison Jordon.

- **Bede Polding College, Windsor**
  Teacher Ms. Danielle Krix Ph. 0245776455
  Steer Number: 38, Name: **"Gunther".**

Students Involved:
John Ashton Yr. 11, Kellie Melton Yr 10, Rachel Melton Yr 9, Luke Seymour, Emma Cahill, Talia Coyte and Sarah Krix of Yr. 8, Ashley Paina and Courtney Crimp of Yr. 7, Stephanie McIlroy, Melissa Mitchell, Courtney Crump, Rebecca Taylor, John Ashton, Nicholas Taylor, Adam Dobson, Ashley Pauna, Stephanie Shute, Brie Coyte, Martin Convey, Heather Rooney, Ashley Leggett, Jessica Smith, Claire Macken, Candice Eyles.

- **McCarthy Senior College, Emu Plains**
  Teacher Mr. Ian Taylor Ph. 0247353211
  Steer Number: 24, Name: **"Geoffrey".**

Students Involved:
Yr. 11, Chris Heap, Chris Langan, Richard Shields, Amanda Williams Yr. 12, Ian Lee, Lachlan Smith, Trina Milton, Jody Puckran, Pete Dominson

- **Macarthur Anglican School, Cobbity**
  Teacher Mr. Milton Gower Ph. 0246475333
  Steer Number: 29, Name: **"Napoleon".**

Students Involved:
Robert Boardman, Michelle Channell, Phillip Welton, Peter Ferguson, James Punbier, Scott Vale, Luke Micallef, Ry Neradovsky.

- **Elizabeth MacArthur High School, Narellan**
  Teacher Ms. Nicolet Westerhof Ph. 0246461899
  Steer Number: 16, Name: **"Tee Pee.**

Students Involved:
Yr. 11, Project with assistance from Yr. 9, Kate Wilson, Amanda Williams, Josh Patterson, Kristy Patterson, Daniel Holder, Jay Dillon.

Current Results:

School	Steer Tag #	Date of Birth 00	Wt # 1 3/5	Wt #2 25/5	Wt #3 22/6	Wt # 4 24/7
Richmond High	008	26th Jul	285	270	310	365
Weight Change				-15	40	55
Net gain					25	80
Bede Polding	038	12th Aug	270	255	300	330
Weight Change				-15	45	30
Net gain					30	60
EMHS	016	30th Jul	290	290	315	360
Weight Change				0	25	45
Net gain					25	70
McCarthy College	024	6th Aug	275	245	275	315
Weight Change				-30	30	40
Net Gain					0	40
MacArthur Anglican	029	8th Aug	290	275	305	350
Weight Change				-15	30	45
Net Gain					15	60

Ken Langford - Uni School's Project Academic Coordinator
Contact: Ph. 0245 701 322 Email. k.Langford@uws.edu.au



How to grow cotton

Time of Year	Activities
August – September	**Soil Preparation** • Growers prepare the soil in readiness for seed planting. This involves levelling the field to a certain gradient to ensure efficient irrigation and building mounds in which the seeds are planted. • Check moisture levels to ensure that the soil is moist enough for the seeds to **germinate**. If not, a pre-plant irrigation will need to be done.
September – October	**Planting** • Check soil temperature. • Planting the cotton seed into the field.
November – February	**Growing season** • Ongoing checks for pests and managing pest management strategies. • Testing soil moisture levels and irrigating as required. • Ongoing weeding of the crop.
March/April/ May	**Defoliation** • The crop is checked by **agronomists** to make sure it is 'ripe' and ready to pick. In this way it is similar to the harvest of fruit. • The leaves surrounding the bolls, the cotton plant's fruit, have to be removed before picking so that the leaves don't contaminate the cotton lint. When ripe, cotton crops are sprayed with chemical defoliant that makes them lose their leaves. **Picking** • Large mechanical cotton pickers pick the crop. The cotton fibre is then packed into large blocks of cotton, called **modules**, which are about the size of a semi-trailer load. **Transportation to Gin** • Cotton is then 'ginned'; i.e. it is processed by machines to separate the cotton fibre (or lint) from the cotton seeds. The lint is then packed into bales.
Off-Season: May – August	It is important to note that during the off-season many other activities are being undertaken such as the classing and marketing of the cotton. Cotton growers also grow other crops (on other fields) and many also graze cattle or sheep so they have many other tasks to complete.

COTTON
DISCOVERY
CENTRE
@ THE COTTON STORE

Soil type

A lot of the cotton grown in Australia is grown on cracking self-mulching **clay soils** found on flood plains adjacent to rivers. Cracking self-mulching soil is a type of soil that expands and contracts depending upon the water content of the clay. Think of the pitch of an oval after it has been really dry — cracks appear and it gets quite hard. When it rains, the water seeps into the cracks and makes the soil moist again.

In the case of cotton farms, once the water soaks into the soil, the cracking clay holds on to the water really well. Clay soil also has many nutrients that the cotton plant needs.

In contrast, sandy soils do not hold water very well — they have very good drainage. This is why drip irrigation is a more effective means of irrigation particularly in areas with sandy soil types.

Fertilisers

There are a range of different fertiliser types including phosphatic, potassic and nitrogenous, and also a range of mixed varieties. It is the nitrogenous type that is used most often in cotton farming.

Nitrogen is the name of one of the most important nutrients needed by all plants, not only cotton. Nitrogen can be added to the soil three months before planting. The type of nitrogen most commonly used is called *anhydrous ammonia*, a liquid usually applied below the surface of the soil, which becomes a gas on contact with the soil. Cotton also needs phosphorous, potassium, sulphur and zinc.

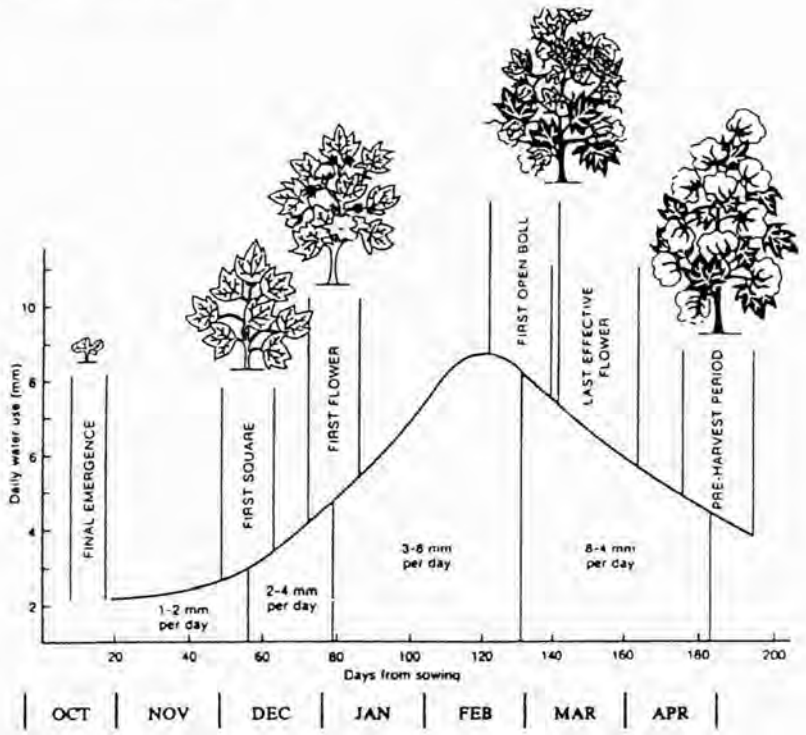
Irrigated Production

On an irrigated cotton farm, fields are levelled and graded such that they have a slight slope. This is done to enable water to flow from the top of the field to the bottom of the field in a controlled way. If the field isn't sloped enough or is uneven, then water can lie around and waterlog the soil. If too steep, the water will run off too quickly and not water the plants. It is important that the slope enables the water to flow **slowly** down the field, watering all the plants evenly. A tail drain is constructed at the end of the field to recycle the excess run-off water. The majority of Australia's cotton is grown under irrigation.

Dryland Production

Dryland cotton farming, where the cotton growers rely purely on rainfall, also have cotton planted in rows but the land doesn't need to be levelled. Furrows for transporting water through the fields are unnecessary because the rain falls evenly over the field.

Moisture Requirements:



For more information about cotton please visit the Cotton Australia website at www.cottonaustralia.com.au or ring the Cotton Discovery Centre

The Cotton Discovery Centre has introduced a new excursion looking at all aspects of gene technology, which is relevant to the Plant Production and Innovation and Diversification Stage 6 topic areas. Students have the opportunity to carry out their own biotechnology experiments under the supervision of a trained scientist.

For information and excursion bookings about this new program or other agriculture programs please contact the Cotton Discovery Centre on ph 02 92112888 or fax 02 92115888

Planning Ahead? Do you Require Show Dates September 2001 to June 2002?
Details can be obtained by contacting the

Agricultural Society Council of NSW
PO Box 1047, Hunters Hill 2110 , phone 02 9704 1111

$5.50 per booklet (incl. GST) OR $11 to go on the mailing list
OR Visit Internet site www.agshowsnsw.org.au

The internet site is updated regularly and also includes information on shows and secretaries. machinery field days, interstate contacts and Royal Shows.

NSW COUNTRY SHOW SCHEDULE

SHOWS in 2001

SEPTEMBER

Barmedman 1	Lake Cargelligo 1	Narrandera 1
Liverpool 1-2	Finley 2-9	Woodstock 2
West Wyalong 4-5	Forbes 6-8	Murrumburrah 7-8
Cudal 8-9	Fairfield TBA	Hay 8-9
Quirindi 8-9	Cowra 11-12	Broken Hill 14-16
Eugowra 14-15	Ardlethan 15	Merriwa 15-16
Molong 15-16	Quandialla 15	Canowindra 21-22
Hillston 22	Nimbin TBA	Temora 13
Young 23-25	Bribbaree 29	Berrigan 30
Griffith 30-1 Oct		

OCTOBER

Morongla 1	Walbundrie 1	Ariah Park 3
Wagga Wagga 3-5	Grenfell 5-6	Kyogle 5-6
Leeton 5-6	Singleton 5-7	Culcairn 6
Trunkey Creek 6	Norfolk Island 8	Casino 12-13
Taree 12-14	Illabo 13	Picton 13-14
Ungarie 13	Lismore 17-20	Barham 20
Cootamundra 20	The Rock 20	Tooraweenah 20
Alstonville 26-27	Carcoar 27	Junee 27

NOVEMBER

Albury 2-4	Murwillumbah 2-3	French's Forest 3-4
Bellingen 9-11	Dungog 9-10	Mullumbimby 9-10
Holbrook 10	Minto 10-11	Bangalow 16-17
Bulahdelah 17-18	Bulli 17-18	Queanbeyan 17-18
Dorrigo 24-25		

2002

JANUARY

Bowral 5-6	Woodstock 9	Pambula 12-13
Albion Park 12-13	Bundarra 18-19	Dapto 18-19
Candelo 20	Eurobodalla 25-26	Kiama 25-26
Tarago 26	Bungendore 27	Glen Innes 31 Jan - 2 Feb

FEBRUARY

Berry 1-2	Rydal 1-2	Morriset 2-3
Nimmitabel 2	Cobargo 8-9	Corowa 8-9
Guyra 8-9	Dunedoo 9	Ashford 9-10
Nowra 8-9	Crookwell 9-10	Luddenham 9-10
Inverell 14-16	Maitland 14-16	Bega 15-17
Gundagai 15-16	Tenterfield 15-16	Kangaroo Valley 15-16
Gunning 16-17	Camden Haven 16-17	Gulgong 16
Binnaway 23	Canberra 22-24	Cessnock 22-23
Barraba 22-23	Jingellic 22-23	Armidale 22-24
Blacktown 22-24	Jerilderie 23	Rylstone 23
Sofala 24		

MARCH

Manilla 1-2	Blayney 1-2	Robertson 1-2
Newcastle 1-3	Milton 1-2	Mudgee 1-2
Walcha 1-2	Boorowa 2	Braidwood 2
Delegate 2	Nabiac 2	Tumut 2
Baradine 2	Deniliquin 2-3	St Ives 2-3
Dalgety 3	Tamworth 8-10	Coonabarabran 8-9
Gresford 8-9	Castle Hill 8-10	Moss Vale 8-10
Wakool 9	Cooma 9	Adelong 9
Cumnock 9	Yass 9-10	Wingham 9-10
Taralga 9-10	Muswellbrook 15-16	Uralla 15-16
Gloucester 15-16	Camden 15-16	Mendooran 16
Lithgow 15-16	Bombala 16	Goulburn 16-17
Henty 16	Koorawatha 16	Tumbarumba 16
Bemboka 17	Sydney 22 Mar - 6 Apr	Comboyne 23-24
Batlow 23	Binnaway 23	

APRIL

Jerrawa 1	Campbelltown 5-7	Stroud 5-6
Wauchope 5-6	Kempsey 9-10	Bathurst 12-14
Bonalbo 12-13	Hawkesbury 12-14	Macksville 12-13
Narrabri 12-14	Brewarrina 13	Woodenbong 14
Maclean 16-17	Grafton 19-20	Gunnedah 19-21
Bourke 20	Gosford 20-21	Orange 20-21
Yeoval 23	Wee Waa 25-27	Cobar 26-27
Wellington 26-27	Coffs Harbour 26-28	Nyngan 28-29
Gilgandra 30 Apr - 1 May		

MAY - JUNE

Dubbo 3-5	Gulargambone 11	Coonamble 7-8
Warialda 9-11	Walgett 11-12	Bingara 17-19
Mungindi 24-26	Moree 31 May - 1 Jun	Trunkey Creek 10 June

Machinery Field Days

2001

Aug 1-2
MALLEE MACHINERY FIELD DAYS
Kevin Emonson, Secretary
PO Box 5, SPEED VIC 3488

Aug 21-23
AG-QUIP
The Secretary
PO Box W520,
WEST TAMWORTH NSW 2340
ph. (02) 6762 2399
fax (02) 6762 2350

Sep 5-6
NEWDEGATE FIELD DAYS
Ms Karen Spindler
Secretary
BEMBOKA LIONS RURAL EXPO (BEGA SHOWGROUND)
Craig Smith
PO Box 43
BEMBOKA NSW 2550
ph. 0408 685208

Sep 18-20
HENTY MACHINERY FIELD DAYS
Doug Meyer, Exec Director
PO Box 79
HENTY NSW 2658

Oct 3
"KILFERA" FIELD DAY
In aid of Royal Flying Doctor Service
Clive Linnett
"Kilfera"
IVANHOE NSW 2878
ph. (02) 6995 1315
fax. (02) 6995 1224

Oct 13-14
MURRUMBATEMAN FIELD DAYS
The Manager
PO Box 138
MURRUMBATEMAN NSW 2582
ph. (02) 6227 5895
fax. (02) 6227 5009

Oct 16-18
AUSTRALIAN NATIONAL FIELD DAYS
The Secretary
PO Box 2150
ORANGE NSW 2800

2002

Mar 5-7
WIMMERA MACHINERY FIELD DAYS
Noel Curran
Secretary
PO Box 272
HORSHAM VIC 3400

Mar 21-24
GIPPSLAND FIELD DAYS
George Nicholson
Gen Mgr
PO Box 366
WARRAGUL VIC 3820
thegfd@dcsi.net.au

May 2-4
TOCAL FIELD DAYS
The Co-ordinator
"Tocal"
PATERSON NSW 2421
ph. (02) 4939 8888
fax. (02) 4938 5549

Development of Resistance to Anthelmintics in Parasitic Worm Populations

Prue Kesby has kindly forwarded this response she received in reply to some questions on the mechanisms by which drench resistance occurs:

"After the recent HSC Trial I sought some extra information on worm resistance to make sure my understanding was 100% correct. My students interpreted the question about worm resistance as asking for two mechanisms by which drench resistance occurs. After genetic resistance they became quite creative; I wanted to make sure I hadn't missed something. After an internet search I had done lots of reading but I was none the wiser so I contacted the "communicator" at CSIRO Animal Health.

I received excellent information from Dr Robert Dobson. He is agreeable to this information being printed in BAAT".

Dr Robert Dobson's Reply:

1st a few general comments:

The "mechanisms of drench resistance" would be how the worm evades the drug. Resistance to a drug in worms is generally a genetic trait. Worm control programs like Wormkill provide the "environment" for selecting the existing resistant worm population. When a drug 1st comes on the market very few worms have the capacity to survive the drug but over time their numbers build up (more correctly - become a larger proportion of the worm population). This happens because they have a survival advantage in the "new-environment" that now, from time to time, includes exposure to the drug.

The aim of a control program like Wormkill is to provide good worm control without selecting for resistance. Unfortunately the aim, "to ensure effective worm control", conflicts with the aim, "to minimise selection for drug resistance", particularly when the former is based around the use of anthelmintics. There is no "best" generic advice or compromise to solve this dilemma, as individual farmers will attach greater importance to one or the other of these aims depending on their particular circumstances. In simple and general terms the better the worm control program the more likely it will select for drug resistance.

I do not think drug rotations are the best way to slow selection for resistance. The simultaneous use of different drugs to delay selection for resistance has been advocated for insects, worms and pests in general. One of the reasons this is strongly advocated in the control of worms is because a portion of the worm population, L3 on pasture, normally escape selection by the drench and thus provide a source of susceptible genes even if a small number of worms survive the multiple treatment. A potential risk to this "combination therapy" is when drenched sheep graze clean pastures, because in this situation the worm population is mostly within the sheep population and consequently few worms if any evade selection. In this case selection would proceed at a fast rate though worm control is very good. In such circumstances consideration

may be given to leaving a few sheep untreated, to ensure the survival of sufficient non-resistant worms to dilute resistant survivors of drenches. This is possibly a controversial conclusion and runs counter to the usual advice (and if you are doing the HSC it is probably better to forget it).

Another web address is: http://www.csiro.au/WormTreatment

Prue's Original Questions (Robert's answers in capitals)

- I am wanting to check up on the mechanisms of drench resistance. I have always thought that resistance is genetic so those that survive breed and pass the resistance on.

  CORRECT

- Does poor management result in actual resistance build up?

  POOR MANAGEMENT AND "GOOD" MANAGEMENT CAN BOTH SELECT RAPIDLY FOR THE POPULATION BECOMING PREDOMINANTLY RESISTANT (REGARDLESS OF THE SIZE OF THE WORM POPULATION).

