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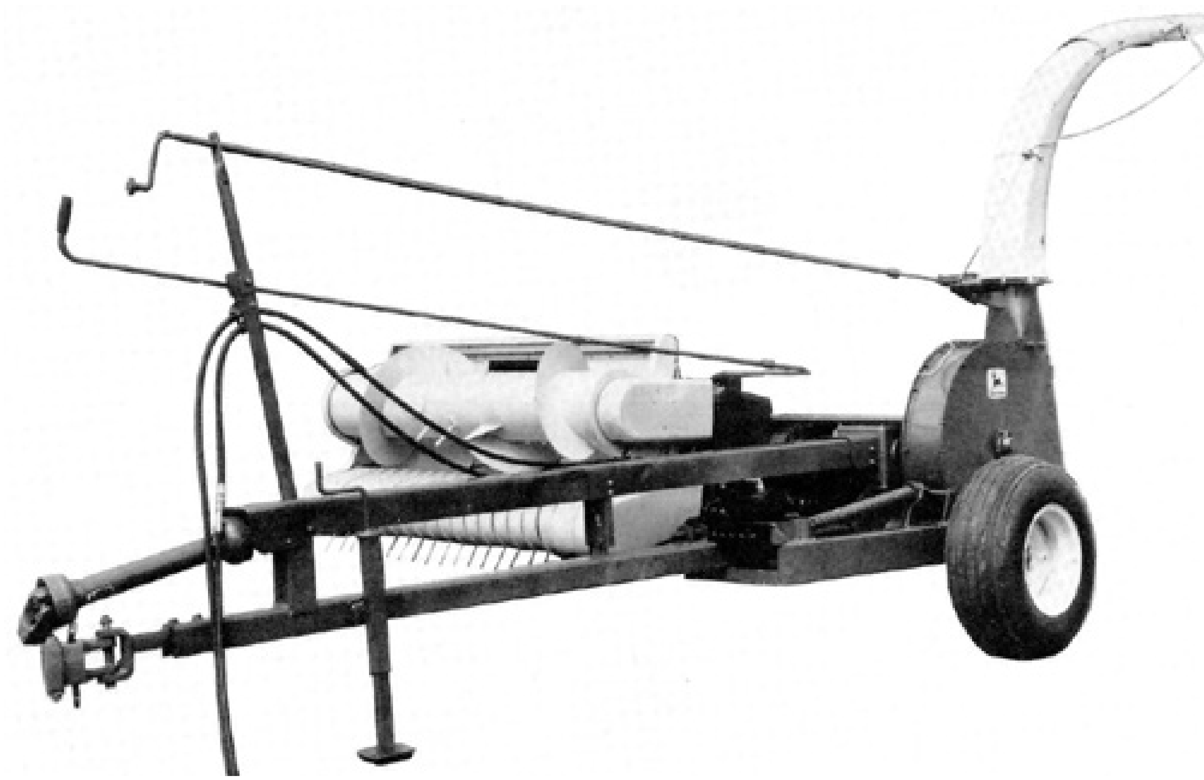
Evaluation Report 121



John Deere 3800 Forage Harvester

A Co-operative Program Between

ALBERTA FARM MACHINERY RESEARCH CENTRE

PAMI
PRAIRIE AGRICULTURAL MACHINERY INSTITUTE

JOHN DEERE MODEL 3800 FORAGE HARVESTER

MANUFACTURER:
John Deere Ottumwa Works
Ottumwa, Iowa
U.S.A. 52501

DISTRIBUTOR:
John Deere Limited
455 Park Street
Regina, Saskatchewan
S4P 3L8

RETAIL PRICE:
$9,945.35 (November 1979, f.o.b. Portage la Prairie, with 1.7 m Windrow Pickup and 2-Row Row Crop Attachment).

