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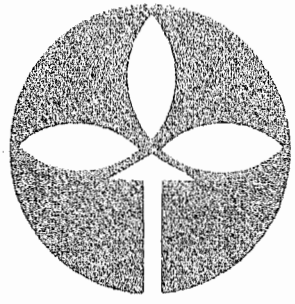

DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA

Agronomy Branch Report

FARMER EXPERIENCES WITH THE ECON FODDER ROLLER IN THE LOWER SOUTH EAST OF SOUTH AUSTRALIA

R.C. Hagerstrom

Report No.

7

July, 1969

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AGRONOMY BRANCH REPORT NO. 7 JULY 1969

INTRODUCTION

In May, 1969, a questionnaire was sent to 34 owners or operators of Econ fodder rollers in the Lower South East. A total of 31 (91%) replies were received.

The answers provided some extremely interesting comments and answers. Results of the survey are given below.

TABLE I

Farm	Number of fodder rolls made each year						Av. lbs. /roll	Total Tons
	1964	1965	1966	1967	1968	Total		
1	9,800	7,700	8,560	950	6,200	33,210	300	4,428
2	-	500	1,000	250	600	2,350	250	261
3	-	3,400	3,100	2,300	1,000	9,800	250	1,090
4	-	3,000	3,200	nil	3,100	9,300	300	1,240
5	-		4,500	nil	6,750	11,250	265	1,324
6	-		1,600	800	2,600	5,000	200	455
7	-		1,500	2,100	7,400	11,000	220	1,100
8	-		8,000	3,000	14,000	25,000	200	2,273
9	-		2,000	n.a.	2,477	4,477	400	814
10	-		200	nil	7,000	7,200	300	960
11	-		400	100	600	1,100	200	100
12	-		2,170	300	16,000	18,470	400	3,360
13	-		300	nil	1,600	1,900	350	292
14	-		1,200	nil	1,400	2,600	450	520
15	-		316	480	1,515	2,311	200	210
16	-		2,500	nil	3,600	6,100	350	940
17	-		600	nil	1,200	1,800	200	164
18	-		1,100	nil	1,300	2,400	300	320
19	-		4,200	nil	3,600	7,800	350	1,200
20	-		5,200	nil	6,400	11,600	375	1,933
21	-		1,400	nil	2,900	4,300	220	430
22	-		-	85	1,950	2,035	225	102
23	-		-	200	4,000	4,200	600	1,135
24	-		-	3,000	4,000	7,000	500	1,555
25	-		-	-	2,800	2,800	250	280
26	-		-	-	4,000	4,000	200	364
27	-		-	-	6,000	6,000	300	800
28	-		-	-	2,300	2,300	275	287
29	-		-	-	8,000	8,000	300	1,067
30	-		-	-	5,800	5,800	230	575
31	-		-	-	4,000	4,000	350	601
Total	9,800	14,600	53,046	13,565	134,092	225,103	300	30,180 tns

From the table I, it will be seen that 1 farmer began using the roller in 1964, 3 in 1965, 17 in 1966, 3 in 1967, and 7 in 1968.

Total rolls made each year are given in Table II.

TABLE II

Year	No. of rolls made each year (31 farms)
1964	9,800
1965	14,600
1966	53,046
1967	13,565
1968	134,092
Total 5 years	225,103 = 30,180 tons

The number of rolls made per working hour ranged between 40 and 200, with an average of 90. Tons per hour ranged from 4 to 30, with an average of 12.2. The weight of rolls ranged between 200 lbs. and 600 lbs., with an overall average of 300 lbs. ($7\frac{1}{2}$ rolls /ton). Most farmers are making the bulk of their fodder reserves as rolls, but still rely to a lesser (and decreasing) degree on rectangular bales. 27% of the total hay made on these farms is as rectangular bales, with 73% as fodder rolls. With some qualifications, 24 of the farmers say that the machine will handle all types of material, from long cereals to short grasses. 7 said it wouldn't.

8 of the 24 using the roller by 1967 said it had trouble picking up the short growth of 1967, 10 said the rolls need a clover content to bind them properly and 7 said that long cereals wrapped around the front drive. This was overcome in some cases by making narrower windrows.

To the questions "Do you feel the roller is a better method of making hay than a conventional baler", 26 said Yes, 3 said No, and two could see no difference between the two machines. 30 said it had a greater output, 26 said it would handle greener material (3 said no, 2 were doubtful), that there were less mechanical troubles was answered "Yes" by 29, 12 considered that a smaller tractor would operate the roller, and the other 19 used the same tractor as on their conventional balers. 23 used tractors with a live P.T.O., 7 did not, and 1 used both and noted little difference in the quality of rolls made.

The size and shape of the windrows was more critical (28), but did not matter to 3 farmers.

The longest time the rolls had been exposed to the weather varied from 5 months to 36 months, and averaged 9 months i.e. one season.

Months exposed	5	6	7	8	10	12	18	20	32	36
No. of farms	3	9	7	3	2	2	1	1	1	1 = 31

28 considered there was no weather damage to the rolls, but 3 remarked that there was slight damage (5 to 10%) caused by water seeping up into the rolls.