- If low doses are given, for one reason or another, then more worms will survive. I would have said that this was poor management not resistance.

  CORRECT, THIS MAY RESULT IN POOR WORM CONTROL BUT NOT NECESSARILY RAPID SELECTION FOR RESISTANCE

- If the correct dose is then given, assuming a low level of genetic resistance, then the worms will die.

  CORRECT. HOWEVER, IN SOME SITUATIONS (LIKE IN A DROUGHT) DRENCHING ALL THE SHEEP AT THE CORRECT DOSE MAY STILL LEAD TO RAPID SELECTION FOR RESISTANCE BECAUSE THERE ARE FEW WORM LARVAE ON PASTURE

- I am aware of Wormkill and the benefits of drench rotation.

  AS I INDICATED ABOVE, I BELIEVE COMBINATION DRUG TREATMENT IS PREFERABLE TO DRENCH ROTATION IN HELPING TO SLOW SELECTION FOR RESISTANCE. THE DISADVANTAGE IS, IT IS MORE EXPENSIVE IN DRENCH AND LABOR COSTS.

- I am asking for clarification as on a recent HSC Agriculture Trial the students were asked to "Outline TWO reasons why resistance to drench develops in worms". I can come up with lots of reasons why they don't work effectively but only one reason why resistance develops.

  SORRY PRUE I SUSPECT I HAVE CONFUSED THE ISSUE. RESISTANCE ALREADY EXISTS IT DOES NOT DEVELOP, ALTHOUGH IT IS COMMON LANGUAGE TO SAY "THE DEVELOPMENT OF DRENCH RESISTANCE". WORMS WITH RESISTANT GENES ARE GIVEN A SURVIVAL ADVANTAGE WHEN DRUGS ARE USED. THE RATE AT WHICH THE RESISTANT WORM POPULATION INCREASE DEPENDS ON FARM MANAGEMENT PRACTICES, THE WAY DRUGS ARE USED AND CLIMATIC CONDITIONS. I SUSPECT THE QUESTION COULD HAVE BEEN PHRASED BETTER (***FOR EXAMPLE, Outline TWO FACTORS THAT CONTRIBUTE TO INCREASING SELECTION OF WORMS THAT ARE RESISTANT TO DRENCHES***).

TOCAL'S WIDE RANGE OF COURSES

Tocal Agricultural College in the Hunter Valley has a range of courses aimed at preparing people for careers on the land. These vary from full-time courses, lasting up to 10 months, to part-time and short courses. These courses cover general agriculture, cropping, beef and sheep production, horse husbandry, machinery and landcare and natural resources.

The 2200 hectare (5500 acres) Tocal property runs about 1400 beef cattle and 70 horses. It also has sheep, dairy cattle, poultry and a range of farm machinery, used for cropping, pasture improvement and hay and silage making.

At Tocal, the students work the farms. They break in the horses, muster cattle, operate machinery, carry out a range of sheep husbandry operations and do fencing and other farm jobs. This allows them to develop practical skills and experience that make them better employees. Students also gain experience on farms and properties throughout NSW and QLD. During this, they gain further skills in areas such as broadacre cropping, operation of larger tractors and sheep and cattle work on large pastoral holdings.

There is considerable demand for Tocal graduates and most have jobs before they finish their course. The balance of practical work and theory and the emphasis on personal skills such as communication, teamwork and initiative, have given college graduates an edge in rural Australia. Principal Cameron Archer says that Tocal graduates can be found in all aspects of agriculture. "They work on properties as farmhands, managers and in other rural businesses all over Australia," he said, "and they are usually held in high regard by employers."

Demand for college courses is expected to be strong next year, with many areas of agriculture having a positive outlook. The college is holding **Open Days on each Friday of the School Holidays**. The dates are October 5 and 12 and prospective students and their families are welcome to attend. Open Days start at 10 am and include a tour of college farms and the historic Tocal Homestead.

Entry requirements for most courses are completion of year 10 and a strong interest in agriculture.

The Tocal property was one of colonial Australia's leading horse and cattle studs and is now recognised for producing well-trained people for the agricultural industries throughout Australia. There are many jobs available in these industries - far more than there are graduates to fill.

Inquiries 1800 025 520

Salinity and the Agriculture Syllabus stage 6

Paul Robey

I am the Education Officer with Salt Action nd I am based at Yanco with NSW Agriculture. Salt Action is an interdepartmental approach involving NSW Agriculture, DLWC, National Parks and Wildlife and EPA as well as other Departments.

The education officer has two basic roles. The first is to provide an educational resource for schools. This is to provide teaching material and units of work etc. Also I can act as liaison with specialist and local salt action officers to provide facilities such as excursion sites, local data, access to piezometer and/or test wells where students can collect their own data. The other role is to prepare short courses in salinity to increase knowledge of salinity in Landcare workers, land managers, local government etc.

Previous Salt Action Education Officers have worked mainly with primary schools in the Murray and Murrumbidgee irrigation areas. Salt Action has produced a teacher resource book for Stage 3. This resource book "A Taste of Salt" is available for primary schools by request. Some of it may be useful for year 7 but it doesn't fit easily into the stage 4 course.

Firstly the importance of the problem of salinity: When a government grants an extra $52 million over the next four years on top of the $30 million for 1999/2000 it is obvious that the problem is serious. This too, is on top of federal expenditure including the National Heritage Trust and the PM's allocation.

Over 30,000 people across NSW are working together toward more sustainable natural resource management through the Landcare movement in NSW.

The NSW Premier has stated that increasing salinity is the result of our failure to manage natural resources in a sustainable way, due (among other things) to **inadequate knowledge about natural resources.** It is very fitting that our syllabus (stage 6) addresses salinity in a substantial way. We as agriculture teachers can play a realistic role in taking on the challenge of salinity.

As well as developing community knowledge we can also help our students interested in a career in resource management. Most year 11 students are aware of hospitality and tourism as a career option but how many know about the career opportunities for a hydrogeologist, agronomist or agricultural economist working in a Salt Action team.

Facts about Salinity

- Between 120,000ha and 174,000 ha is affected by dryland salinity in NSW.
- The West Australian wheat-belt is losing an area equal to one football oval an hour to salinity.
- At the present rate of degradation, in 2050, the area of affected land in the NSW part of the Murray Darling Basin could increase to 2.4 million ha.
- Irrigation salinity threatens 70-80% of irrigated land.
- Some 80 country towns across Australia are in trouble including Wagga Wagga.
- Parts of western Sydney are finding that the "rural problem" problem of salinity is now threatening land and buildings as well as water courses in their suburban environment.

Part One – Salinity an Overview

Salinity can be consequence of natural processes – that is a process unconnected with human activity. This type of salinity is called primary salinity. When Charles Sturt "discovered" the Darling River he recorded that the water was too salty to drink. Other naturally saline areas are salt lakes in arid regions. Many sub soils in semi-arid regions are saline, not as a result of association with groundwater discharge but from and accumulation of salt deposited by rainfall.

Salinity that is a result of human activity is known as secondary salinity. This involves the accumulation of soluble salts in soils, rivers and groundwater through activities such as irrigation, land clearing and urban development

Irrigation salinity occurs as a result of either a rising saline watertable or the application of saline irrigation water. The practices and factors that lead to this watertable rise and the accumulation of salt in the surface soil are:

- the replacement of deep-rooted perennial plants with annual species such as cereals and annual pasture plants means that more water drains past the shallow root zones and into the ground water.
- over watering by applying more water than is required by the crop or pasture. If this excess of water isn't removed by drains, it will seep through the soil to the ground water system.
- irrigating unsuitable soil. Sandy soil has large pore spaces that let water seep through easily. Sand holds less water than loam or clay and more water seeps through to the ground water.
- irrigating on uneven ground and/or poor drainage means that a paddock may not drain freely after irrigation and water lies in the depressions. The only way the water can leave is through evaporation or seeping through to the groundwater system.
- channel seepage is a major contributor to groundwater.
- irrigating on uneven slopes will result in more water being applied than is necessary to meet the needs of the plants. Irrigation takes longer, giving water more time to seep past the root-zone, especially in the top end of the paddock.
- infrequent watering allowing the soil to dry out means that large amounts of water are applied. Much of this water may then flow through cracks in the soil to the watertable. Another effect of dry soil is the death of some roots which in turn reduces the ability of the plant to use the water.

The basic processes involved with irrigation salinity are:

- the **movement of water** past the root zone and into the ground water system
- the **leaching of salt** in the soil and the addition of the salt to the ground water.
- the **rising of the water table**.
- the **capillary rise of the water** and dissolved salt toward the surface through the root zone.
- the **concentrating of the salt at the surface** through evaporation of water.

With dryland salinity the processes leading to the watertable rise are often different from irrigation salinity as there is no increase in the amount of water coming onto the land through rainfall. Dryland salinity is mainly caused by the clearing of the deep rooted trees, shrubs and perennial grasses and their replacement with shallow rooted annual plants such as cereal crops and annual pastures.

This causes watertables to rise and when the watertable nears the surface seepages or discharge will occur. All groundwater contains dissolved minerals and evaporation can concentrate these to problem levels in areas of slow groundwater discharge.

The causes **of urban salinity** are the same as dryland and irrigation salinity and usually combines both. Urban salinity is simply saline groundwater discharge in an urban location. The cause of urban salinity is due to the major changes in landuse and drainage caused by the urban development. This results in a change to the balance of the groundwater system causing a rise on the watertable. The installation of reticulated water systems can result in extra water accessions to the groundwater system through leakages. Irrigation of large areas or parks and gardens often results in over watering and excess water adding to the groundwater system. Other groundwater accessions can occur through septic systems, the disposal of storm water, leaking sewerage systems and drainage in rubble pits.

There are three basic requirements before salinity can occur.

- A porous soil or rock in which salt can be stored
- A supply of water to mobilise the salt
- A mechanism by which salt is redistributed to locations in the landscape , including rivers, where it can cause damage.

All three need to be present for salinity to occur

Only one needs to be absent to rehabilitate saline land and water, in the form of ground water, is the obvious factor to work with.

Wherever there is saline water in the rootzone there will be potential for salinity.

Dryland salinity usually occurs in the lower parts of the landscape either at valley floors or at the break of slope. Other points in the landscape can have characteristics (eg road compaction and a change in the geology) that can cause the saline groundwater to rise to the surface with or with hydraulic pressure.

The extent of salinity.

Secondary salinity is a widespread problem in dryland (including irrigated) areas of the world.

Table 1: **Global extent of secondary (human induced) Salinisation as at 1991.**

Continent	Area 10^6ha
Asia	52.7
Africa	14.8
North and Central America	2.3
South America	2.1
Europe	3.8
Australasia	0.9*
Total	76.6

Source: Oldeman et al (1991).

* note the increase to 2.5 x 10^6ha in 1996 in table 2.

In Australia the area affected by salinity is about 4.5% of presently cultivated land.

Table 2. **Extent of dryland salinity in Australia**

State	1996 Estimate km^2
Western Australia	18,040
New South Wales	1,200
Victoria	1,200
South Australia	4,020
Queensland	100
Tasmania/ NT	180
Total	24,740

Source: Prime Minister's Science Engineering and Innovation Council 1998

The Murray Darling Basin Salinity Audit found that if we continue to use our landscape as we do now the area of land affected by serious salinisation could increase to 2-4 million ha by 2050 in the NSW part of the basin.

The Hunter Valley and the Sydney Basin are also affected and have saline groundwater within 2m of the surface.

In the mid 1980's it was estimated that there 96,000 ha of saline irrigated land and 560,000 ha of irrigated land with water tables within 2m of the ground surface and that this would grow to 870,000ha by 2015.

The Murray Darling Basin Salinity Audit (1999) found that:

The salt mobilisation process across all the major river valleys of the Basin is in a very large scale. **The annual movement of salt in the landscape will double in the next 100 years**. (a rise from 5 million tonnes of salt per year in 1998 to over 100 million tonnes per year in 2100)

Average river salinities will rise significantly, exceeding the desirable thresholds for domestic and irrigation water supplies in many tributaries and exceeding the critical levels for some reaches.

The effects of salinity **(summarised from the PMSEC report on Dryland Salinity 1999)**

Agriculture.	Capital value of land lost	$700 million
	Annual lost production	$130 million
	Cost of remediation	????

Stream Salinity Increasing salinity levels have significant impacts on aquatic ecosystems and all extractive users including drinking water, mining and irrigation.

Biodiversity. Rising watertables and increasing salinity impacts on native vegetation. Remnant native vegetation is threatened and this puts many species of native animals under threat. Riparian vegetation, critical to stream bank stability and often the only wildlife corridors left in and agriculture landscape, and wetland areas are already damaged and under increasing threat.

Public Infrastructure. Road and bridge damage caused by shallow saline groundwater is a major cost to local government. High water tables affect about 34% of state roads and 24% of national roads in SW NSW and damage costs about $9 million per year.
Salinity costs the city of Wagga Wagga $500.000 per year from salinity induced damage to roads, footpaths, parks, sewage pipes, housing and industry.

Urban Households. Costs vary from direct damage to buildings to the loss of value of residential land. Increased salinity in the Murray River is estimated to cost the city of Adelaide $55-65 million per year mainly dealing with harder water.

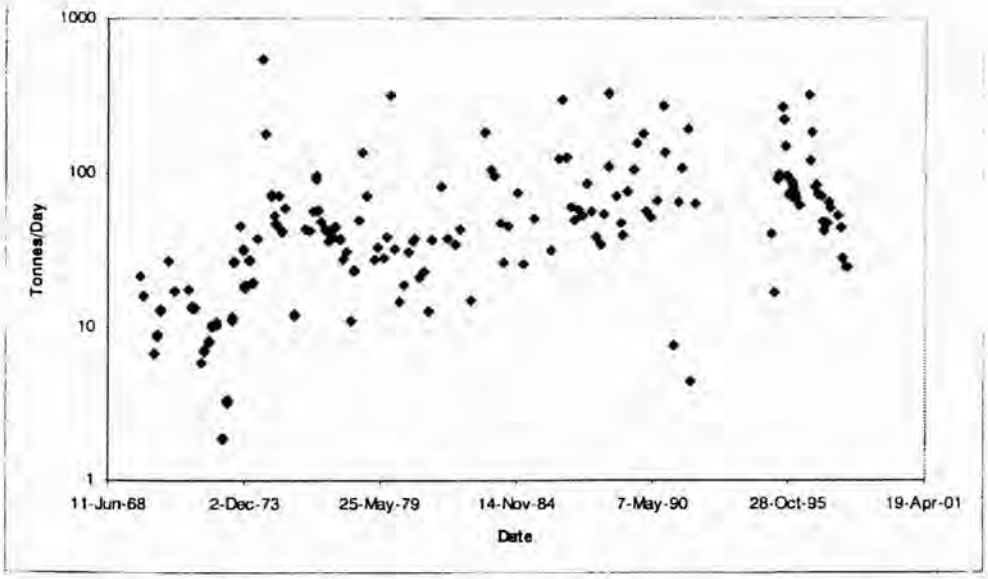


Figure Plot showing increasing salt load (flow multiplied by salinity) over time for Billabong Creek at Walbundrie, NSW. Note the large variability inherent in the data

(source : Barber and Armstrong 2000)

This creek at Walbundrie (near Albury) had the highest rising trend of salt concentration (40 µS/cm/yr) of any stream in the Murray Darling Basin over a 21 year period. The scatter graph shows a great deal of variation of data as the flow rate of the stream fluctuates wildly. The salt load average over the period was 52 tonne per day rising by an annual average of 4.8 tonne per day. The stream above Walbundrie flows through dryland cereal and grazing country. Rising groundwater levels measured in the Murrumbidgee-Riverina sub basin parallels the rising trend in the salt load.

The early signs and development of salinity

- The development of saturated conditions in the sub-surface, or where an aquifer already exists, a measurable increase in the hydraulic head. This may be soon after clearing in local flows and decades or longer in regional flows.
- An increase in the mass of salt discharged from the catchment.
- Presence, and growth, of areas of salinised soil where seepage occurs
- Poor growth and death of vegetation due to both excess water and excess salt.

The first two indicators will occur unnoticed unless there is monitoring. The other 2 are usually the first visual sign of salinisation .

Part Two – Managing Salinity.

The year 2000 saw the presentation of various major salinity management strategies. These include the allocation of $700 million for salinity and water quality programs over the next seven years announced by the Prime Minister in October, the release of the NSW Salinity Strategy by the Premier in August and the Murray Darling Basin Salinity strategy.

These strategies have developed from the realisation that although much has been done to combat the salinity problem the salinity levels of our rivers are increasing. Much of the effort was project based and relied on project funding and was *ad hoc* in character.

The Salinity Summit
In March 2000 the NSW Government hosted a salinity summit bringing together land managers, conservationists, scientists and others to address the problems of salinity. This summit, the recommendations and the resultant NSW Salinity strategy is an excellent example of the role of government in land and resource management (see the NSW Salinity Strategy for more details).

The NSW Salinity Strategy
This strategy involves a joint approach between government and communities. To slow down the increase in salinity we need to:

- Protect and manage native vegetation;
- use our land so less water goes into the watertable;
- use water more efficiently;
- use engineering solutions;
- make better use of land affected by salt; and
- focus our efforts on priority salinity hazard landscapes.