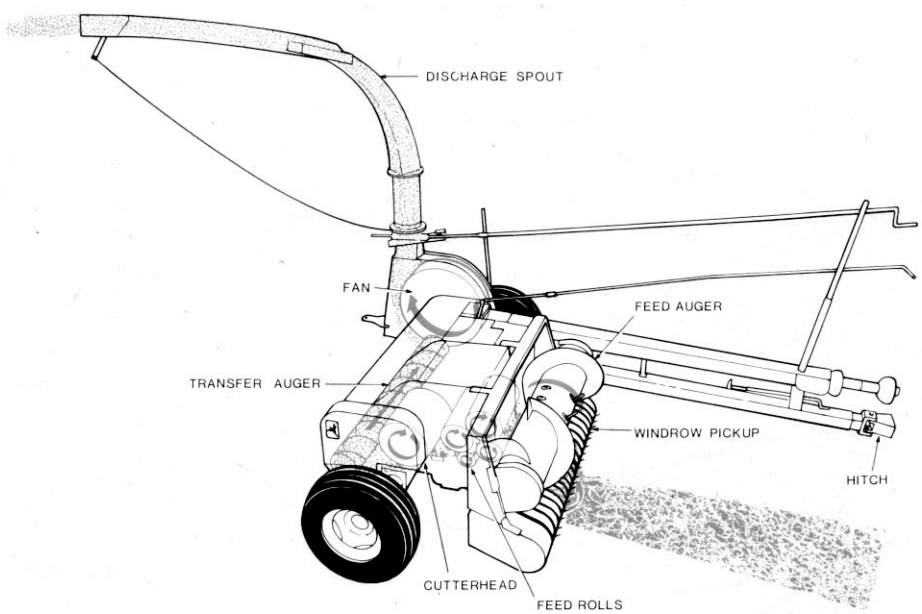


FIGURE 1. John Deere 3800 Schematic.

SUMMARY AND CONCLUSIONS

Overall functional performance of the John Deere 3800 was *very good.* Ease of operation and adjustment was *good.*

Workrates ranged up to 18 t/h (20 ton/h) in standing corn, up to 38 t/h (42 ton/h) in alfalfa and up to 23 t/h (26 ton/h) in barley. Dry-weight workrates ranged up to 7 t/h (8 ton/h) in corn, up to 16 t/h (18 ton/h) in alfalfa and up to 14 t/h (15 ton/h) in barley. In most crops, capacity was limited by performance of the windrow pick-up or the two-row row crop head. In windrowed crops, ground speeds were limited to about 8 km/h (5 mph) since the windrow pickup had no speed adjustment. Acceptable performance of the two-row row crop head kept working speeds of the John Deere 3800 to somewhat below the optimum workrate in corn. The optional three-row gathering head would be more suitable for typical prairie corn crops.

The use of 50 mm (2 inch) recutter screen reduced workrates by as much as 25%. The recutter screen significantly reduced the number of long silage particles, its use was warranting its use for certain silo unloading systems but it resulted in increased power consumption and reduced harvesting rates.

At both the 6 and 13 mm (0.25 and 0.5 inch) length-of-cut setting only 2% of alfalfa silage particles had a length greater than 100 mm (4 inch), and about 7% of corn silage particles had a length greater than 26 mm (1 inch).

A tractor with 110 kW (150 hp) maximum power take-off rating would have sufficient power reserve to operate the John Deere 3800, at optimum workrates, in most field conditions.

Power consumption, at similar workrates, was about 32% higher at the 6 mm (0.25 inch)length-of-cut setting, than at the 13 mm (0.5 inch) setting.

The manual controls were fairly convenient. Changing from the windrow pickup to the row-crop header was relatively easy. Cutterhead knife sharpening was easy, however; adjusting the shear plate was inconvenient due to limited access.

The John Deere 3800 was safe to operate if the manufacturer's safety recommendations were followed.