29 said that water penetration was not a bad problem, but with the proviso that the rolls had a clover content to bind the rolls. 2 considered they had not had sufficient rain to test the water penetration.

18 considered that both rectangular bales and fodder rolls are needed for a successful fodder conservation programme. 4 had not had sufficient experience, and the other 9 considered that the rolls alone are suitable.

Damage to underlying pasture was severe on 11 farms slight on 11, and none noticed on 9. The severity of the damage was mainly dependant on the pasture species - annual pastures, and Currie cocksfoot were worst affected, while phalaris and perennial ryegrass were least affected.

Also, the time lag between making and carting made the damage more severe. However, there were comments from 4 farmers that since the rolls occupied no more than 1% to 2% of the total paddock area, this damage was not significant.

13 carted all the rolls to a fenced off area, 10 did no carting and the other 8 carted some and left some where they were made.

Grazing was restricted on 27 farms and stock were allowed free access to the rolls on the other 4.

25 farmers use the deferred grazing system of management and 6 do not.

Stock grazing problems were noted on 6 farms, without further qualification, 12 farms had no problems and on the other 13 farms "some" problems were noted. The ingenious ways in which some of these were overcome is discussed later.

All of the farmers are pleased, with reservations, with the machine.

Comments from Farmers

1. Machine

(a) design and construction

- some hay elevated over the raddle bars - prevented by sheet iron under drawbar.
- welding coming apart in 1st year - I think the machine could be improved in a number of ways, considering its cost.
- machine poorly made - needs better workmanship and refinements.
- not pleased with the machine itself, since it is very poorly made. But pleased with this method of haymaking.
- trouble with chains will be overcome by fitting Reynolds chains.
- pleased with the machine, but there is room for improvement.
- Japanese chains are no good - 5 sets on 3,000 rolls.
- machine design mainly good but very poorly made - using inferior bearings and chains and poor welding.
- had to replace wooden blocks on the end of the raddle.
- trouble getting tail gate to close after ejecting roll (since modified).
- wrong chains on roller bar caused nuts to loosen.
- wooden blocks broke when they came in light contact with stone.
- pick up on a conventional baler is far better under rougher conditions.
- mouth of the roller needs improving so that rougher windrows can be picked up with less hay wrapping around the bottom shaft and sprockets and to avoid slat damage on rough paddocks.
- needs guard over power drive.
- a counter would be an advantage.
- guards have been fitted over vee belts and gearbox.
- roll counter added.
- galvanised bolts for belts and raddle bars have aided replacement.
- lower raddle idler axle broke because of stress concentration in sharp internal angle machined on shaft. Cured by new shaft with radius in angle.
- raddle bars bend on obstructions in rough country.
- design of main trip is poor and my roller had a weak main axle which bent.

- slats taking hay around and locking tightly around cogs and shafts - corrected by replacing blocks with belts.
- trip arm kept bending - corrected by altering position of thrust at fulcrum.
- shaft at bottom of tail gate broke.
- set screw in manual release lever too small.
- machine seemed very hard to release using the manual release.
- all wooden blocks on end of bars broke.
- belt breakages reduced by using 4 ply instead of 3 ply belts.

(b) servicing

- slats becoming uneven (easily overcome).
- catch on tail gate not efficient - necessary to back roller into roll to close gate - wastes time, and upsets self-fitted bale counter.
- printed instructions - print too small.
- essential to keep certain parts well greased.
- selling agents did not service the machine or set it going in the year it was purchased.
- poor service for such a costly machine.
- service isn't the best.

(c) cost

- machine too dear.

(d) setting up

- it is important to adjust the chain speed to 10% slower than the ground speed.
- trouble with chains slipping off.
- does not pick up cleanly enough when very hot and dry.
- ground speed in relation to belt travel is most important.
- chain speed to ground speed ratio very important.
- the manual claims you can bale 20-30 tons per hour. The best I could was about 6 tons per hour but even this is equivalent to 240-300 square bales per hour.
- one chain wore out drive cog because they were set up out of alignment.
- raddle belt tension initially too tight causing top of bales to be pulled off.

(e) replacement parts list from 23 machines - 8 had no new parts

belts	19 sets	gearbox drive	1
chains	11 sets	universal joint	1

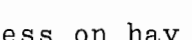
slats	8 (fitted 2 extra tooth/slat to improve pickup)	carrier bearing on P.T.O.	1
bearing on drive shaft	5	main axle	1
Idler shaft	4	trip catch	1
welding	5	release spring	1
wooden blocks	4 sets	tailgate shaft	1
drive cog	2	spring	1
latch bolt	1	axle housing oil seal	1
gearbox gasket	1	raddle idler shaft	1
rear shaft	1		

(f) operation of

(i) windrows

- windrow must not be too high, otherwise hay gets tangled in the front of the machine.
- windrows had to be perfect - otherwise hay went everywhere. I found it necessary to windrow headland and roll these first.
- windrow must not be too wide.
- long cereal winds around the machine (not worth rolling anyway.)
- raking is the critical factor.
- hay kept building up around the front drive.
- finger wheel rake is needed to keep enough hay raked so the roller can keep working at top speed.