The major "tools" in the strategy are

1. The development of "**end of valley salinity targets**". This will be done by Catchment Management Boards these targets will reflect the salinity levels we are prepared to live with and can afford.
2. **Market based solutions and strategic investment**. The Government recognises that a market based approach supported by the community, is one of the key sustainable solutions to salinity. This strategy is still in the planning stage but it involves trading in "salinity credits". For example farmers that can demonstrate that their new farming practices (eg wood-lotting or the sowing of deep rooted perennials) has decreased the amount of recharge is credited with "salinity credits" which they can then sell to land managers that were seeking to manage their land in ways that increased salinity. These land managers would be required to buy credits to offset the cost their actions. Also salinity credits could be purchased and taken out of circulation to reduce salinity.
3. **Salinity-related business opportunities.** In the future the amount of land affected by salinity will increase significantly. New industries and products need to be developed that will utilise the saline water and soil. Many examples of these are mentioned in the strategy. These involve new products such as marine aquaculture and "saltbush fed lamb"; residual products such as salt mining and industrial use of saline waste water; and salt avoidance products such as farm and plantation forestry.
4. **Regulation.** Government intervention in the form of regulation and environmental planing is recognised as an important tool especially in relation to urban planing and urban salinity.
5. **Government Advice.** This will be provided by specialist Salt Action Teams. The teams will consist of hydrogeologists, ecologists, agriculturalists, economists and others in a mix that reflects the local needs
6. **Information.** As information underpins any sound management plan, a plan on this scale needs to gain greater access to data and analytical tools to provide information. This information tool also involves dissemination to the community and **educational institutions**.
7. **Research.** Our knowledge of salinity is still very incomplete and sound scientific research is necessary especially in the area of:
    - the biophysical processes of salinity;
    - the impact of salinity on natural ecosystems;
    - land-use systems that minimise recharge or allow use of salt-affected land and water; and
    - the social and economic impacts of options for action.

8 **Planning systems.** Planning at all levels will be undertaken. This will include partnerships between government, local government, community groups (eg Landcare) and Catchment Management Boards etc.

Some interesting aspects.

Use the water where it falls.

Farmers can reduce or eliminate recharge through leakage from the root-zone through the following farm practices.

- **Growing lucerne** not only as a user of water but as an economic producer in the farm plan eg as an alternative to clover pastures and an alternative to shallow rooted annual crops. Lucerne can be used to control recharge through **phase farming** (Ridley et. al. 1998). In areas where the rainfall is less than 600mm pa., lucerne can remove excess water from the root-zone and make a positive contribution to the lowering of the water table over the first 3 years of a lucerne crop in a rotation phase.
- **Alley farming** involves using a planned, managed combination of shrubs and/or trees in lines with cropping or grazing in-between.
- Planting **trees and woodlots** especially in steep, shallow and rocky recharge areas.
- Growing tree plantation as a commercial crop. ie **agro-forestry**.
- Avoiding summer fallows.
- Using **opportunity cropping** or double cropping. This is the practice of growing winter and summer crops in a well-managed rotation.

Why trees are not enough.

The solution to reducing rising watertables, waterlogging and salinity will not be achieved by just planting trees. To reduce the amount of water reaching the groundwater system by the amount necessary to lower the water table in salt affected areas other types of deep rooted perennial plants are required in farming programs. In many cases trees will not be enough to achieve the desired result unless much of the land is completely reafforested. Shallow rooted annual plants such as cereal crops and annual pastures, that are currently a major component of farming systems, will have to be replaced by deep- rooted perennial plants. Plants such as lucerne can play an important role in both the reduction of soil water leakage to the groundwater system and the economic productivity of the farm.

Improving the general health of crops to create maximum use of water not only reduces leakage to the ground water but also can also increases crop or pasture productivity and hopefully profitability.

Electromagnetic Surveys.

Recently a great deal of interest has been shown on the use of airborne EM surveys to monitor and locating salinity in the ground.

Scientists involved with geological surveying and mineral exploration have developed a method of measuring, interpreting and modelling both on the ground and in the laboratory, the geophysical data obtained from airborne surveys. This information can be used to determine with greater accuracy:

- where the salt is and where it is not - in a three dimensional representation;
- how much salt is stored in a particular area;
- the pathways that the salt takes as it moves through the landscape; and
- the rate at which the salt is delivered to the surface or into streams.

Fresh water can also be located using this technology.

The new technology is a high-resolution airborne electromagnetic system that can sense conductivity at least 150m below the surface and with an accuracy of better than 5 meters vertically and more than 50m horizontally.

This data can be used to intercept fresh ground water before it reaches salt areas in an aquifer and take the fresh water out of the groundwater system. It can also allow farmers and land mangers to determine the extent of their problems and more specifically accurately locate the source of the problems.

Some hydrologists still have reservations about the accuracy of this technology specifically in relation to the modelling of the data and the need for much more ground validation.

The cost is claimed to be very low as it can often be done in conjunction to other aerial surveys such as mineral surveys.

Market failure

Participants at the NSW Salinity Summit saw the emergence of salinity as an example of market failure, and ongoing market failure as one of the major barriers to prevention, reducing or living with salinity.

One cause of market failure is that the individuals and industries creating the problem may not be the same as those experiencing the problem.

Another cause of market failure is inadequate accounting for future costs. This is either due to lack of knowledge or the human tendency to discount things that may happen far into the future.

Subsidised water was provided to encourage the growth of irrigation industries. When the true cost of water is not factored in there is little incentive to use water efficiently.

The net result of this market failure is that the true cost of production in terms of environmental maintenance and the repair of land degradation is not reflected in the price of agricultural products. There is little incentive for land managers to fundamentally change the way they do business.

This has resulted in a strong market led approach to solving the salinity problems outlined in the State Salinity Strategy. Funds from the private sector in the form of investment are needed to supplement government funds for salinity remediation in both rural and urban land. (see the NSW Salinity Strategy for more details).

Part 3 Salinity in the Agriculture Syllabus

In the introduction I quoted from the NSW government's Salinity Strategy that the main reason that salinity has increased to this level is due to **inadequate knowledge about natural resources.** This is a good reason why we as schoolteachers need to understand the science and processes involved in salinity. At a recent seminar involving salinity officers, Landcare professionals and community members from the Murray River it was agreed that there was a widespread awareness of salinity but that the knowledge of the processes and other related aspects of the salinity problem was poor. As this problem will be of major consequence to the social, economic and environmental sustainability of our Australian way of life for the next 100years or more it is important that the community is **knowledgeable and not just aware** of salinity. It is here that schools can play a major role in the community education of salinity. A lack of knowledge encourages complacency, negative thinking and quick fix solutions such as "all farmers need to do is plant more trees".

Preliminary Year.

Introductory references are made to Aboriginal land practices prior to European arrival and the changes in the Australian environment that have occurred since the arrival of Europeans. Also students are asked to identify land degradation problems on their case study farm.

HSC Year

In the core study the concepts from the preliminary year are further developed with an emphasis on sustainable farming practices, community action and conservation of waterways.

A very specific elective study called "sustainable Land and Resource Management" has been a very popular elective (>50% of all participating students) and there is a possibility the participation will increase as previously it competed with the popular "animal production" in a choice of 1 in 3. In this new syllabus students now have to do 2 electives from a choice of 6. This elective study deals comprehensively with land degradation problems with specific references to salinity. (see appendix for syllabus extracts). Students can do a research project instead of the two electives and research involving salinity is very acceptable.

Teaching Resources and the Role of Salt Action

There are many very useful web sites and I have included a list of these they are still growing and it appears most of them are reinventing the wheel.

I have also provided a review of some videos and will continue to update these in BAAT when necessary.

Salt bags should also be available from NSW Agriculture early this year. The main component is an EC meter which has been purchased in a bulk order with the discount being passed on.

Field measurement and monitoring of saline water can be done using test wells or piezometers and access to these can be arranged.

Field trips and excursions are also being developed. Anyone bringing students to Yanco can arrange to have an evening talk on salinity, a 20 minute bus tour of irrigation salinity and remediation, or a 2-3 hour excursion relating to dryland salinity and remediation.

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Prime Ministers Science, engineering and Innovation Council 1998. **Dryland salinity and its impact on rural industries and the landscape.** Occasional paper no. 1.

Ridley, A. et al. 1998. **Phase Farming using lucerne in crop rotations.** in Michalk, D. and , J. Proceedings of the 9th Aust. Agronomy Conf. CSU. Http://life.csu.au/argonomy/

Appendix - Resources

Useful Web Sites

http://www.nsdp.gov.au National Dryland Salinity Program. Excellent set of fact sheets for students .

http://www.dwlc.nsw.gov.au Dept Land and Water Conservation

http://www.mdbc.gov.au Murray Darling Basin Commission excellent site covers many issues inc erosion.

http://www.landcareaustralia.com.au Landcare Australia

http://www.Landcarensw.org Landcare NSW – good case studies on salinity.

http://www.agric.nsw.gov.au NSW Agriculture. (use internal search facility).

http://www.nre.vic.gov.au Victorian Dept. Natural Resources

http://www.abc.net.au ABC. Go to "science" or "rural" for items on salinity.

http://www.science.org.au/nova/topicindex.htm Monitoring the White Death-soil salinity. Australian Academy of Science.

http://www.agric.wa.gov.au/progserv/natural/trees/Salinity/salgen.htm Dryland salinity an introduction. excellent.

http://www.nsw.gov.au obtain the document *Taking on the challenge: The NSW Salinity Strategy.*

http://www.nccnsw.org.au/veg/context/salinity_fs.html Nature Conservation Council of NSW. fact sheet

Salinity Teaching Resources – a brief review

Title	Type of Resource	Available from	Comments
Salinity our Problem	booklet	NSW Agriculture, DLWC, Riverina Field Studies Centre	A very good resource for 7-10 and a **good introduction to salinity for HSC students.** Clear and informative diagrams of processes.
Dryland Salinity	set of 8 pamphlets	DLWC. (Salt Action)	The first 4 books are up to date and have been reprinted. A little brief. Books 1 (the causes) and 2 (how severe is your discharge) are very relevant for students.
Salt	Video 25 min	Murray Darling Basin Commission GPO Box 409 Canberra ACT 2601 Ph 62790100	Excellent video, don't be put off by primary school students at the start. Covers topics well and is suited to secondary students. Concentrates on **irrigation salinity.**
Dryland Salinity	Video 35 mins	As above. (MDBC)	Up to date, topical and relates to western NSW. Good visuals and integrated approach. There is probably too much "talking head" and therefore would be best with keen students. Could be more on causes and processes.
Irrigation Salinity Notes	Pamphlets. Part of a series	NSW Agriculture. (Salt Action)	Very specific on various aspects of irrigation salinity. Good for students especially stage 6. **Irrigation Salinity.**
A Taste of Salt	Teacher Resource book	NSW Agriculture. (Salt Action). Education Officer Salt Action. Yanco Agric. Institute. Paul.robey@aric.nsw.gov.au	Excellent resource designed specifically for **the HSIE stage 3** (years 5/6) syllabus. May be useful for student activities in years 7 and 8. Developed and trialled in co-operation with some NSW primary schools.
Salt of the Earth	Video. 35 min	Distributor Media Associates PO Box 1067 Dickson ACT 2602 Phone 02 62421998 Fax 02 62421983	Featuring Roy Slaven a self proclaimed lover of soil and Dr. Anna Ridley a leader in soil water use research. A general but good overview of salinity with good coverage of causes and solutions. Looks at individual, community and government action.
Crisis in the Basin	video	Video Education 111A Mitchell St. Bendigo VIC 3550 ph. 03 54422433	Covers all aspects of river degradation in the Murray Darling Basin. Divided into sections with brief outline notes. Final section (18mins) deals with salinity. Some excellent detail and some radical and practical solutions eg. marine fish farming.

Code of accepted farming practice for the welfare of poultry

Source: Victorian dept of Agriculture

1 Introduction

This Code of Practice is intended as a guide for people responsible for the welfare and husbandry of domestic poultry. It recognises that the basic requirement for welfare of poultry is a husbandry system appropriate to their physiological and behavioural needs. The basic needs of poultry are:

readily accessible food and water to maintain health and vigour; freedom to move, stand, turn around, stretch, sit and lie down; visual contact with other members of the species; accommodation which provides protection from the weather and which neither harms nor causes distress; prevention of disease, injury and vice, and their rapid treatment should they occur.

The Code emphasises that, whatever the form of husbandry, managers and others responsible for the day-to-day needs of domestic poultry have a responsibility to care for animals under their control. The importance of good stockmanship in animal welfare cannot be over-emphasised. Persons responsible for the care of poultry should be well trained, experienced and dedicated. A knowledge of the normal appearance and behaviour of their birds is essential for them to be treated efficiently and with consideration.

Assistance with the establishment of poultry farms and advice on the management of poultry can be obtained from qualified advisers with experience in private or government employment. Veterinary advice should also be sought when poultry are in ill-health.

This Code is based on the knowledge and technology available at the time of Publication. It does not replace the need for experience and commonsense in the husbandry of domestic poultry.

This Code will be reviewed as frequently as necessary, to take account of advances in technology and in the understanding of animal physiology and behaviour and in regard to the expectations of the industry and the general community. Reviews to be undertaken within a maximum of 10 years.

2 Housing

2.1 General

2.1.1 Advice on welfare aspects should be sought when new cages or equipment are being purchased, new buildings being constructed or existing buildings modified. Such advice is available from qualified advisers with experience in private or Government employment.

2.1.2 Floors and other surfaces should be designed, constructed and maintained so as to minimise the risk of injury and disease, and to adequately support the birds.

2.1.3 Alternative husbandry systems and innovative cage designs which enhance bird welfare should be encouraged and applied to commercial egg production as practical and economical systems become available.

2.2 Cage Systems

2.2.1 The floor should be constructed to enable support for each forward pointing toe and the slope of the floor should not exceed 8 degrees.

2.2.2 In cages, birds should be able to stand at normal height. Cages should be at least higher than the maximum height of the birds standing normally. The height of all cages installed for layer hens after I January 1995 should be at least 40 cm over 65% of the cage floor area and not less than 35 cm at any point.

2.2.3 The design and size of cage openings should be such that birds can be placed in them and removed from them without causing injury or unnecessary suffering. All cages for laying fowls installed after 1 January 1995 should have doors the full height and width of the cage front.

2.2.4 Multi-deck cages should be arranged so that birds in the lower tiers are protected from excreta from above and so that all birds are fully visible for regular inspection and individual birds can be easily removed from cages as required.

2.3 Non-Cage Systems

2.3.1 Deep litter floors should be checked frequently for dryness and friability. If litter becomes caked, wet or excessively dusty the problem should be rectified.

2.3.2 Nest boxes and roosting areas should be easily accessible and should not be so high above the floor level that birds may be injured when ascending or descending.

2.3.3 Nest litter, where used, should be changed regularly so as to be clean, dry, friable and moisture absorbent.

3 Space allowances

3.1.1 It is recommended that baseline stocking densities be reviewed and adjusted according to advances In knowledge. The space allowed for each bird will vary according to the species, breed, strain and type of bird in addition to increasing age and weight.

3.1.2 The stocking density will also depend on the quality and type of housing and the capacity to achieve and maintain acceptable levels of temperature, humidity, air exchange, removal of noxious odours and lighting. Upon the occurrence of disease or evidence of behavioural changes, such as cannibalism, stocking densities should be re-evaluated immediately and adjusted accordingly. Other factors may be involved in disease or behavioural changes.

3.1.3 Maximum stocking densities apply only to birds housed under good management with optimal temperature and ventilation conditions, otherwise lower densities apply. Maximum densities generally refer to terminal liveweights but should not be exceeded at earlier growth stages, e.g. prior to thinning-out.

3.1.4 Floor space specifications in any non-cage system may include any slatted or metal mesh areas and any areas occupied by feeding and watering equipment and nest boxes.

3.1.5 Maximum stocking densities for poultry are presented in the appendices 1 and 2.

4 Equipment

4.1.1 All equipment to which poultry have access should be designed and maintained to avoid injury or pain to the birds.

4.1.2 All feeders and waterers should be checked for efficient operation at least once each day.

4.1.3 All automated hatchery and environmental control equipment for controlled environment sheds must have adequate back-up systems and alarms in case of equipment failure.

5 Lighting

5.1 Young birds reared away from the hen require a light intensity of about 40 lux on the food and water for the first three days after hatching in order to learn to find food and water. It may then be reduced to as low as 2 lux during rearing.

5.2 During inspection of poultry a light intensity of at least 10 lux at bird level is required.

5.3 Where young poultry are housed in enclosed sheds using continuous light, a 'blackout' training period should be implemented to prevent panic should lighting fail. A suitable method is to commence with 15 minutes blackout and increase over a few days to one hour in each 24 hours.

5.4 Where poultry do not have access to daylight they should be given lighting over a period of at least 8 hours per day. Photoperiods in excess of 20 hours per day may be detrimental to the laying bird.

6 Ventilation

6.1.1 Ventilation is required at all times to provide fresh air. The accumulation of water vapour, heat, noxious gases and dust particles may cause discomfort or distress and predispose to the development of disease. Consideration should be given to the feasibility of dust filters where air is mechanically recirculated in poultry houses.

6.2 Recognising the possibility of extremes of weather conditions, ventilation facilities and equipment should aim to maintain shed relative humidity below 80% at all times especially at temperatures above 30oC.

6.1.2 The presence of ammonia is usually a reliable indicator of the build-up of noxious gases; it should not be allowed to exceed 20 parts per million (ppm) of air measured at bird level in enclosed buildings without immediate corrective action being taken. (A level of 10-15 ppm of ammonia in the air can be detected by smell. An ammonia level of from 25-35 ppm will cause eye and nasal irritation in humans).

6.1.3 Hydrogen sulphide levels should be kept below 5 ppm and carbon dioxide below 0.3%.

6.5.1 If stocking density of fowls on deep litter exceeds 28 kg/m2 (equivalent to approx. 710 cm2 per 2.0 kg bird) in summer months or 32 kg/m2 (620 cm2 per 2.0 kg bird) in winter months mechanical air movement is essential. In force-ventilated sheds, assisted ventilation should be capable of exhausting up to 4.6m3 air/hour/kg liveweight during summer months with an optimum velocity of air movement past the bird of 0.25-1.0 m/second.

6.5.2 Force-ventilated sheds must have automatic alarm systems to warn of power failure. A back-up alarm system to warn of temperature increase in such sheds is also essential and should operate through an alternative circuit to the power failure alarm system. In force ventilated sheds emergency ventilation provisions including automatic backup power supply must be available.

7 Temperature

7.1 Newly hatched birds

7.1.1 Newly-hatched birds have a poor ability to control body temperature and require supplementary heat to bring their environmental temperature up to the comfort range as evidenced by alert and active behaviour. Optimum temperatures vary for different species and operators should know of the specific requirements for the species under their care.

7.1.2 Subject to species and seasonal variations supplementary heat at gradually reducing levels may be required up to about 5 weeks of age. The behaviour of the birds is the best indicator of discomfort if insufficient or excessive heat is being provided.