Only several minor mechanical problems occurred during the 230 hour test.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifications to reduce feed auger wrapping and bunching in long stemmed crops, such as sweet clover.
2. Modifications to allow the drawpole locking pin to retract completely from the drawpole positioning hole, to facilitate hitch positioning.
3. Providing more convenient access for lubricating of drive chains.
4. Modifying the feedroll drive idler shield, to improve convenience, and modifying the method of securing the fanshaft shield.

Chief Engineer - E.O. Nyborg
Senior Engineer - J.C. Thauberger
Project Engineer - R.R. Hochstein

THE MANUFACTURER STATES:

At the time of completing this report, the John Deere 3800 Forage Harvester is no longer being prod uced and for that reason recommended changes are not contemplated.

GENERAL DESCRIPTION

The John Deere 3800 is a power takeoff driven, pull-type, forage harvester with cylindrical cutterhead. It is available either with a windrow pickup or a row crop head.

The cutterhead is fed by a reversible feedroll assembly which pivots about the cutterhead shaft. Length of cut may be set, either by changing the feedroll drive sprockets, or by varying the number of cutterhead knives. Chopped forage is delivered from the cutterhead to the discharge fan with a transfer auger. The adjustable discharge spout and the feedroll clutch are controlled manually from the tractor seat.

The test machine was equipped with a 1.7 m windrow pickup as well as a two-row row crop head. Detailed specifications are given in APPENDIX I, while FIGURE 1 shows the location of major components.

SCOPE OF TEST

The John Deere 3800 was operated in the crops shown in TABLE 1 for 230 hours while harvesting about 260 ha. It was evaluated for rate of work, quality of work, power requirements, ease of operation and adjustment, operator safety, and suitability of the operator's manual.

TABLE 1. Operating Conditions

CROP	AVERAGE YIELD (t/ha at 60% Moisture Content)	HOURS	FIELD AREA (ha)
Alfalfa	11	44	54
Grass	11	13	15
Clover	12	32	47
Green Barley	7 to 12	36	47
Corn (row-crop head)	20 to 32	105	97
	TOTAL	230	260

RESULTS AND DISCUSSION

RATE OF WORK

TABLE 2 presents typical workrates for the John Deere 3800 in a variety of field conditions. The workrates for alfalfa and green barley were measured in crops yielding above 10 t/ha which had been windrowed with 5 to 5.5 m wide windrowers, while the workrates in corn were measured in standing crops yielding more than 30 t/ha, harvested with the two-row row crop head at a 900 mm row spacing. The reported values are for average continuous feedrates, with the harvester loaded to optimum levels, which was usually governed by pickup or row crop head performance. Daily workrates would be lower than those in TABLE 2, since the reported values do not include time for maintenance and unloading of wagons.

TABLE 2. Average Workrates

CROP	MOISTURE CONTENT %	LENGTH-OF-CUT SETTING (mm)	WORKRATES (t/h) ACTUAL	WORKRATES (t/h) DRY-WEIGHT
Alfalfa	77		38.0	8.7
	62		24.4	9.3
	57	6	22.1	9.5
	49		16.0	8.2
	44		19.5	10.9
	67		31.0	10.2
	62	13	35.1	13.3
	48		25.6	13.3
	44		28.5	16.0
Green Barley		6	23.5	14.1
	40	6*	18.7	11.2
		13	21.4	12.9
		13*	16.1	9.7
Corn	60	6	13.0	5.2
		13	18.0	7.2

* 50 x 305 mm Recutter Screen Used

Both actual workrates and dry-weight workrates are reported in TABLE 2. The actual workrates, which include the crop moisture content, indicate the total weight of forage being harvested, but should not be used for comparing performance of different forage harvesters. The dry-weight workrates, which indicate the weight of dry matter being harvested, provide a better comparison of the performance of different forage harvesters and assessment of the effect of crop variables and machine settings.

Actual workrates ranged up to 38 t/h whereas dry-weight workrates ranged only up to 16 t/h.