(ii) shape of rolls

to make rolls of uniform diameter, and not cone shaped, it is necessary for tractor driver to steer a course thus: 

- dampness on hay makes difficult work (runs up over chains).
- lop-sided rolls due to poorly raked windrows.
- lop-sided rolls due to reel belt stretching unevenly.
- hay comes around on the end of slats if the hay is light, the day is windy, windrows are too high or ragged or with bad cornering.
- if the roll begins to form unevenly on rough ground, even it up by forking in more hay on the smaller side of the roll.
- a cereal crop becomes very slippery when dry and won't compact when rolled.

2. Paddock preparation

- paddocks must be almost perfect - no sticks or stones. A baler can be used where Econ can not.

3. Cutting time and method

- lucerne cut, raked and rolled all in one day - carted 2 weeks later - Awful smell but cattle ate the lot and did well on it. (Depends on suitability of weather.) A lot of time wasted testing to see if the hay is dry enough. (can be overcome with exhaust mounted drier).
- raking the hay is of great importance - we always double rake i.e. both sides of windrow, then roll in the same direction as the mower travelled. This lessens the chance of conical rolls.
- we roll 3 x 7' mower cuts into one windrow then roll about 10 acres/hour = 170 rolls/hour. Large windrows allowed to settle overnight.
- slasher not the best machine to use when cutting hay - tears it apart too much.
- hay cut with a slasher does not roll up very well.
- rolls made with slasher - cut pasture tended to fall apart.

4. Tractor

- a large tractor is not needed but added clearance is a help.
- use tractor with close front wheels to roll over windrow.
- hand clutch on tractor very useful.

5. Feeding out

- to save time carting and feeding out, I like to carry 3 rolls at a time on the buckrake, thus oo. With the buckrake I find it hard to get the 3rd. roll on top of the other two. In fact only about 25% of my "loads" have 3 rolls.
- research required on methods of lifting and carrying rolls to storage area (other than a buckrake), and also for feeding out.
- unroll the hay when stock are to feed it.
- unroll for both sheep and cattle - more stock can get at them and less seeds in wool of sheep.
- buckrake used primarily for carting rolls has many other uses on the farm.

6. Stock

- barley grass seeds in eyes of sheep and cattle if feed in the roll. Unrolling the hay like a carpet seems to overcome this eye trouble

- sheep autumn shorn to avoid grass seeds.
- grass seeds in eyes of weaners, December shorn. Not in eyes of wethers December shorn or February shorn other sheep.
- grass seed troubles if material cut too late. Best rolls are cut early.
- lambs need all wool removed from head.
- grass seeds on poll and in eyes of weaners. Overcome by time of cutting.
- sheep do not waste as much as with square bales, provided rolls are strip grazed and unrolled.

7. Contractors

- contractors' customers like hay because is cheaper, and better quality, but mainly because it's easier to feed out.

8. Pasture damage

- killed Currie cocksfoot when left on paddocks for $2\frac{1}{2}$ months - very little damage to phalaris or lucerne.
- harbour for rabbits.

9. General Hints

Comments:-

- damage comes more from underneath than on top.
- long cereal requires narrow windrows.
- faster than rectangular baler when the going was good.
- it is the easiest way of making hay but I am not yet convinced that it is the complete answer.
- extremely economical method of making hay with regard to labour saving, capital outlay and carting costs. Buckrake is essential, since leaving the rolls in position is not very practical.
- I consider the Econ roller is a partial answer to the high cost of fodder conservation, but would not recommend the rolls for winter feeding. I think sheep make the best use of fodder rolls as they don't soil the hay as much as cattle, and eat a greater proportion of it.
- Econ fodder rolls are the biggest breakthrough in fodder conservation in Australia in the 20th century because of less cost. One person only needed to feed out.
- main justification for rolls V's bales is - they must remain in the paddock, and be accompanied by a deferred grazing practice.

- roller very suitable on 1 labour unit farm.
- with deferred grazing, keeping up the supply of water in autumn can be a problem.
- we think the roller plays a very important part in grazing management as it not only saves time in feeding out but also in the cost of making hay.
- I am very pleased to be able to conserve the feed which we pay money to grow which would otherwise be wasted.
- cheapness and ease of operation plus no carting for autumn feeding are main points in favour of roller.
- I suggest permanent Econ paddocks located around the property next to the best water supplies. Keep these paddocks heavily fertilized and sprayed against weeds. Take the stock to the feed rather than moving the rolls.
- the roller is a great breakthrough in fast, cheap and efficient hay making.
- hay can be rolled with a higher moisture content than a square baler can press it.
- it is necessary to remove the rolls from the paddock to protect the pasture and the cost of transport makes the cost of rolls as great as that of conventional bales - bales are cheaper to cart.