7.2 Growing and adult poultry

7.2.1 Poultry should be protected from draughts during cold weather and have access to shade during hot weather.

7.2.2 Adequate precautions should be taken to minimise stress produced by temperatures high enough to cause prolonged panting, particularly when high temperatures are accompanied by high humidity. In hot weather provision of adequate cool water and ventilation is essential. Where high temperatures are causing distress, foggers, roof sprinklers, fans or other systems should be used to control heat build-up within buildings. Foggers should not be used if relative humidity reaches 80% at temperatures above 30oC.

7.2.3 It is essential that no stocking density or other constraining practice be allowed to prevent birds adopting behaviour to facilitate body heat loss in hot weather, such as panting, vibrating the floor of the mouth cavity ('gular flutter') standing erect with wings held away from the body and raising of the scapular feathers.

7.2.4 The construction and positioning of nest boxes should be such that they do not become heat traps.

7.2.5 Recognising the possibility of extremes of environmental conditions, housing and facilities for heating and cooling should aim to maintain shed temperatures between 19oC and 33oC at all times.

8 Protection

8.1 Birds should be protected from predators. Other birds may present a welfare risk by predation, aggression, food competition or disease transmission. Vermin control measures should be taken if necessary.

8.2 Poultry accommodation should be sited to be safe from the effects of fires and floods.

8.3 Adequate fire-fighting equipment should be available to control a fire in any part of a poultry house.

8.4 When planning new buildings, consideration should be given to the use of construction materials with a high fire resistance, and all electrical and fuel installations should be planned and fitted to minimise the fire risk.

8.5 Sufficient exits should be accessible, especially in new buildings, to facilitate the evacuation of birds from the building in an emergency.

9 Food

9.1.1 Poultry, other than newly-hatched birds, should have access to food at least once in each 24-hour period. The complete withholding of food for longer periods is not acceptable. The period for newly-hatched birds may be extended to not more than 72 hours.

9.1.2 Poultry should receive a diet containing adequate nutrients to meet their requirements for good health and vitality. Poultry should not be provided with food that is deleterious to their health.

9.1.3 When using mechanical systems for delivery of food alternative methods of feeding should be available. There should be enough food on hand, or ready means of obtaining food, in the event of failure of supply. The manufacturer's recommendations on number of birds per feeder should not be exceeded. For fowls in laying cages a trough length of not less than 10cm per bird is recommended.

10 Water

10.1.1 Poultry should be provided with sufficient drinkable water to meet their physiological requirements. Water should be cool in summer.

10.1.2 Under no circumstances should poultry, other than those newly-hatched, be deprived of water for more than 24 hours. Newly-hatched birds require water within 72 hours. Lesser periods apply during hot weather.

10.1.3 Water which is contaminated or deleterious to health should not be provided.

10.4 A minimum of one day's calculated water requirements should be available in storage or auxiliary supply in case of breaks, repairs or failure of pumping equipment.

10.5 When a poultry enterprise is first established, or when a new water source is obtained, the water should be tested for salt content and microbiological contamination and advice obtained on its suitability for poultry. As the composition of water from bores, dams or water holes may change with changes in flow or evaporation, the water may require more frequent monitoring for suitability for use. Information on water testing can be obtained from the local office of the Department of Natural Resources and Environment .

10.6.1 Each bird should have access to at least two drinking points (drinkers, nipples or cups). The manufacturer's recommendation on number of birds per drinker should not be exceeded. For adult fowls in laying cages at least 10cm of water trough should be provided for each bird or no less than two nipple or cup drinkers should be provided within reach of each cage.

11 Health and distress

11.1.1 Those responsible for the care of domestic poultry should be aware of the signs of ill health or distress. Signs of ill-health in poultry include reduced food and water intake, reduced production, changes in the nature and level of their activity, abnormal condition of their feathers or droppings, or other physical features. Evidence of behavioural changes may indicate ill-health or distress or both.

11.2 If persons in charge are not able to identify the causes of ill-health or distress or to correct these, they should seek advice from those having training and experience in such matters. Such persons may be specialist poultry veterinarians or other qualified advisers in private or Government employment.

11.3 Poultry producers should also operate an effective programme to prevent infectious disease and internal and external parasitism. Vaccinations and other treatments applied to poultry should be undertaken by people skilled in the procedures.

11.4 Should an outbreak of feather picking or cannibalism occur, or an outbreak appear imminent, environmental factors that may aggravate it should be examined and if appropriate, adjustments made, such as reducing the stocking density, light intensity, temperature, humidity or disturbances to the pecking order, removing injured birds, removing birds observed to be instigating pecking, or eliminating shafts of bright sunlight.

11.5 Dead birds should be removed and disposed of promptly and hygienically. Records of mortalities, treatment given and response to treatment should be maintained to assist disease investigations.

11.6 Medication should only be used in accordance with the manufacturer's instructions unless professional advice has been given to vary the directions.

11.7 Birds with an incurable sickness or a significant deformity should be removed from the flock and humanely destroyed as soon as possible. Neck dislocation and gassing using carbon dioxide or other suitable gases are acceptable methods provided these are carried out competently.

11.8 Where required, premises and equipment should be thoroughly cleaned and disinfected before restocking to prevent the carry-over of disease-causing organisms to incoming birds.

11.9. Buildings should be effectively constructed and maintained to restrict the entry of wild birds, rodents and predators that are capable of causing disease and/or distress.

12 Inspections

12.1 The frequency and level of inspection should be related to the likelihood of risk to the welfare of the birds, but should be at least once each day. Inspections are best made separately to other management practices. Under certain

circumstances more frequent inspections may be required, such as during hot weather or during outbreaks of disease or cannibalism. Dead and injured birds should be removed for disposal or appropriate treatment without delay. Checks should also be made of the effectiveness of any automated feeding or watering systems where these have been installed.

12.2 Where cages are installed in multiple tiers it should be possible to inspect birds in all tiers easily and routinely.

12.3 Poultry should be checked regularly for evidence of parasites and effective treatment should be instituted according to the manufacturer's directions.

13 Management practices

Some of the following management practices may only occur in commercial enterprises and some may only apply to fowls under range conditions.

13.1 Artificial Insemination

13.1.1 Artificial insemination is a highly skilled procedure that should be carried out only by competent, trained personnel maintaining a high standard of hygiene and taking care to avoid injury or unnecessary disturbance to the birds.

13.2 Beak Trimming

13.2.1 When performed as a preventive measure beak trimming should be carried out by a competent operator soon after hatching and preferably within 3 weeks. For chickens, the operator may remove not more than half of the upper beak and one-third of the lower beak.

This means:- day old chickens: not more than 3mm of the upper and 2.5mm of the lower beak.

10-day old chickens, not more than 4.5mm of the upper and 4mm of the lower beak.

13.2.2 Further trimming of the beaks of growing birds may be necessary to prevent cannibalism during the laying period but not as a means of restricting or retarding body weight.

13.3 Dubbing (Fowls)

13.3.1 If dubbing is necessary it should be carried out by a competent operator soon after hatching, preferably within 72 hours.

13.4 Toe trimming

13.4.1 To avoid injury to hens during mating, the terminal segment of each inward pointing toe of male breeding birds may be removed soon after hatching, preferably within 72 hours.

13.4.2 For all other classes of birds, trimming, if necessary, should be limited to the. nail of the toe only.

13.4.3 Sharp spurs on adult males should be trimmed to prevent injury to other birds and handlers.

13-5 Blinkers ('spectacles')

13.5.1 The use of blinkers and other vision impairing equipment is not recommended except where other measures to control cannibalism have failed.

13.5.2 Blinkers should be applied by a competent operator and those which cause mutilation of the nasal septum should not be used.

13.5.3 Blinkers which may injure the bird if they become entangled should not be used.

13.5.4 Blinkers should not be applied to poultry unless nest boxes are situated at ground level.

13.6 Castration ('surgical caponising')

13.6.1 This is an unacceptable practice and should not be undertaken.

13.7 Devoicing

13.7.1 This is an unacceptable practice and should not be undertaken. 13.8 Flight restriction

13.8.1 De-winging, pinioning, notching or tendon severing to restrict flight in poultry are unwarranted practices and should not be performed

13.8.2 If flight restriction is required, the flight feathers of one wing may be trimmed.

13.9 Moult inducement and controlled feeding

13.9.1 Moult inducement or controlled feeding practices should only be carried out on healthy birds under close management supervision and under conditions that will not cause cold stress. Substitution of a high fibre diet, for example, whole barley, in place of normal rations is a preferred method of moult inducement. Adequate feeding space is necessary during such practices.

13.9.2 The use of electric pulse wires to control feeding or to compensate for deficient cage designs is not recommended. Wires to deter birds from perching over feed or water containers should only be live for necessary training periods.

13.9.3 Methods of moult inducement and controlled feeding which totally deprive birds of food or water for more than 24 hours should not be used.

13.10 Identification

13.10.1 Wing and leg bands used for bird identification should be checked regularly and where necessary loosened or removed to avoid injury to the bird. Webbing between the toes may also be used for identification by marks made within 72 hours of hatching.

14 Hatchery management

14.1 Culled or surplus hatchlings awaiting disposal should be treated as humanely as those intended for retention or sale. They should be removed and humanely destroyed by a recommended method such as carbon dioxide gassing and thoroughly inspected to ensure that all are dead.

14.2 Hatchery waste, including unhatched embryos, should be destroyed quickly and effectively.

14.3 Hatchlings should be brooded within 72 hours of hatching. Weak, deformed and unthrifty birds should be culled and destroyed humanely.

14.4 Young birds in brooders should be inspected at least twice every 24 hours and action taken to correct deficiencies in husbandry should such occur.

15 Transport of day old birds

15.1 Day-old birds should be healthy and vigorous. They should be placed in suitably ventilated boxes without overcrowding. Care should be taken to ensure adequate ventilation of the boxes, particularly when they are stacked. The birds should be protected from direct sunlight and cold draughts.

15.2 Packing materials used inside boxes should be new, clean, dry and non-toxic.
15.3 The stocking density for day-old chickens for transportation should not exceed 25cm2 per bird (standard containers are 60 cm by 45 cm for 100 chickens).
15.4 Internal dividers in boxes for freighting day-old birds should be secured to the floor of the boxes or the floors sufficiently rigid to prevent entrapment of part of the bird on movement of the boxes.
15.5 Boxes used for long distance freighting should be clearly marked with the date and time of dispatch and written instructions should be provided on required holding conditions for the attention of those responsible for transportation.
15.6 Hatchlings should be brooded as soon as possible after delivery.

16 Transport of growing and adult poultry

16.1 Birds should be herded for pick-up only under the supervision of a competent person to avoid suffocation and bruising. They should be handled and crated gently to avoid injury. At all times care should take precedence over speed and labour cost.
16.2 Sick or injured birds should not be crated and should be treated or humanely destroyed.
16.3.1 Crates or cages used for the transport of poultry should be of a design that when properly maintained and managed prevents escape from, or the protrusion of any part of a bird through, the crate such that it could be entrapped or damaged during handling or transport. Cage floors should be rigid or supported to prevent collapse onto structures or cages below.
16.4 Crates, or cages, should be loaded on transports in a manner that provides for adequate ventilation for the birds particularly when vehicles are stationary. Crates, or cages, should be securely attached to the transport vehicles to prevent injury to the birds.
16.5 Crates should be ventilated and of sufficient height to allow birds to stand, move and seek comfort but to prevent bruising during transport. Crates should be designed and maintained to allow birds to be put in and taken out without injury.
16.6 Covers should be provided to protect birds in crates from wind and rain and from excessively hot or cold conditions. Special care is necessary in hot weather to ensure that the provision of covers does not restrict air movement or elevate temperatures within the crates.
16.7 Birds should not be held in crates or containers for longer than 24 hours unless they are assured of access to food and water. It is recommended, when a delay is anticipated and holding time is likely to significantly exceed 24 hours, that suitable arrangements be made e.g. the birds be released into a shed where they have access to feed and water or immediate slaughter arranged at another slaughterhouse, as may be appropriate.
16.8 Contingency plans should be in place to minimise any delay that could be stressful to birds as a result of transport breakdowns and to minimise any distress to the birds.
16.9 The responsibility for birds during transportation rests with the transport driver or railway official.

17 Sale of poultry

17.1 Where poultry are sold at saleyards they should be unloaded without delay from transports and placed in pens or cages with access to feed, water and shelter.
17.2 Stocking densities at saleyards should not exceed those densities recommended in the appendices by more than 50% for more than 12 hours.
17.3 Poultry should not be held at saleyards for more than 24 hours.

18 Poultry at slaughtering establishments

18.1 Care should be exercised to ensure that poultry are not subjected to unnecessary stress while awaiting slaughter.
18.2 Contingency plans should be available in the event of an industrial dispute or processing plant closure.
18.3 Birds should be stunned and bled, neck dislocated or decapitated, with minimal handling and in such a manner, either manually or mechanically, that minimises distress and bruising/injury. Detailed recommendations are contained in the publication Model Code of Practice for the Welfare of Animals, Livestock and Poultry at Slaughtering establishments (Abattoirs, Slaughter-houses and Knackeries). Model codes are available from CSIRO publications

APPENDIX I: Additional recommendations for range poultry

Range poultry include backyard poultry and any other housing or management practice where poultry are not confined to cages.

A1.1 Management
Poultry should not be kept on land which has become contaminated with poisonous plants, chemicals or organisms which cause or carry disease to an extent which could seriously prejudice the health of poultry. The time taken for land to become so contaminated depends upon the type of land and the stocking density. Flocks should be moved before this stage is reached. Houses should be sited on well drained land and should be portable to facilitate regular movement to avoid continuously muddy conditions which may lead to the discomfort of the birds. Alternatively management practices should be implemented to avoid such conditions developing. Permanent sheds should be sited and managed to prevent the development of
continuously muddy or contaminated conditions. Shelter from sun and rain should always be available. Windbreaks should be provided in exposed areas.

A1.2 Housing
When poultry are transferred to range houses, precautions should be taken to avoid crowding and suffocation, particularly during the first few nights. Birds should not be confined for too long during hours of daylight or subjected to direct sunlight during confinement.

A1.3 Health & Protection
A1.3.1 Predators: Precautions should be taken to protect poultry against foxes, cats, dogs and other predators.
A1.3.2 Diseases: Regular monitoring for parasitic and infectious disease should be undertaken and treatment applied to control or eradicate these before outbreaks cause ill-health or losses. Cannibalism is likely if localised high stocking densities occur.
A1.3.3 Food: Supplementary-feed should be provided to range poultry.

APPENDIX 2: Maximum recommended stocking density for fowls

It is not possible to relate stocking density to welfare in a simple manner. Adequate welfare involves consideration of group size, the housing system, the feeding and watering system, the breed and strain of fowl, temperature, ventilation, lighting and other husbandry factors. The observance of any particular stocking density on its own cannot ensure the welfare of birds. This appendix supplements material in Section 2 - Housing and Section 3 - Space Allowances.

A2.1 Cage Systems
The Agricultural and Resource Management Council of Australia and New Zealand has agreed that minimum space allowances for the domestic fowl held in cage systems for egg production be installed in the statute law of States and Territories and come into force from 1.1.96. The standard will provide a minimum space allowance of 450 sq cm per layer hen under 2.4 kg with heavier birds receiving 600 sq cm, calculated to include the area under any egg baffle/manure deflector.
A2.1.1 Floor area is measured in a horizontal plane and includes the area under the egg/waste baffle and the area under the drinking nipples and vee-trough for water.
A2.1.2 Rearing fowls for laying or breeding 40 kg liveweight per m2 cage floor area.
A2.1.3 Laying or breeding fowls weighing up to 4.5kgm liveweight

Table 1 Types of cageUntil 31.12.95
Maximum liveweight per unit of floor area (kg/m2)After 1.1.96
Minimum cage floor area per bird (cm2)
3 or more fowls (<2.4kg) per cage52450
3 or more fowls (>2.4kg) per cage52600
2 fowls per cage40675
single fowl cages261000

A2.2 Deep litter (where greater than 50% of the floor is litter) Floor area may include any slatted or metal mesh area and any area occupied by feeding and watering equipment and nest boxes. In the case of birds kept for breeding, liveweight to include the weight of cockerels. Rearing of laying fowls Rearing of layer and meat chicken breeders30kg/m2; Laying and breeding birds, Meat chickens40kg/m2

A2.3 Range Indoors As for deep litter.
Outdoors No more than 1500 hens per hectare (600 hens per acre)

A2.4 Transportation
Recommended maximum liveweight densities for growing and adult fowls: Hot and/or humid conditions 55 kg/m2Other times 60 kg/m2

This publication may be of assistance to you but the State of Victoria and its officers do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

Some more information.....

Useful Web Sites:

Poultry dissection slides: http://www.uga.edu/poultry/courses/ps202lr4/index.htm
This site has slides of a poultry dissection, showing a different bit on each slide

Chick hatching images:
http://www.ext.vt.edu/vce/specialty/anscience/poultry/imagelib/index.html
The different stages of embryo development are shown, culminating in the hatching of a chick

Links to many Australian and international poultry sites:
http://ansc.une.edu.au/poultry/links.html#1

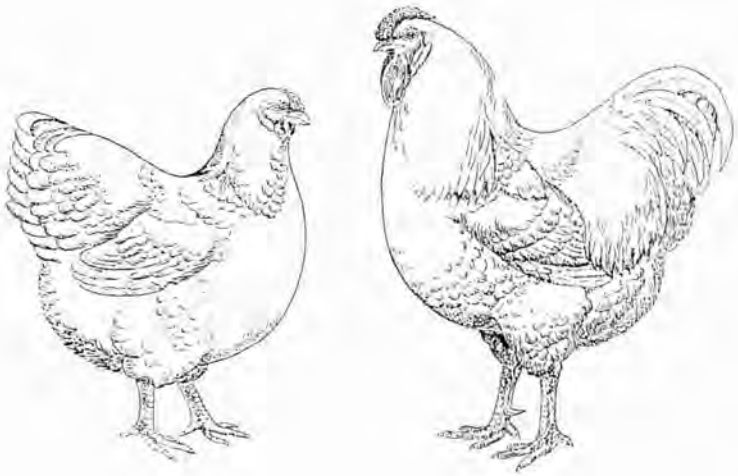
Information on cloning and Genetic engineering techniques:
http://www.genaust.com.au/technologies.htm

If you have found any useful web sites please share them with others,

similarly, if you are having trouble locating some info, let us know and maybe someone will have the answer.