Workrates were influenced by crop moisture content, length-of-cut setting, use of a recutter screen and the type of header attachment used. An increase in the moisture content of alfalfa, from 44 to 77%, decreased the dry-weight workrate by 25%. Changing the length-of-cut setting in alfalfa from 13 to 6 mm decreased the dry-weight work-rate by 30%. Using a recutter screen significantly reduced harvester workrates. In green barley, a 50 mm recutter screen reduced the dry-weight workrate by 20% at the 6 mm cut setting, and by 25% at the 13 mm cut setting.

In most crops, workrates were limited by performance of the windrow pickup or the two-row row crop head and not by cutterhead capacity. This limited the ground speed to less than 8 km/h. Heavy windrows or tall row crop stands were desirable, to fully utilize cutterhead capacity. Significantly higher workrates could be expected in corn, if a three-row row crop head were used.

Similarly, higher workrates might be expected in windrowed crops with the optional 2.1 m windrow pickup which can be adjusted to one of three speeds to suit varying crop conditions.

QUALITY OF WORK

Uniformity of Cut[1]

TABLE 3 presents typical particle size distributions in second-cut, full bloom alfalfa, harvested at 56% moisture content. Particie size variations are given for both 6 and 13 mm cut settings, with and without the 50 mm recutter screen. At the 6 mm cut setting (APPENDIX IV, Figure 9) 22% of the silage had a length greater than 26 mm, while at the 13 mm cut setting, 23% had a length greater than 26 mm. The 50 mm recutter screen significantly red uced the number of particles greater than 26 mm length.

TABLE 3. Particle Size Distribution in Alfalfa

PARTICLE LENGTH	PERCENT OF TOTAL SAMPLE WEIGHT			
	WITHOUT Recutter Screen		WITH 50 mm Recutter Screen	
	6 mm CUT SETTING	13 mm CUT SETTING	6 mm CUT SETTING	13 mm CUT SETTING
Less than 4 mm	13 (Fig. 9a)	7	20	17
4 to 9 mm	35 (Fig. 9b)	22	40	30
9 to 13 mm	18 (Fig. 9c)	31	17	20
13 to 26 mm	12 (Fig. 9d)	17	15	20
26 to 100 mm	20 (Fig. 9e)	21	8	13
Greater than 100 mm	2 (Fig. 9f)	2	none	none

TABLE 4 presents typical particle size distributions in corn, harvested at 60% moisture content, for both 6 and 13 mm cut settings.

TABLE 4. Particle Size Distribution in Corn

PARTICLE LENGTH	PERCENT OF TOTAL SAMPLE WEIGHT	
	6 mm CUT SETTING	13 mm CUT SETTING
Less than 5 mm	16 (Fig. 10a)	7
5 to 7mm	12 (Fig. 10b)	7
7 to 9ram	29 (Fig. 10c)	19
9 to 13 mm	23 (Fig. 10d)	28
13 to 26 m m	12(Fig. 10e)	34
Greater than 26 mm	8 (Fig. 10f)	5

Only 8% of the chopped corn had a length greater than 26 mm, at the 6 mm cut setting (APPENDIX IV, Figure 10), while only 5% of the corn particles were longer than 26 mm at the 13 mm cut setting. The smaller percentage of longer particles in corn, compared to alfalfa, was due to the perpendicular, in-line-feeding by the row crop head.

[1]For each leng th-of-cut setting, a forage harvester produces a range of particle lengths. Length uniformity is important for proper operation of some vertical silo unloader systems. Reduced unloading rates may result if the silage contains a significant number of particles greater than 40 mm in length. On the other hand, particle length variation has little influence on silage palatability. The importance of silage length uniformity must be individually assessed, based on the type of silage handling equipment used.

Windrow Pickup Losses: Pickup losses were insignificant at speeds up to 8 km/h, provided that the windrow was not severely wind-scattered. The open-ended pickup design was effective in picking moderately scattered wind rows and negotiating corners.

Row Crop Head Losses: Losses from row crop head were insignificant at speeds below 7 km/h provided care was taken to keep the divider noses centered between the rows.