Email details to : brigitte@zipworld.com.au

Wyandotte Information



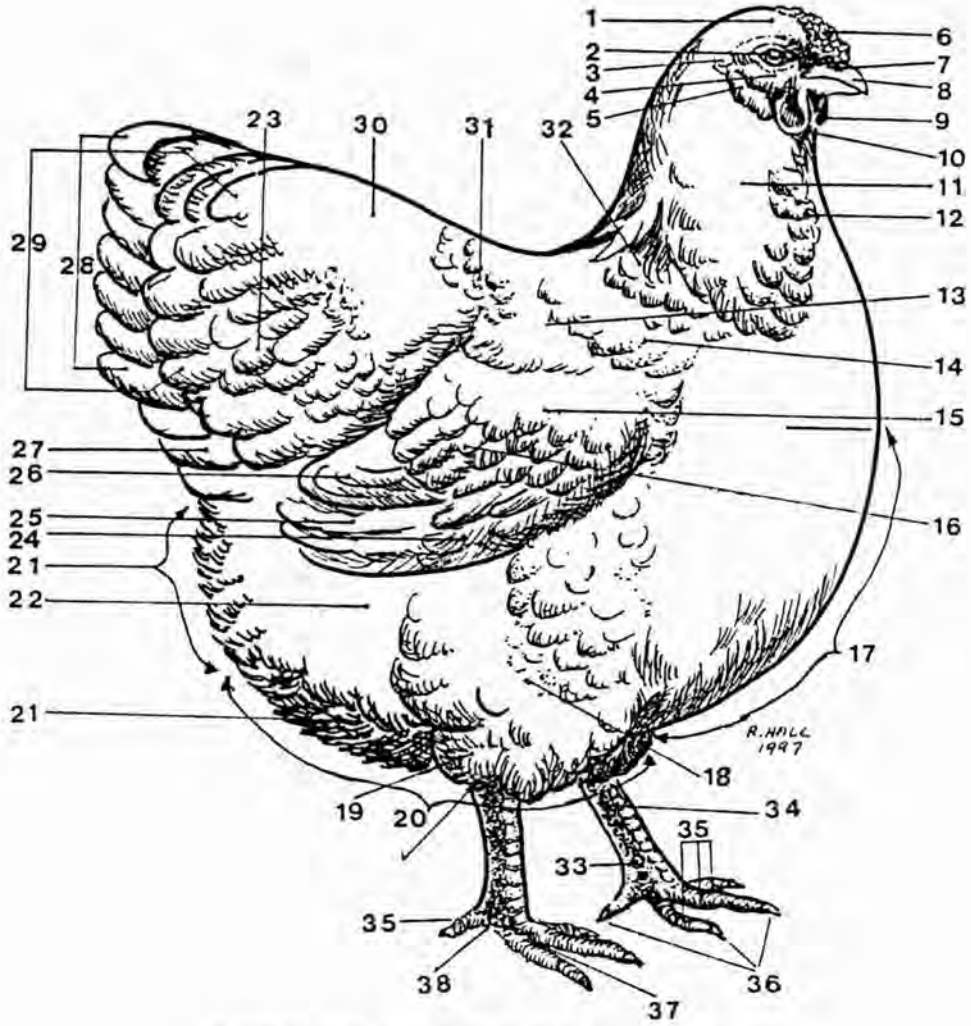
The Wyandotte poultry club have been a strong supporter of Sydney schools for many years. They have always been ready to give advice on show preparation and have provided many schools with birds and fertilised eggs. They run a School Competition as part of their annual show, held every June at either Castle Hill or Fairfield Showgrounds. Wyandotte shows are also held at various venues throughout the state. At time of writing, the cost of junior membership was $10.00. Members receive a newsletter which contains show dates and results, as well as articles on care and preparation of the various types of Wyandotte. Meetings are generally held at Fairfield or Moss Vale Poultry Pavilions.

Further information on the club or Wyandotte poultry can be obtained by contacting:

Sydney District and International Wyandotte fanciers Inc.

President: Mr W. Doherty
39 Norcott Rd.
Lalor Park, 2147

WYANDOTTE FEMALE

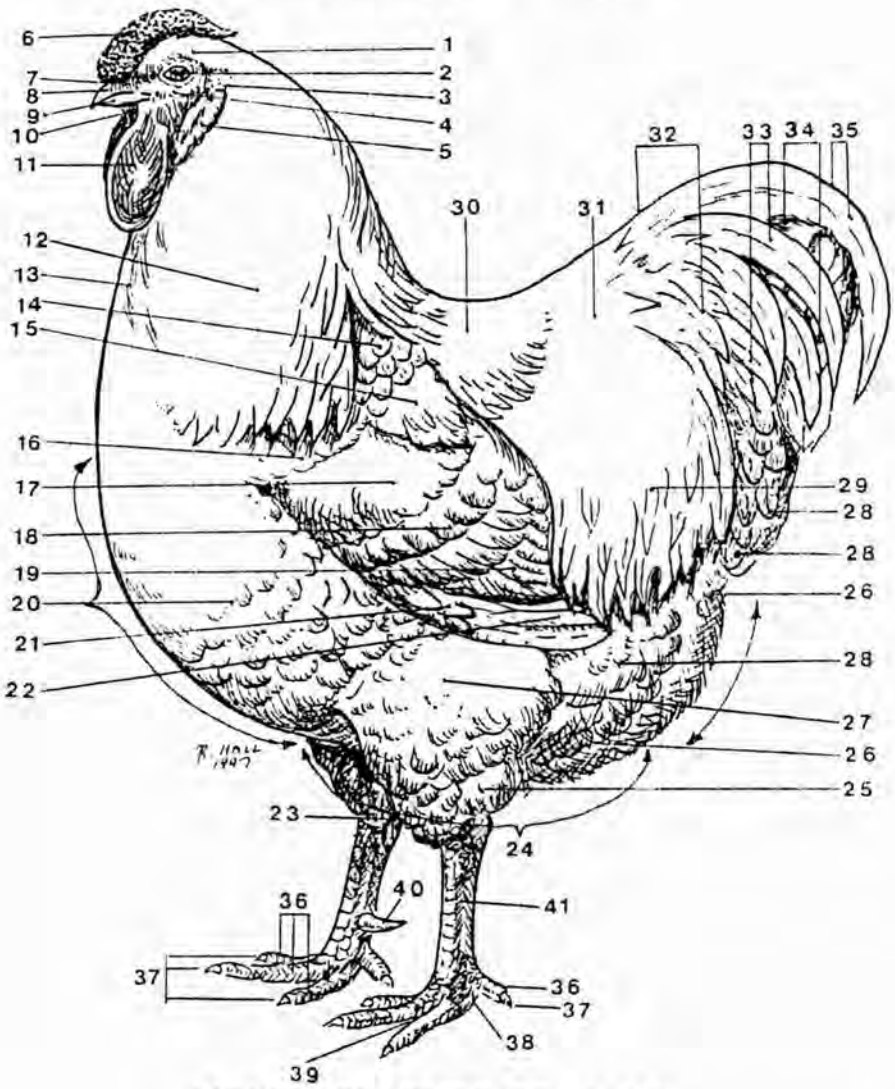


NOMENCLATURE OF FEMALE

1. Skull
2. Eye
3. Ear
4. Face
5. Ear-Lobe
6. Comb
7. Nostril
8. Beak
9. Wattle
10. Throat
11. Hackle
12. Front of Neck Plumage
13. Shoulder
14. Wing Front
15. Wing Bow
16. Wing Covert or Wing Bar
17. Breast
18. Lower Thigh Plumage
19. Middle of Hock Joint
20. Abdomen
21. Fluff or Stern
22. Rear Body Feathers
23. Cushion
24. Primary Coverts
25. Primaries
26. Secondaries or Wind Bay
27. Rear Body Feathers
28. Main Tail
29. Tail Coverts
30. Sweep of Back
31. Back
32. Cape
33. Spur
34. Shank
35. Toes
36. Toe Nails
37. Web
38. Foot

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WYANDOTTE MALE



NOMENCLATURE OF MALE

1. Skull
2. Eye
3. Ear
4. Face
5. Ear-Lobe
6. Comb
7. Nostril
8. Upper Mandible or Beak
9. Lower Mandible or Beak
10. Throat
11. Wattle
12. Hackle
13. Front of Neck Plumage
14. Cape
15. Shoulder
16. Wing Front
17. Wing Bow
18. Wing Coverts or Wing Bar
19. Secondaries or Wing Bay
20. Breast
21. Primary Coverts
22. Primaries
23. Middle of Hock Joint
24. Abdomen
25. Hock Plumage
26. Fluff or Stern
27. Lower Thigh Feathers
28. Rear Body Feathers
29. Lower Saddle
30. Back
31. Upper Saddle
32. Tail Coverts
33. Lesser Sickles
34. Main Tail
35. Main Sickles
36. Toes
37. Toe Nails
38. Foot
39. Web
40. Spur
41. Shank

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THE WYANDOTTE- specifications

Origin of Breed North America
Classification Heavy Breed

The Wyandotte is a bird of curves showing no flat sections when viewed from front and sides. The bird should give the appearance of being deeper than it is long. A medium weight, dual purpose fowl for the production of meat and eggs. Colour of skin, yellow; colour of egg shells, varying from very light to a rich brown, depending on individual strain, and the stage of production.

STANDARD WEIGHTS:	STANDARDS
Cock 4 kg (8 1/2 lbs)	Hen 3 kg (6 1/2 lbs)
Cockerel 3.5 kg (7 1/2 lbs)	Pullet 2.5 kg (5 1/2 lbs)

STANDARD WEIGHTS:	BANTAMS
Cock 850 gms (30 ozs)	Hen 750 gms (26 ozs)
Cockerel 750 gms (26 ozs)	Pullet 700 gms (24 ozs)

SHAPE MALE

COMB: Rose; low, firm on head; top, free from hollow centre, oval, surface covered with small, rounded points; tapering to a well-defined point at rear; the entire comb curving to conform to the shape of skull.

BEAK: Short, well curved.

FACE: Smooth, free from small feathers; skin fine and soft in texture.

EYES: Full, round, prominent.

WATTLES: Moderately long, nicely rounded at lower edges, uniform, fine in texture, free from folds or wrinkles.

EAR-LOBES: Oblong, well defined, hanging about one-third the length of wattles; smooth.

HEAD: Short, round, crown broad.

NECK: Short, well arched. Hackle - abundant, flowing well over shoulders.

BACK: Medium in length, broad its entire length, flat at shoulders.
Saddle - broad, full, rising with concave sweep to tail; Saddle feathers abundant.

TAIL: Short, well spread at base, carried at an angle of forty degrees (40^0) above horizontal.
Main Tail - broad and overlapping. Sickles - moderately long, curving gracefully and closely over tail. Coverts - broad, abundant, filling out well in front, hiding the stiff feathers.

WINGS: Medium in size, well folded; carried not too closely to body, and without drooping; sides well rounded. Primaries and Secondaries - broad and overlapping in natural order when wing is folded.

BREAST: Broad; deep, rounded.

BODY AND FLUFF: Body - medium in length, deep, round. Fluff - medium in length, moderately full, smooth, not so abundant as to hide profile of lower portion of lower thighs.

LEGS AND TOES: Legs - set well apart and straight when viewed from front. Lower Thighs-medium length, stout, showing outlines when viewed sideways, well covered with smooth feathers. Shanks - medium length, stout, well-rounded, smooth. Toes - four on each foot, straight, well spread.

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SHAPE FEMALE

COMB: Rose, similar to that of male, but much smaller.
BEAK: Short, well-curved.
FACE: Smooth, free from small feathers.
EYES: Full, round, prominent.
WATTLES: Fine in texture, well rounded.
EAR-LOBES: Oblong in shape, well defined.
HEAD: Short, round; crown, broad.
NECK: Short, well-arched; neck feathers abundant.
BACK: Medium in length, broad its entire length, flat at shoulders; rising in a concave sweep to a broad, slightly rounded cushion, which extends well on to main tail; plumage abundant.
TAIL: Short, well-spread at base, carried at an angle of thirty degrees (30^0) above horizontal. Main Tail - broad and overlapping. Coverts - broad, abundant.
WINGS: Medium in size, well-folded; carried not too closely to body and without drooping; sides well-rounded. Primaries and Secondaries - broad and overlapping in natural order when wing is folded.
BREAST: Broad, deep, round.
BODY AND FLUFF: Body - medium in length, deep, round. Fluff - medium in length, moderately full, smooth, not so abundant as to hide profile of lower portion of lower thighs.
LEGS AND TOES: Legs - set well apart and straight when viewed from front. Lower Thighs – medium in length, stout, showing outlines when viewed sideways; well-covered with smooth feathers. Shanks - medium in length, stout, well-rounded, smooth. Toes - four on each foot, straight, well-spread.

GENERAL DISQUALIFICATIONS

Specimen lacking in breed characteristics.
Definite indications of contagious or communicable diseases.
Evidence of faking.
COMB: Comb foreign to breed, over large, lopped, sufficient to obstruct sight.
SHANKS AND TOES: Duck foot, knock knee, bow leg, deformed foot and foot joint, more or less than four toes. Presence of, or unmistakable evidence of the removal of any down, stub, feather, or part of feather from shanks below the hock joint or foot, or foot or toe. Foreign colour to that described for breed and variety (slight reddish tinge of pigment in yellow shanked varieties not to disqualify).
BEAK: Deformed.
EYES: Blind in both, irregular pupil.
WINGS: Primaries or secondaries: twisted feather, spit wing, slipped wing.
BACK: Crooked, roached or deformed.
TAIL: Permanent absence, split tail, twisted feather, squirrel tail, wry tail.
BODY: Crooked keel or beast bone.

SERIOUS DEFECTS

Absence of leader, or more than one leader, telescoped or stopped comb.
Keel front.
Split front.

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Fast Facts

Australia's Sheepmeat Industry

Australia is one of the world's leading producers of lamb and sheep and is the world's largest exporter of mutton and second largest exporter of lamb.

Australian sheep and lamb flock

as at June 2000



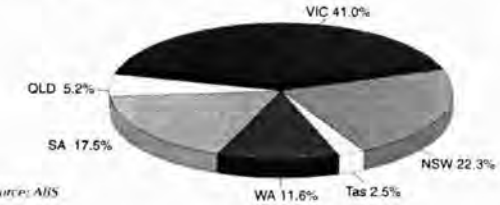
Source: ABS

Did you know...

- Around 43,700 Australian farms carry at least 200 sheep. Of these, around 39% receive some revenue from prime lambs (ABARE).
- The prime lamb industry is concentrated in NSW and Victoria. In 1999-2000, over 85% of prime lamb producers who received more than 20% of their income from prime lamb sales were located in these two states (ABARE).
- Last year Australia produced around 373,000 tonnes of lamb and 347,000 tonnes of mutton (ABS 2000).
- Together Victoria and NSW produce 63% of Australia's total lamb production and 58% of Australia's mutton production.
- The gross value of Australian sheep, lamb, and live sheep production is estimated at $1.5 billion (ABARE).

Australian lamb production

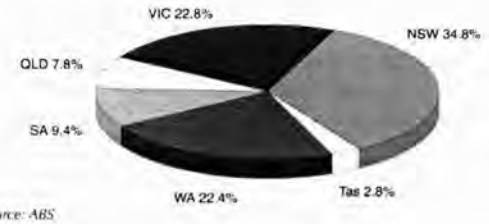
Total = 373,364 tonnes cw (2000)



Source: ABS

Australian mutton production

Total = 347,440 tonnes cw (2000)



Source: ABS

Consumption:

- Australians eat 5.8kg of mutton and 13kg of lamb per person yearly (carcase weight - MLA 2000 estimate).
- Around 58% of Australian households buy fresh lamb (Roy Morgan Brand Planner 2000).
- Fresh lamb consumption throughout Australia is around 24 million servings per month (Roy Morgan Brand Planner 2000).

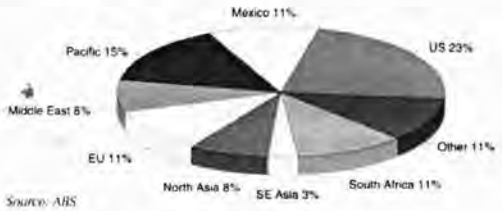
Flock facts and figures:

- 53,150 properties with sheep and lambs (ABS 2000)
- Sheep and lamb flock total 118.6 million (ABS 2000)
- 50 million breeding ewes (ABS 2000)
- 31 million lambs aged under one year (ABS 2000)

MEAT & LIVESTOCK AUSTRALIA

Lamb exports

Total = 111,919 tonnes sw (2000)



Source: ABS

Live sheep exports

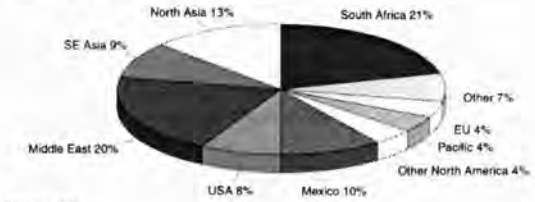
Total = 5,351,796 head (2000)



Source: ABS

Mutton exports

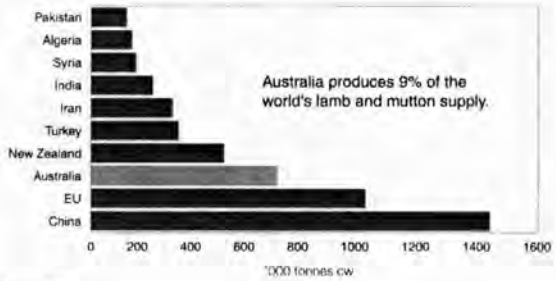
Total = 179,478 tonnes sw (2000)



Source: ABS

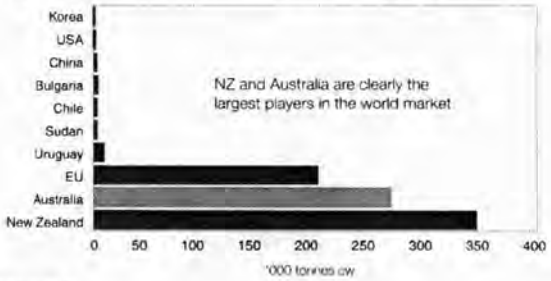
Around the world:

Top ten lamb and mutton producing countries



Source: FAO

Top ten world lamb and mutton exporters



Source: FAO

Export facts and figures:

- In 2000, Australia exported 35% of its total lamb production and 67% of its total mutton production (AFFA/ABS 2000).
- The value of total lamb exports in 2000 was $440.5 million and mutton exports was $363 million (ABS/AFFA). A close second behind New Zealand in world lamb exports and largest mutton exporter.
- In 2000, 44% of Australia's mutton exports was bone in mutton, 25% carcase, 14% bone out primals, and 17% manufacturing (AFFA).
- In 2000, 77% of Australia's lamb exports was bone in lamb, 11% carcase, 10% bone out primals, and 2% manufacturing (AFFA).
- Australian live sheep exports were valued at $214 million in 2000 (ABS) - the world's largest live sheep exporter.
- 79% of Australian live sheep exported from Australia are shipped from Western Australia.