POWER REQUIREMENTS

Tractor Size: Peak power take-off input, at maximum workrate, was about 105 kW in alfalfa and 75 kW in corn. Corresponding average power requirements were about 80 and 45 kW, respectively. Low power requirements in corn were due to the low feeding capabilities of the two-row row crop head in typical prairie corn crops.

Power requirements increased with shorter cut settings and higher moisture contents. For example, when harvesting 11 t/ha alfalfa, at 50% moisture content (at a dry-weight workrate of 10 t/h), changing the length-of-cut setting from 13 to 6 mm increased the power input by 18 kW. At the same dry-weight workrate, in the same field conditions, 20% higher crop moisture content increased power consumption by 14 kW, at the 13 mm cut setting.

Total drawbar power requirements on firm, level fields, at 6 km/h, were about 12 kW. This included the draft of the forage harvester and a dump wagon with a 3 t load. In soft, hilly fields drawbar requirements were as great as 20 kW. A tractor with 110 kW maximum power take-off rating should have sufficient power reserve to operate the John Deere 3800, at optimum workrates, in most field conditions.

Specific Capacity:[2] FIGURE 2 shows the specific capacity of the John Deere 3800 in alfalfa at 6 and 13 mm cut settings. Specific capacity is a measure of how efficiently a machine operates. A high specific capacity indicates efficient energy use, while a low specific capacity indicates less efficient operation.

As seen in FIGURE 4, a 20% Increase in crop moisture content reduced the specific capacity by about 20%. Changing from 13 mm to 6 mm cut setting reduced the specific capacity by about 20%.

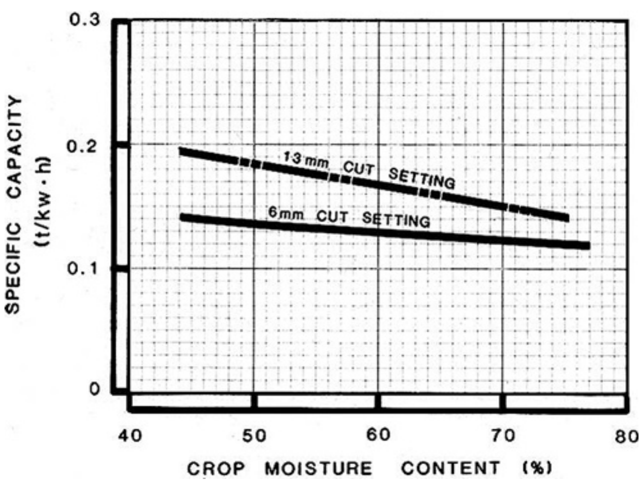


FIGURE 2. Specific capacity in Alfalfa, based on dry-weight workrates.

In corn, at 60% moisture content, specific capacities were 0.12 t/kW-h at 6 mm cut setting and 0.22 t/kW-h at 13 mm cut setting. In green barley, at 40% moisture content, specific capacities were 0.27 t/kW-h at 6 mm cut setting and 0.41 t/kW-h at 13 mm cut setting. In the same barley field, the use of a 50 mm recutter screen caused a 25% decrease in specific capacity at 6 mm cut setting and a 40% decrease at 13 mm cut setting.

EASE OF OPERATION AND ADJUSTMENT

Hitching: The John Deere 3800 was equipped with an equal-angle hitch arrangement which attaches to the tractor drawbar, extending it 100 mm. To adjust drawpole height, the hitch clevis could be reversed. Adjustment was ample for all tractors used during field testing. The manufacturer recommends that the tractor drawbar be from 330 to 430 mm above the ground.

Manual Controls: The John Deere 3800 had two manual control levers. One lever controlled the discharge spout direction and spout deflector position. The second lever controlled the forward and reverse for the feedroll clutch. Both levers had to be lengthened 600 mm to suit the operator location and hitch geometry of one of the tractors used during evaluation. The shaft adjustment range was insufficient to suit some tractors. When properly adjusted, both levers were convenient to use.