Contact

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Japan: World Trade Centre Bldg, PO Box 29, Trade Centre, 2-4-1 Hamamatscho, Minato-ku, Tokyo 105-6112 JAPAN Tel +81 3 3435 5785 Fax +81 3 3438 1677
Europe: c/- Australian Consulate General; 5th Floor; Gruneburweg 58-62; 60322 Frankfurt - Main; GERMANY Tel +49 69 9055 8500 Fax +49 69 2055 8519

SHEEPMEAT
Sheep

History

Sheep arrived in Australia on the First Fleet over 200 years ago. Governor Phillip had 29 sheep on board, bought from the Cape of Good Hope in South Africa. Along with the sheep, there were about six cows, two bulls and a handful of goats, pigs and poultry. The animals would help the new settlers establish a food source.



The colonists found farming sheep difficult. The conditions in Australia were different from England. The coastal grasses around Sydney did not suit the sheep's diet and the climate was hot.

The course of sheep farming changed with two events. The first was the explorers, who on venturing into central Australia, found fertile land for sheep grazing. The second event was the arrival in Australia of the **merino** breed of sheep.

In 1797, two ships from the new Sydney settlement sailed to South Africa for fresh supplies. As luck would have it, a small flock of Spanish Merinos, descended from a gift from the King of Spain to the Dutch Government, was being disposed of. The two Sydney bound ships bought 13 each.

When the ships returned to Australia, a pioneering farmer, Captain John Macarthur, purchased four ewes and two rams. The breed soon thrived making Captain Macarthur one of our early pioneers of sheep production.

There are now around 116 million sheep in Australia.



All about sheep

Sheep are production animals, raised to provide us with useful products. Other production animals include cattle (for beef meat and milk), chicken (for eggs and chicken meat) and pigs (for pork meat). Sheep and lambs are social animals that like staying in groups called **flocks**.

Sheep have cloven (split) hooves allowing them to climb steep hills. They can be raised in areas with hills and rocks. The dense fleece (wool) keeps a sheep warm and dry during winter and cool during summer. The farmer shears the fleece, normally once a year, to sell as wool.

Sheep produce two major products for us. Nutritious meat such as lamb (from younger animals) and mutton (from older animals) provides us with protein (the building blocks for growth), energy and vitamins/minerals. The fleece provides wool used in clothing, fabrics and carpets. Sheep by-products make hundreds of everyday household and food products such as soap, cosmetics, fine china, gelatin, medicinal supplies and even strings for musical instruments.





Turning grass into meat

Sheep are **herbivores** meaning they only eat plants such as grass. They have no top front teeth, enabling them to eat grass and pasture close to the ground without pulling up the roots. They will also eat some weeds and other plants, which can grow uncontrolled if not grazed, making them an excellent production animal when managed properly.

Pasture food such as grass help lambs and sheep gain weight and grow. They are **ruminants** meaning that they have four stomachs and regurgitate food after swallowing. Sheep re-chew regurgitated food (known as cud) to help in its digestion.

MEAT & LIVESTOCK
AUSTRALIA

The Sheep Flock

Ram A male sheep used for breeding
Fact: *Some rams have horns that continue to grow throughout life*

Wether A castrated male sheep

Ewe A female sheep
Fact: *A ewe usually gives birth to one or two lambs each year*

Lamb A sheep less than one year old, with no permanent teeth
Fact: *A ewe can identify its lamb by its bleat and smell*

Weaner A lamb taken away from its mother and fed on pasture



Sheep breeds

There are hundreds of sheep breeds in the world. A breed is a certain type of sheep which has features suited to different types of production. Some breeds are good at producing wool, while others are good at producing meat.

Farmers who breed sheep to produce quality meat are called **prime lamb producers**. They use many different breeds of sheep to produce lambs with the best meat.

Farmers who breed sheep for wool are called **wool producers**. Most of the sheep in Australia are bred for wool. The most popular breed for fine wool is the merino, which is often used to make suits. Other breeds produce wool for use in blankets and carpets. A by-product of wool production is also meat. Meat from older sheep is known as mutton.

Breeds that produce good quality wool and meat are called 'dual-purpose breeds'.

The black sheep

Occasionally, black lambs are born in flocks. Sheep farmers view them as a problem because black wool can contaminate the normal white wool. The farmer therefore separates black sheep from the rest of the flock.





WORD MAZE

1. Who was one of the first pioneers of sheep in Australia?
2. What is a male sheep, used for breeding, called?
3. and 4. What are the two main products from sheep?
5. What is a sheep under one year old called?
6. What is a female sheep called?
7. Identify one way ewes can identify their lambs ... by their _ _ _ _ _.
8. What is the most popular breed of sheep in Australia?

W	S	B	R	A	M	U	A	R	P
I	O	T	R	G	A	I	I	D	M
M	Y	O	P	K	I	E	J	A	A
A	D	R	L	S	T	W	E	O	C
O	A	U	D	U	M	E	N	I	A
N	I	B	M	A	L	R	G	T	R
I	T	C	Z	O	N	A	O	F	T
R	L	T	B	L	E	A	T	S	H
E	I	A	H	S	F	Q	X	U	U
M	S	O	V	M	E	A	T	W	R

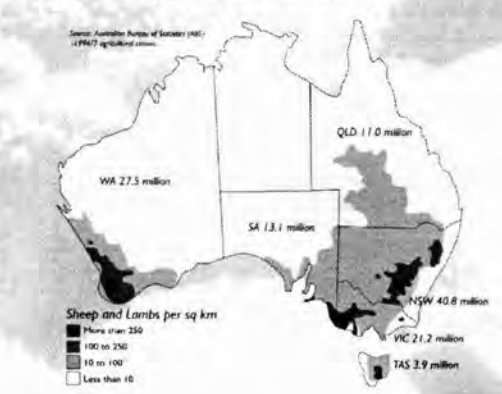
Meat and Livestock Australia is committed to providing information on the Australian red meat industry and values your feedback to develop future materials. For further information please contact:
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SHEEPMEAT
Sheep Production

Australia's sheep and lamb flock

Australia is one of the world's leading producers of lamb and sheep. The total value of Australian sheep, lamb and live sheep for export production is estimated at $1 billion making it one of the country's most valuable industries.

In 2000, there were almost 116 million sheep and lambs in Australia. New South Wales is the State with the most sheep, followed by Western Australia and Victoria.





Sheep and lambs are raised on rural properties. There are over 55,000 properties in Australia raising sheep and lambs, but most properties also run other enterprises such as cattle and cropping. The sheepmeat industry in Australia is mostly pasture based, meaning lambs are raised on grass and pastures.

Almost half of Australia's flock is breeding ewes. There are around 30 million lambs aged under one year.



Production

In Australia, there are many different types of sheep producers. Some farmers raise sheep for wool, meat or a combination of both.

- Farmers that breed and raise sheep for meat are called **prime lamb** or **sheepmeat producers**.
- Farmers that breed and raise sheep for wool are called **wool producers**.
- **Live export producers** raise lambs and sheep to send on ships to other countries.

Type of sheep farmer	Main product	By-product
Wool producer	WOOL	MEAT - lamb or mutton
Prime lamb producer	MEAT - lamb	WOOL
		MEAT - mutton

Prime lamb producers produce our finest lamb meat, which people around the world and here in Australia eat. Prime lamb production occurs in areas where pasture is of high quality including the tablelands of New South Wales, eastern and south-west Victoria, south-eastern South Australia, Tasmania and south-west Western Australia.

Prime lambs require a good diet, and high rainfall or irrigation to help pastures grow so there is plenty of food for the lambs and their mothers (ewes). It is estimated that about a third of all sheep producers are 'prime lamb producers'. Lamb meat is the meat from young sheep that do not have their adult teeth (up to 12 months old).

Most of the lamb Australia produces goes to butchers and supermarkets in Australia. The remainder goes to markets in the United States, South Africa, Europe, Mexico, the Middle East, Asian Countries and the Pacific nations.

Wool producers also provide sheep for production of meat, but it is a by-product of their industry.

Wool producers sell the sheep for meat at around six years old. The meat from these older sheep is called mutton. Mutton is a popular meat in many markets including the Middle East, South Africa, North Asia and South East Asia. Sometimes wool producers sell lambs when they have too many.

Sheep producers also breed and raise sheep for the live export market. Usually, wool producing sheep that are not used for breeding are sold at 2-3 years of age for the live export trade. These sheep are sent on special ships to countries who want live animals to process themselves. In many markets, this is because of religious requirements. The live export of sheep is valued at $180 million each year to Australia.

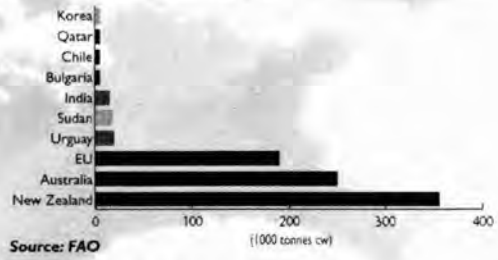
MEAT & LIVESTOCK AUSTRALIA



Around the world

Top ten world lamb and mutton exporters

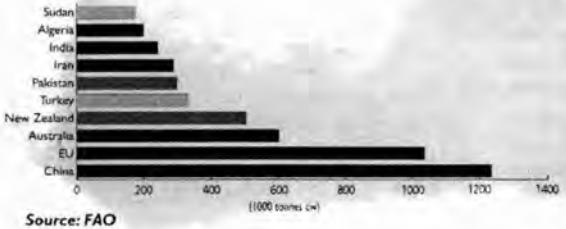
New Zealand and Australia are the largest lamb and mutton exporters in the world. Australia produces around 8% of the world's lamb and mutton supply.



Source: FAO

Top ten lamb and mutton producing countries

The largest lamb and mutton producing country in the world is China but they sell very little to other countries. They produce lamb and mutton mainly to feed the local population.



Source: FAO



Meat terms

Lamb: Meat from sheep with no permanent teeth (approximately 0-12 months old)

Hogget: Meat from sheep with one or two permanent teeth (approximately 12-20 months old)

Mutton: Meat from older sheep with 1-8 permanent teeth (over approximately 20 months)

Sheep breeds



There are hundreds of sheep breeds in the world. Different breeds of sheep grow different types of wool and meat. Sheep are bred for either meat or wool production, although a few breeds are bred to do both. These are called dual purpose breeds. It is important for producers to select the right breed for their operations.

Sheep bred for their wool account for most of Australia's population. The most popular breed for fine wool is the merino. Farmers often switch between wool production and prime lamb production depending on the price of wool.

Wool breeds	Dual-purpose breeds (wool and meat)	Meat breeds
Merino strains Superfine Fine Wool Medium Wool Strong Wool	*Merino based breeds* Corriedale Bond Polwarth	*Prime lamb sires* Poll Dorset/Dorset Horn Suffolk White Suffolk Southdown
Carpet wool breeds Elliotdale Tukidale Drysdale	*Long wool meat* Border Leicester Coopworth	*New meat breeds* Texel Damara Dorper

CASE STUDY
Sheep Breeder

Arthur Gates has bred Dorset sheep for over 33 years with his wife and three children. His property is 8km from Armidale in New South Wales.

Sheep breeders like Arthur breed rams for sale as well as producing prime lambs. Good breeding rams are in high demand to produce large and lean lambs suitable for market requirements. The breeding operation is a science, involving computers, genetics, nutrition and good farming skills.

Arthur has a busy schedule and can only take a break once a year in June.

The cycle of breeding at Arthur's property starts with mating of ewes and rams in April and May. One ram is placed in the paddock with many ewes and mating takes place. The rams are removed from the paddocks once mating is completed. One ram can mate with as many as 50 ewes.

The time from mating to birth of lambs (the gestation period) is around five months. So up to September/October Arthur looks after the ewes by monitoring their nutrition. A pregnant ewe needs a good diet and extra feed may need to be provided.

Lambing is in September/October to coincide with the "spring-flush" of pasture growth. At this time of year, pastures are at their best quality and help the ewes provide an enough milk supply for the growing lambs.

Throughout the year, Arthur collects a lot of data on the lambs and a computer program is used to estimate their breeding value (LAMBPLAN). This is important for breeders who want to keep selecting the best ram lambs for breeding. It is an on going cycle of improving the off-spring from year to year.

Arthur has a ram sale in February each year.

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SHEEPMEAT
Lamb Production



Lamb production is the raising of lambs for market. Prime lamb producers specialise in producing lambs for meat, and not sheep for wool.

Prime lamb terms

Turn-off: Lambs sold or which have left the property

First and second cross lambs: Prime lambs (see below)

Sire: A ram used to mate with the ewes

Sucker: Lambs which are sold while still feeding on their mother's milk

Weaner: Lambs removed from their mother and fed on pasture

Producing a prime lamb

Prime lamb producers are broadly defined as those who only turn-off first cross and/or second cross lambs (which in turn provide the best meat). If a producer turns-off merino lambs, they are not considered to be a prime lamb producer, because most merino lambs come from wool producing properties.

First cross lambs are produced by mating a Merino ewe with a maternal sire ram such as a Border Leicester. In some regions, mating a terminal sire (ram) to a Merino or Corriedale ewe is also popular.

Second cross lambs are produced by mating a first cross ewe with a terminal sire ram such as a Poll Dorset or Suffolk.

Prime lamb producers buy special rams, bred to produce the best meat, to mate with the ewes. Farmers only allow the



rams to mate with ewes at certain times of the year. This way, lambs are born at a time when the pastures are lush and the ewes can produce good milk to enable their fast growth. The farmer puts the ram (sire) in a paddock with many ewes (usually one ram to 50 ewes) to mate for 6-8 weeks. This is known as **joining**.

Most of the lambs sold for meat in Australia are from prime lambs.

Percentage turnoff of lambs

Based on estimates for 2000 season (MLA Lamb Survey 2000)



Raising lambs

Prime lamb production is best suited to a pasture base occurring in areas of high rainfall in fertile regions or irrigated areas with good pasture. The tablelands of New South Wales, eastern Victoria, south-eastern South Australia and south-west Western Australia are good prime lamb areas.

Most rain falls during winter which brings the best pasture in spring. Good pasture supports ewes during pregnancy and lactation (producing milk), ensuring the lambs are healthy. Before and throughout joining, many farmers give their ewes extra food such as oaten hay, cereal, grain, lupins and silage. Most prime lambs are born during winter.

During lambing (when lambs are born), farmers will observe the ewes but will not generally disturb them. They will only assist ewes that are having a difficult birth. Although there are many births, a ewe can easily identify its lamb by its bleat and smell.

The first cross ewe is popular as a prime lamb mother because she cares for her lambs well and produces more milk for them. The growth of lambs from first cross ewes is also generally faster than from merino ewes (depending on pasture conditions). The lambs feed on their mother's milk until they are ready to be weaned or sold.

Prime lambs are **weaned** (removed from their mother) when they are 2-6 months old, depending on the production system. Lambs are put onto good quality pastures, including a mixture of crop stubble, improved and irrigated pastures.

At 4-6 weeks of age, lambs are **marked** where their tails are docked (removed), their ears marked for identification, males are castrated if required and all lambs are vaccinated so they remain healthy.

Prime lambs are sold when they reach a required weight for the market. This may be before or after weaning. Lambs sold off their mothers are referred to as **suckers**.

Managing the health of the first cross ewes and terminal sires is very important for prime lamb producers. The farmer **shears** the sheep once a year, usually between Spring and Autumn. It takes about two weeks for a farmer to shear all the sheep. The wool grows back, so by the time winter arrives they will have a full fleece again. Ewes are also crutched (trimmed) before lambing to remove dirty wool (dags) on the sheep's rear.



MEAT & LIVESTOCK
AUSTRALIA

Pasture and feed management

Pasture is what sheep graze on, and includes plants like grasses and legumes. Pasture improvement and management is an important part of a prime lamb business. Producers improve their pastures by selecting the right grasses and legumes (pastures), and by fertilising, spraying and irrigating.

Prime lamb producers know how many sheep they can put in a paddock to make the best use of the pasture. Producers must ensure the pasture can support the number of lambs in the paddock. Too many sheep will cause sheep to lose weight and may even cause long term damage to the pasture. Too few sheep may see good pasture go to waste.

During the spring months, most farmers are also busy making hay and storing it, ready for later use in the summer and autumn when it will be needed. Hay is made by briefly drying grass and other pasture material in the paddock before packaging into small or large bales. Hay can be stored for many months without spoiling.



PRIME LAMB FACT

Most prime lambs are sold for meat to domestic retailers.







CASE STUDY



What happens on a prime lamb property?



Mark and Jenny Buckingham and their children Alex (7) and Jack (4) produce prime lambs on their family farm "Norong" near Rutherglen in Northern Victoria. Mark is a fourth generation farmer. His great-grandfather, grandfather and father all ran the property.

The Buckingham's farm is 400 hectares in size. Almost 600 mm of rain falls each year which makes good pastures for prime lamb production.

Mark and Jenny's prime lamb operations are based on the Poll Dorset breed. They have around 100 stud ewes and approximately 1,200 first cross ewes. Around 700 are used for spring lambing with the remainder used for early sucker lambs in autumn. The Buckingham's sell their lambs by forward contract or over the hooks, using an agent (see MLA sheep sheet 4).

Life for Alex and Jack on the farm is busy. The boys help move mobs of sheep to different paddocks with the farm dog. They also open and shut gates so the sheep stay in the right paddocks. Jack looks after many of the farm animals including a recent litter of pups and his Shetland Pony. Alex likes working with machinery on the farm, and enjoys riding in the farm ute.

Alex goes to school in nearby Rutherglen where Jack also goes to kindergarten. Every school morning, they walk down the long driveway from home to catch the bus to school and then home again after school.

The Buckinghams also run beef cattle and grow grain crops and pastures. Their interests include horses and training kelpie dogs.

The Buckingham's prime lamb calender

April	Spring lambing ewes joined Autumn lambing begins
May	Crops sown
June	Crutching Pasture work Spray pastures
July	Maintenance of property (eg fencing)
August	Shear rams and ewes Monitor crops and pastures
September	Spring lambing begins
October	Spring lambing continues
November	Joining for Autumn lambs Shear first cross ewes Cut hay Weaning, marking and vaccinations
December	Monitoring lambs
January	Shearing Irrigation
February	Pasture work and irrigation
March	Spring lambing ewes joined

CLASSROOM ACTIVITY

On a map of Australia, highlight the best areas for prime lamb production.

Why do you think these areas are best suited for prime lamb production ?

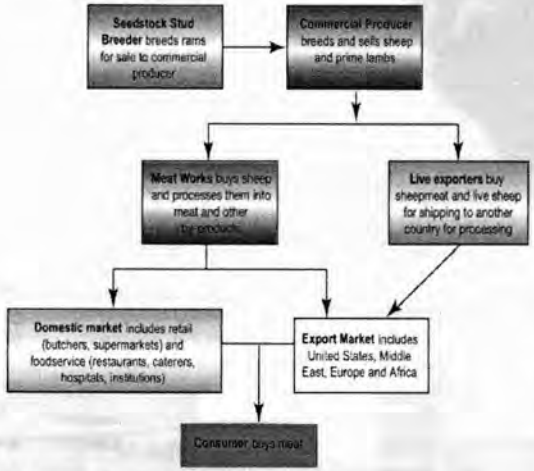


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SHEEPMEAT Industry

The sheepmeat industry from farm to market

The sheepmeat industry is very large because it takes many people to buy, sell and market the live animal and products. The process of taking the animal from farm to market involves many steps.



Selling

Sheep buyers include meatworks and other sheep producers. When farmers decide to sell their sheep or lambs, there are five options available to them as follows.

Option 1: Saleyard auction

The most traditional way of selling lambs or sheep is at a saleyard. The saleyard is like a big market, where producers and breeders bring their sheep to sell. Pens of animals are auctioned and the sheep are sold to the buyer who bids the highest price.



Page 1



Option 2: Paddock sales

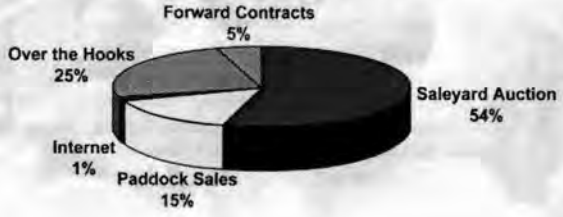
The buyer purchases the sheep directly from the farmer. They don't go to a saleyard. They can be sent on a ship for live export, transported directly to the meatworks or go to another farm. Payment is generally made on a dollar per head basis. Stock are inspected on the farmer's property by the buyer and are sold straight out of the paddock.

Option 3: Over the hooks

Over the hooks is the marketing of livestock to a processor, where payment is based on weight after processing (the Hot Standard Carcase Weight), the fatness of the lamb and the value of the skin. It ensures producers get paid for what they produce and that consumers are more satisfied. Stock are delivered to the abattoir and may be sold with or without an agent. One of the advantages of this sale method is that producers can receive information on their production called carcase feedback. This enables producers to analyse their production performance and assist them in making wise management decisions.

Proportion of prime lambs sold by each method

Estimates based on data from ABS, ABARE and individual abattoirs.



Option 4: Forward contracts

Some processors have introduced forward contracts for lamb purchase to ensure they obtain the number and type of lambs that their customers require. Contracts specify the number, weight and fatness of lambs to be delivered. Price is set at the time of signing the contract. The lambs are delivered for marketing over the hooks, on the contract date.

Option 5: Internet

Sheep are traded via computers, over the Internet. Animal details are entered into a computer and potential buyers can look at the descriptions of the mobs for sale. Bidding then occurs for the animals. The sheep stay on the farm until they are sold.

Who's who in sheep marketing

Breed Societies: Promote a particular breed of sheep to producers and other breeders
Commercial Breeder: Produces breeding rams to improve quality of sheep
Commercial Producer: Produces lambs and sheep to sell for meat or wool
Peak Councils: The Sheepmeat Council of Australia represents and promotes the national interests of Australian sheepmeat producers
Agent: Brings the seller (producer) and buyer together
Livestock Buyers: Purchase sheep from an auction, Internet or direct from the producer
Live Exporters: Purchase and ship live sheep to other countries
Processor: Processes sheep and lambs into meat and other valuable products
Meat Buyers: Wholesalers, retailers, supermarkets, foodservice operators or exporters who purchase meat to sell to consumers

MEAT & LIVESTOCK AUSTRALIA

MLA SHEEP SHEET 4 - The Sheepmeat Industry

Quality

The Australian sheepmeat industry's quality assurance program, Flockcare, helps producers meet food safety and quality guidelines. This is important for consumers who want a safe, good quality product. Flockcare is a system which farmers can use to ensure food safety, protection from chemicals and residues, animal health, care and welfare, animal preparation, presentation and transport.

Processing

Sheep and lambs are processed into meat and other products at the meatworks or abattoir. The system ensures the humane treatment of the animals as well as safety and quality of the final meat products. There are approximately 116 Australian abattoirs licensed to process sheepmeat for the domestic market and nine licensed to process sheepmeat for export.

While meat is a valuable part of the animal, the other products processed from the animal (by-products) are also important. The by-products are used to manufacture hundreds of items which we use every day - clothing, carpet, paints, cosmetics, dog food and even sports equipment.



SHEEP FACT

Australia is the largest exporter of live sheep in the world.



Selling our sheepmeat

Sheepmeat is processed for the domestic market (within Australia) and for the export market (overseas). Australia sells lamb and mutton to over 70 countries. The major markets for Australian sheepmeat are the United States, the Middle East, South Africa the European Union, Papua New Guinea and Japan.

Our biggest market for lamb is Australia. We consume most of the lamb produced here in Australia and only about a third of all lamb is exported. Most of the mutton Australia produces is exported.

Our major global competitor is New Zealand who is the world's largest exporter of sheepmeat. Australia and New Zealand are the major sheepmeat exporters in the world.

Live sheep exports

In 2000, almost 5.4 million sheep were shipped from Australia to other countries, making Australia the largest live sheep exporter in the world. The ships used to carry the animals are specially designed to carry the sheep and during the journey stockhands feed and take care of the animals.

Most of the live sheep are exported to markets in Kuwait, Saudi Arabia, Jordan, United Arab Emirates (UAE), Bahrain, Oman, Qatar, Egypt and Israel. Sheepmeat is a traditional food throughout the Middle East. While Australia sells chilled and frozen lamb and mutton to the Middle East, the live export trade is also very important. Many of these countries prefer buying live animals so they can process the meat according to their religious beliefs.

Peak demand for sheep is during the religious festivals in the Middle East. Ramadan is the ninth month of the Muslim calendar, when for the entire month, Muslims fast during the daylight hours and only eat small meals in the evening. When Ramadan ends, it is celebrated for three days in a holiday called Eid ul Fitr (the Feast of Fast Breaking). Gifts are exchanged and friends and family gather together for large meals. Lamb and mutton are popular choices for meals throughout Ramadan.

A second festive occasion, Eid ul Adha, is celebrated a few months after Ramadan. On this day, many Muslims offer animals, usually sheep, as a religious symbol. The processed meat is distributed for consumption to the poor and needy.

Australian Live Sheep Exports



Australian Sheepmeat Exports



CLASSROOM ACTIVITIES



* Name five countries in the world which buy Australian lamb and mutton?
* Draw on a map of the world where these countries are.
* How do you think the meat gets there?
* How do producers sell lambs or sheep?
* What is the most popular sale method and what do you think happens there?

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THE EGG

eat eggs get keep shorter them hen small begin chicken with

Female chickens, (hens), will _ _ _ _ _ to lay eggs when they are about 20 weeks old. They will lay _ _ _ _ for most of the year but may stop in winter, when the days get _ _ _ _ _ _ _. A _ _ _ can't lay more than one egg a day. When hens are young, the eggs are _ _ _ _ _. As the hens get older, the eggs _ _ _ larger.

The egg is the female reproductive cell of the _ _ _ _ _ _ _ (actually, of all birds). The eggs we _ _ _ have been designed to feed and protect a developing chicken embryo. Most of the eggs we eat, however, won't have embryos in _ _ _ _ - this will only happen if the hen has mated _ _ _ _ a rooster and the eggs have become fertilised. Most layer farms don't _ _ _ _ any roosters, so the eggs have no chance of getting fertilised.

Questions:

1. Will a chicken lay eggs if she has not mated with a rooster?

2. Would it be possible to hatch an egg you bought from the supermarket? Explain your answer

3. Explain why most layer farms don't have any roosters.



Task 2



1. Name three animals that lay eggs: _____ _____ _____

2. What are three things that can be made from eggs?
_____ _____ _____

3. Unscramble the following words from the passage above:

chcinek geg hne troesor sdfeertili aly eoybmr mtdae amrfs

Task 3 INSIDE THE EGG

Copy the diagram of an egg onto your sheet:

Complete the sentences using words from the list below:

Air cell; Chalaza; Yolk; Egg white; Germinal disc; Shell; Shell membrane

____ Provides food for the developing embryo.

_____ _____ Also called "germ spot", is where the embryo starts to grow in a fertilised egg.

___ _____ Is also called albumen. There is a thick and a thin layer which are needed to protect the embryo.

_____ Is needed to help keep the yolk in place and acts as a shock absorber.

_____ _____ Stops germs and bacteria getting through the shell and into the egg.

___ ____ Provides air for the developing chick. This space gets bigger as the egg gets older.

_____ Is made of calcium and protects the egg.

EGGS SHOULD ALWAYS BE STORED WITH THE AIR SPACE UP

Draw a picture of eggs stored the <u>correct</u> way in an egg carton:

Task 4 Listening Task

Hatching Eggs

When the hen has laid about _____ eggs she will sit on them to hatch them.

Chicken eggs take _____ days to hatch.

If the eggs have been taken away from the hen, they are put into an _____.

An incubator is a box which is kept warm using a light. It can be used to keep the eggs warm until they hatch.

If the temperature in the incubator is too hot or too cold, the chicks will _____



Task 5

Sketch the incubator:

Show the following in your sketch:

light, door, water tray, egg tray, thermometer

Why is the water tray needed? _____

Incubator record:

Number of eggs _____

Colour of eggs _____

Type of eggs _____

Date _____

Temperature _____

Expected hatching date _____

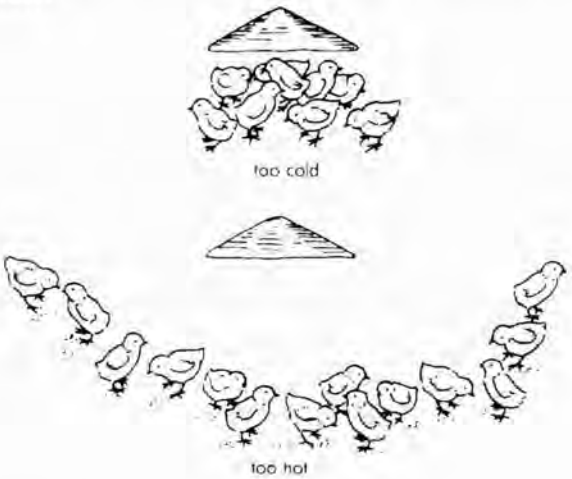
Task 6 When they hatch

Cross out the incorrect word:

When chicks hatch, they have small fluffy feathers instead of/off the kind that adult birds have. These fluffy feathers don't/don't keep the chicks warm. They need there/their mother to make sure they don't get to/too cold. Their/they're adult feathers start growing in a few weeks.

Task 7

A brooder is an electric or gas heater used to keep young chicks warm if their mother is not there. Use the diagrams of chicks under a brooder to help you answer the questions below.



a) Why do young chicks need to be kept warm?

_____

b) Do adult chickens need a brooder? _____ Explain your answer:

_____

d) Draw a picture of the way you think chicks would be standing under the brooder if it was at the right temperature:

Pests

Task 1. Use the following words to fill in the missing spaces in the passage:

kill pest environment together insects snails from rid too very wrong take is control eat

A pest is any plant or animal found living in the wrong place at the _____ time. Most of the pests in Australia have come ____ another country.

Methods of Pest Control



We can divide pest _____ methods into 3 areas:

1. Chemical: This is the most common method of getting ___ of pests. Pesticides are used. They usually ____ pests quickly and efficiently but can be harmful to the _____ and don't work if used too often. Pesticides must be used ____ carefully.

2. Non-chemical: This includes things like people picking _____ or bugs off plants with their hands. Another method __ called Biological control. This is when another animal is used to kill the ____, eg: using chickens or ducks to ___ insects, or using insects like the ladybird beetle to eat other _____. These methods generally ____ longer to work but don't harm the environment and keep working for longer.



3. Integrated: This means using both chemical and non-chemical methods _____, eg: using special wasps to kill insects which attack orange trees but also using a spray that won't hurt the wasps if the number of insects becomes ___ large.

Task 2. Answer the following questions in your book:



1. What is a pesticide?
2. Give an example of non-chemical control.
3. Describe the difference between chemical and biological control.
4. Explain what is meant by integrated control.
5. Which method of control would be the quickest?
6. Which method of control would be the safest for the environment?
7. Write down the names of 3 pests.

Task 3. Unjumble the following words found in the passage:

secdpitei cbillagioo pset istcen alnis haicmecl aetyfs gub raysp

Task 4. Explain why the chemicals are used in a dangerous way in each picture:





Task 5. Draw pictures for the following rules for working with chemicals:

1. Always wear protective clothing
2. Never spray near animals or other people
3. Do not spray near waterways or on windy days
4. Always read and follow the instructions

1	**2**
3	**4**

Homework

Name: _____
Due: _____

Task 1: Learn the following spelling words:

Chemical, insect, damage, biological, control, affect, herbicide, pesticide, spray, environment

Task 2: Arrange the words in alphabetical order:

Task 3: Write the meaning of each of the spelling words in the space below:

a) _____

_____

b) _____

_____

c) _____

_____

d) _____

_____

e) _____

_____

f) _____

_____

g) _____

_____

h) _____

_____

i) _____

_____

j) _____

_____

Mulching

Fact File

A mulch is any material that is used to cover bare soil. Mulches are generally used around areas where plants are growing. They help keep the soil moist and prevent erosion (= soil being washed or blown away). A mulch will also help prevent the growth of weeds.

There are two main kinds of mulches:

- Organic mulches, which are made from animal or plant materials, eg: straw, wood chips, manure
- Inorganic mulches, which are made from non-living materials, eg: plastics or pebbles

Task 1:

Use "Agriculture and You, Book 1". Read pages 94-96, to help you answer the following questions.

1. List the ways in which mulches benefit plants.
2. Which types of soil benefit most from mulching?
3. List examples of organic mulches.
4. Suggest reasons why clippings treated with hormone weed killer should not be used as a mulch.
5. Describe the **advantages** of using inorganic mulches.
6. Outline some of the **disadvantages** of using inorganic mulches.
7. Explain why black polythene sheeting (plastic) is often used.
8. Briefly outline the advantages of mulching.
9. Explain why winter and early spring are the best times to mulch.
10. Why must organic mulches be renewed?



Task 2

Use the information in the text book to create a one page "**Fact Sheet**" which could be used to teach year 8 students about mulching.

- Use point form, and illustrations.
- Include information on: the definition of "mulch"; types of mulches; advantages of using a mulch; and, how and when to use mulches.

Interpreting Seed Packets

Task 1

Choose words from the list to complete the passage below:

planted year important grow packet seeds

When planting _____ it is very important to choose a type that is suited to the time of _____ . If it is not the right time of year the seeds won't _____ . It is also very _____ to read the instructions very carefully. If the seeds are not _____ at the correct depth they will not grow properly either. All the information you need to plant seeds properly will be found on the back of a seed _____ .

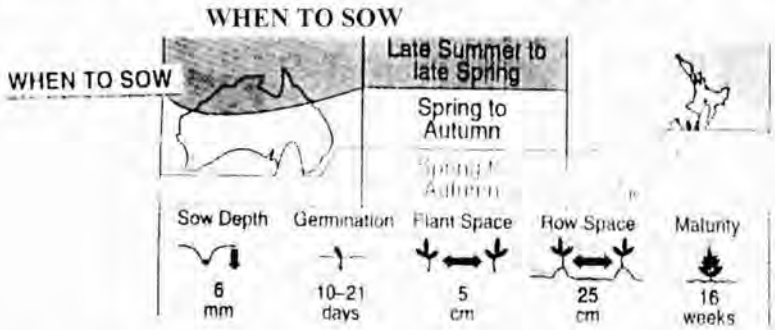
Task 2

Arrange the words from the list above in alphabetical order :

Task 3

Use the information on the seed packet below to help you answer the following questions:

Topweight Carrots- A delicious variety of carrot that is easy to grow. Ideal for salads.



a) What type of seeds are these?_____

b) When should you plant them at school? _____

c) How deep should these seeds be planted? _____

d) From this information, do you think these seeds are: large **or** small?

e) How long before the seeds sprout or germinate? _____

f) How far apart should the plants be spaced?_____

g) How far apart should the rows be spaced?_____

h) How long before the plants can be picked (are mature)? _____







Use the following information to make the back of a seed packet for tomatoes:

Plant: Tiny Tim Tomatoes

When to sow: Northern Australia- All year round
Southern Australia- Spring to summer
Tasmania- Summer

How deep to sow: 10mm
Germination: 7 - 10 days
Plant space: 15cm
Row space: 50cm
Time till harvest: 12-14 weeks

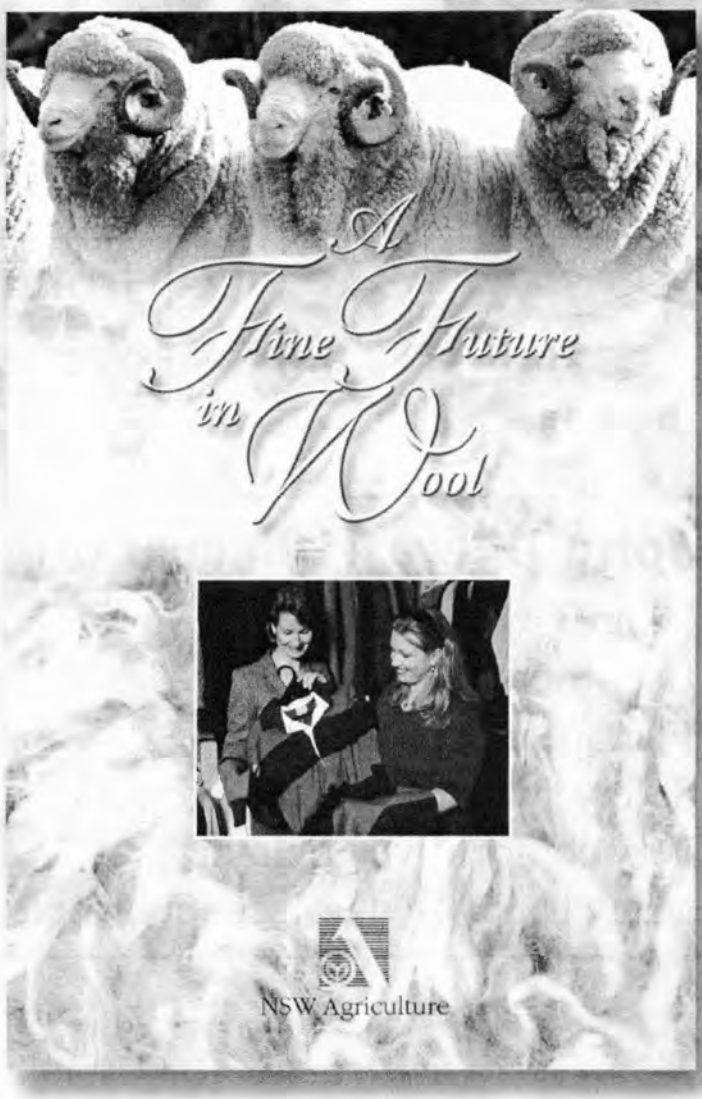
Look at actual seed packets to get ideas



Make a colourful front cover for your seed packet.
This should have: a picture of the plant,
the price,
a use by date,
a company name, on it

Fold or join the front and back together to make a seed packet

THE VIDEO THAT STARTS YOUR OWN FINE FUTURE



The future in wool production is in finer wools: with wools lower than 20.5 micron now making up nearly half of this State's production.

NSW Agriculture's latest video, *A Fine Future in Wool*, shows you how to focus your wool operation for a profitable, sustainable future. The video features 15 producers explaining how they improved their operations through:

- focusing their business with benchmarking;
- getting the genetics right for their flocks;
- discussing visual indicators versus measurement of fleece;
- business risk management strategies for price;
- improved pasture practices to enhance production.

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NSW Agriculture

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From the vault....

Who is responsible for this gem from 1990 BAAT (vol. II)? It wouldn't be a former Sydney Branch office bearer, would it?

Artificial Insemination comprehension Exercise

My uncle Oswald by Roald Dahl "

The following is an extract from a book by Roald Dahl called My Uncle Oswald. Read through the passage and answer the questions.

'Good,' he said. Then he began his story.
'Exactly fourteen years ago,' he said, 'in the winter of **1905,** I observed a goldfish frozen solid in the ice in my garden pond. Nine days later there was a thaw. The ice melted and the goldfish swam away, apparently none the worse. That set me thinking. A fish is coldblooded. So what other forms of cold-blooded life could be preserved at low temperatures? Quite a few, I guessed. And from there, I began speculating about preserving *bloodless* life at low temperatures. By bloodless I mean bacteria, etcetera. Then I said to myself, "Who wants to preserve bacteria? Not me." So then I asked myself another question. "What living organism above all others would you like to see kept alive for very long periods?" And the answer came back, spermatozoa!'
'Why spermatozoa?' I asked.
'I'm not quite sure why,' he said, 'especially as I'm a chemist, not a bio man. But I had a feeling that somehow it would be a valuable contribution. So I started my experiments.'
'What with?' I asked.
'With sperm, of course. Living sperm.'
'Whose?'
'My own.'
In the silence that followed, I felt a twinge of embarrassment. Whenever someone tells me he has done something, no matter what it is, I simply cannot help conjuring up a vivid picture of the scene.
It's only a flash, but it always happens and I was doing it now. I was looking at scruffy old A. R. Woresley in his lab, as he did what he had to do for the sake of his experiments, and I felt embarrassed.
'In the cause of science everything is permissible,' he said, sensing my discomfort.
'Oh, I agree. I absolutely agree.
'I worked alone,' he said, 'and mostly late at night. Nobody knew what I was up to.'
His face disappeared again behind the smokescreen, then swam back into view.
'I won't recite the hundreds of failed experiments I did,' he said. 'I shall speak instead of my successes. I think you may find them
interesting. For example, the first important thing I discovered was that exceedingly low temperatures were required to keep spermatozoa alive for any length of time. I kept freezing the semen to lower and still lower temperatures, and with each lowering of the temp. I got a longer and longer life span. By using solid carbon dioxide, I was able to freeze my semen down to - 97° Centigrade. But even that wasn't enough. At minus ninety-seven the sperm lived for about a month but no more. "I must go lower," I told myself. But how could I do that? Then I hit upon a way to freeze the stuff all the way down to - 197° Centigrade.'
'Impossible,' I said. 'What do you think I used?'
'I haven't the foggiest.'

'I used liquid nitrogen. That did it.'
'But liquid nitrogen is tremendously volatile,' I said. 'I how could you prevent it from vaporizing? What did you store it in?"
'I devised special containers,' he said. 'Very strong and rather elaborate vacuum flasks. In these, the nitrogen remained liquid at minus one-nine-seven degrees virtually for ever. A little topping up was required now and again, but that was all.'
'Not for ever, surely.'
'Oh, yes,' he said. 'You are forgetting that nitrogen is a gas. If you liquefy a gas, it will stay liquid for a thousand years if you don't allow it to vaporize. And you do this simply by making sure that the flask as completely sealed and efficiently insulated.'
'I see. And the sperm stayed alive?'
'Yes and no,' he said. 'They stayed alive long enough to tell me I'd got the right temperature. But they did not stay alive indefinitely. There was still something wrong. I pondered this and in the end I decided that what the sperm needed was some sort of buffer, an overcoat if you like to cushion them from the intense cold. And after experimenting with about eighty different substances, I at last hit on the perfect one.'
'What was it?'
'Glycerol.'
'Just plain glycerol?'
'Yes. But even that didn't work at first. It didn't work properly until I also discovered that the cooling process must he done very gradually. Spermatozoa are delicate little fellows. They don't like shocks. You cause them distress if you subject them straight away to minus one-nine-seven degrees.'
'So you cooled them gradually?'
'Exactly. Here is what you must do. You mix the sperm with the glycerol and put it in a small rubber container. A test tube is no good. It would crack at low temperatures. And by the way, you must do all this as soon as the sperm has been obtained. You must hurry. You cannot hang about or it will die. So first you put your precious package on ordinary ice to reduce the temperature to freezing point. Next, you put it into nitrogen vapour to freeze it deeper. Finally you pop it into the deepest freeze of all, liquid nitrogen. It's a step by step process. You acclimatize the sperm gradually to coldness.'
'And it works?'
'Oh, it works all right. I am quite certain that sperm which has been protected with glycerol and then frozen slowly will stay alive at minus one-nine-seven for as long as you like.'
'For a hundred years?'
'Absolutely, provided you keep it at minus one-nine-seven degrees.'
'And you could thaw it out after that time and it would fertilize a woman?'
'I'm quite sure of it. But having got that far I began to lose interest in the human aspect. I wanted to go a lot further. I had many more experiments to do. But one cannot experiment with men and women, not in the way I wanted to.
'How did you want to experiment?'
'I wanted to find out how much sperm wastage there was in a single ejaculation.'
'I'm not with you. What d'you mean by sperm wastage?'
'The average ejaculation from a large animal such as a bull or a horse produces five ccs of semen. Each cc contains one thousand million separate spermatozoa. This means five thousand million sperm altogether.'
'Not five thousand million! Not in one go!'
'That's what I said.'
'It's unbelievable.'
'It's true.'
'How much does a human produce?'
'About half that. About two CCS and two thousand million.'
'You mean to tell me,' I said, 'that every time I pleasure a young lady, I shoot into her two thousand million spermatozoa?'
'Absolutely.'
'All squiggling and squirming and thrashing about?'
'Of course.
'No wonder it gives her a charge,' I said.
A. R. Woresley was not interested in that aspect. 'The point is this,' he said. 'A bull, for example, definitely does *not* need five thousand million spermatozoa in order to achieve fertilization with a cow. Ultimately, he needs only a single sperm. But in order to make sure of hitting the target, he has to use a few million at least. But how many million? That was my next question.

Questions:

1. **In what year did the story begin?**
2. **What are the names of the two characters in the passage?**
3. **What was used to freeze the sperm initially? What happened to the sperm and why?**
4. **What final technique was used to store the sperm?**
5. **How much semen and sperm does a bull produce?**

Comparison of Costs: A.I. vs Traditional.

Cost comparison exercise for a 100 cow commercial herd.

Data: *a)* Bulls cost = $1000
-traditional: 3% of bulls (3 years service)
-A.I. 1% of bulls (4 years service)
b) 75 % of cows settle or conceive at 1st insemination.
c) Semen costs $5/straw
d) Technician charges $5/insemination.
e) Labour - 5hrs./day at $8/hr
f) The A.I. program runs for 6 weeks.

Artificial Insemination			Traditonal Mating
Semen:	5x . . .	=$._____	Bulls: $\frac{3 \times 1000}{3}$ = $1000
Technician:	5x ...	=$_____	
Bull:	$\frac{1x}{4}$	=$ _____.	
Labour:	__x6x7	=$_____.	
	Total = _____		

Variation:

What is the cost if the farmer inseminates the cows?

New cost = $_____

What is the cost if the bull costs $1500?

New cost = $_____.

Which method would you advise the farmer to use?
Back up your suggestion with reasons.



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3. The Local Harvest
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Contact: Louise & Harry Saarinen.

4. Kurrajong Australian Native Foods
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Contact: Lee Etherington. E-mail: localfocus@zeta.org.au

5. Blue Mountains Lavender Farm
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Contact: Carol Maher. E-mail: lavender@pnc.com.au
Group bookings of 20 from late Nov 2001 to Feb 2002.

6. Enniskillen Orchard
753 Grose Vale Rd, Grose Vale. Ph: 4572 1124.
Contact: John & Trish Maguire. Email: maguires@hawknet.com.au

7. Blue Mountains Natural Spring Water
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Contact: Frances Digges. E-mail: bmnsw@fastlink.com.au

8. Gretchen's Farm (Pecans & Climbing Roses)
Old Kurrajong Road, Richmond. Ph/Fax: 4578 2994.
Contact: Gretchen Wheen.

9. Tanglin Lodge Alpacas
52 Tennyson Rd, Tennyson. Contact: Cheryl & Geoff Uren.
Ph/Fax: 4571 1852. E-mail: tlodgealpaca@one.net.au

10. Penrith Valley Oranges
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Contact: Ivan Glover. E-mail:penvalorange@bigpond.com.au

11. Windsor Smokehouse Pty Ltd.
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Contact: Gerhard & Eva Salzger. E-mail: wsh@hawknet.com.au

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Contact: Karen Borg.

14. The Hawkesbury Vegetable Farm
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15. Alleena Alpaca Stud
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Contact: Peter & Carolyn Auld. E-mail: enquiries@tizzana.com.au

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R	V	C	L	O	V	E	R	I	S	P	D	A	S	T
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ABOMASUM
AYRSHIRE
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BLOAT
BRUCELLOSIS
BULL
CALF
CASTRATE
CLOVER
COLOSTRUM
DAIRY
DISEASES
FRIESIAN
GAS
GERMS
GRASS
GURNSEY
HAY
HEIFER
ILLAWARRA
INFECTION
JERSEY
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NEEDLE
OIL
OMASUM
REGURGITATE
RETICULUM
RUMEN
STEER
TETANUS
TICKS
UDDER
VACCINATE
WORMS

PIG PRODUCTION

L	V	U	P	R	E	K	N	I	R	D	G	R	D	B
A	A	B	E	R	K	S	H	I	R	E	E	E	I	A
N	C	R	T	R	O	T	T	E	R	S	S	N	S	R
D	C	E	G	E	A	C	A	R	E	H	T	A	E	L
R	I	T	P	E	L	L	E	T	S	E	A	E	A	E
A	N	A	H	X	W	G	H	S	K	D	T	W	S	Y
C	A	W	E	K	S	H	I	T	S	R	I	A	E	S
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N	O	I	T	A	L	I	T	N	E	V	W	G	S	R
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C	O	R	U	D	U	M	O	J	W	O	R	R	A	B
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O	A	T	S	A	C	O	R	N	O	C	A	B	T	M
P	V	G	M	H	W	L	N	B	N	J	F	Z	Y	Q

BACON
BARLEY
BARROW
BERKSHIRE
BOAR
CORN
DISEASE
DRINKER
DUROC
FARROW
GESTATION
GILT
GRAINS
GRASS
HAM
INJECTION
LANDRACE
LARGE WHITE
LEATHER
LIGHTS
MUD
OATS
PELLETS
PIGGERY
PIGLET
PORCINE
PORK
PROCESSING
PRODUCTION
SAUSAGE
SHED
SOW
STY
TAMWORTH
TROTTERS
VACCINATION
VENTILATION
WATER
WEANER
WHEAT

GROWING SEEDS

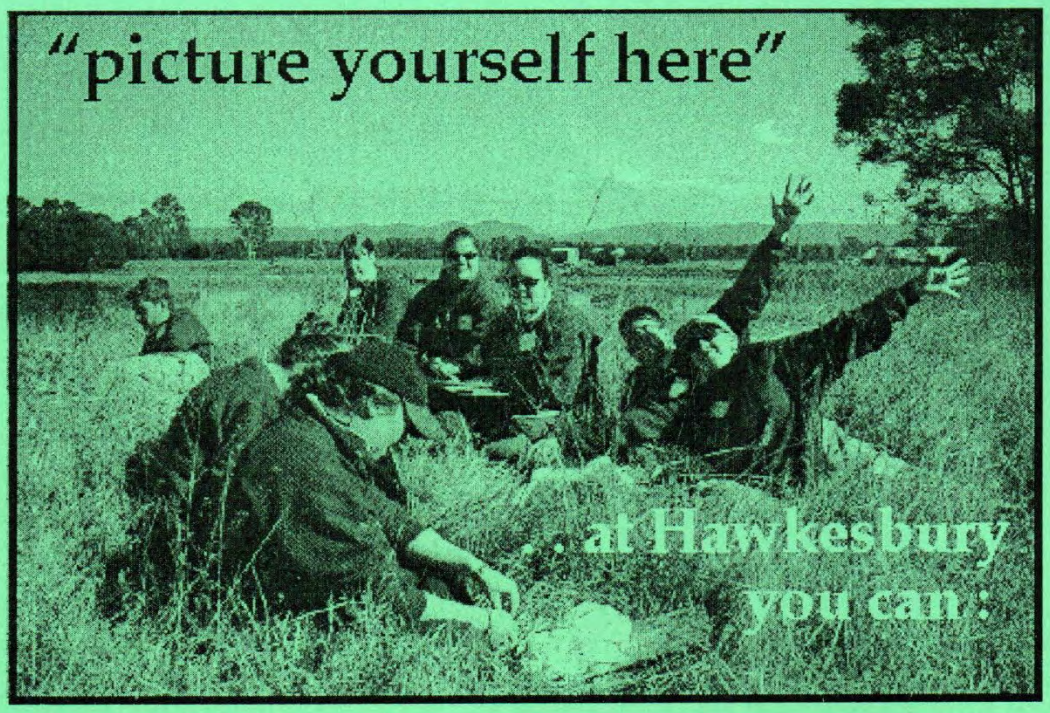
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I	W	C	U	N	T	H	I	N	T	N	T	D	D	B
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D	W	S	E	L	M	I	S	U	V	D	D	I	W	O
L	G	I	E	A	L	R	T	A	R	E	A	M	Z	P
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W	O	S	A	O	E	U	I	H	M	U	H	E	I	T
L	K	W	K	T	R	R	T	C	U	N	U	A	N	S
H	L	N	Y	E	G	P	A	U	S	N	W	K	D	R
O	F	I	T	C	E	R	I	D	A	Y	S	G	N	E
V	T	D	Z	D	F	W	D	O	J	F	R	T	O	K

AUTUMN
CLIMATE
CROP
DAMP
DAYS
DEEP
DEPTH
DIRECT
EMERGE
FERTILIZE
GERMINATION
HARVEST
MATURITY
PESTS
ROW
SEASON
SEEDLING
SHADE
SNAIL
SOIL
SOW
SPACING
SPRING
SPRINKLE
SUMMER
SUNLIGHT
SUNNY
THIN
TRANSPLANT
VARIETY
WATER
WEEKS
WELL DRAINED
WINTER

HERBS

S	A	M	I	N	T	O	R	E	G	A	N	O	G	P
E	S	L	B	H	D	O	O	W	M	R	O	W	A	I
V	B	A	O	L	E	C	I	R	O	C	I	L	L	N
I	A	B	R	E	D	N	E	V	A	L	L	K	U	T
H	S	N	A	G	V	L	Y	G	E	O	E	C	D	A
C	I	O	G	A	N	E	N	R	P	V	D	O	N	C
Y	L	M	E	S	C	O	R	R	I	A	N	D	E	R
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ALOE VERA
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BEE BALM
BORAGE
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