Windrow pickup: The pickup attachment (FIGURE 1) had excellent feeding characteristics in most crops. Pickup losses usually were insignificant at speeds below 8 km/h. The small diameter drum minimized windrow lift, while the open-ended design kept pickup end losses to a minimum when turning sharp corners or picking scattered windrows. No skid feet adjustments were provided, but this did not appreciably affect picking performance. However, some damage to pickup teeth occurred in stony fields.

In wind rowed sweet clover, at moisture contents less than 45%, wrapping around the feed auger and bunching in front of the feedroll adversely affected performance at the 6 mm cut setting. Auger wrapping and bunching in this crop were nearly eliminated by increasing feedroll speed by changing to the 13 mm cut setting. Adjustable feed auger speed, matched with the feedroll speed, would probably have eliminated auger wrapping in this crop and still have permitted a 6 mm cut setting. It is recommended that the manufacturer consider modifications to reduce feed auger wrapping and bunching in dry, long stemmed crops such as sweet clover.

Two-row Row Crop Head: The two-row row crop head (FIGURE 3) was equipped with a belt gathering system with a 960 mm row spacing. The system was positive for forward speeds up to 7 km/h but limited the capacity of the machine due to the inability of the row crop head to feed larger quantities of crop to the cutterhead. A three-row row crop head would be more suitable for typical prairie corn crops.

FIGURE 3. Two-Row Row Crop Head: (A) Divider Noses, (B) Oscillating Knife, (C) Nose Adjusting Straps, (D) Gathering Belts, (E) Gatherer Feedroll.

The pivoting divider noses had a tendency to dig soil when the harvester frame was set at maximum ground clearance. Lowering the frame by rotating the offset axles reduced divider nose digging, improving the nose floatation. The divider noses could also be kept from digging by shortening the adjustable nose support straps. This adjustment was inconvenient, and it took two men about 20 minutes to reposition the three divider noses.

The skid feet on the divider noses did not provide adequate floatation on rough or stony fields. Overall stalk gathering performance was good. For proper performance, maximum side drift from the row had to be less than 150 mm, requiring operator vigilance to minimize losses.

Feedrolls: The feedrolls were very aggressive in most crops. Occasional plugging occurred in bunchy windrows at high feedrates. Unplugging of the feed rolls was easily performed, from the tractor seat, by reversing the feed roll d rive. The reversing feed roll clutch control was positive and effective.

[2]Since the specific capacities presented in FIGURE 4 are based on dry-weight workrates, direct comparison to specific capacities of equipment such as balers is not valid. Baled hay normally has a moisture content of about 20% and is not refined to the same degree as silage.

In one 32 t/ha corn crop, harvested at 60% moisture content, the feedrolls slipped on the corn stalks as the stalks entered the feedrolls, significantly reducing permissible forward speed. This may have been due to inability of the front feedrolls to positively grasp the stalks. More aggressive feedroll action may have reduced this problem. This did not occur at 13 mm cut setting nor did it occur as readily in other conditions.

Cutterhead Plugging: Cutterhead plugging occurred infrequently. A plugged cutterhead usually resulted in the shear bolts shearing. This was usually due to engaging the power take-off clutch too quickly or failing to allow all forage to pass through the harvester before disengaging the power take-off clutch. Access to shear bolts was good.

Discharge Spout: The height and reach of the discharge spout could be adjusted by add Ing or removing pipe sections, as shown in FIGURE 4. The dimensions in FIGURE 4 are for the adjustable axle set for maximum ground clearance. The axle could be positioned to give discharge spout heights 50 and 100 mm lower than those shown in the figure.

The forage discharge direction was controlled with a crank, while the discharge angle could be changed by pulling or push-Ing on the same crank assembly, from the tractor seat. Adjusting the discharge angle was easy, provided the friction plate at the base of the discharge spout was properly set. Horizontal rotation of the discharge spout was often confusing, particularly when rapid rotation was needed on cornering.

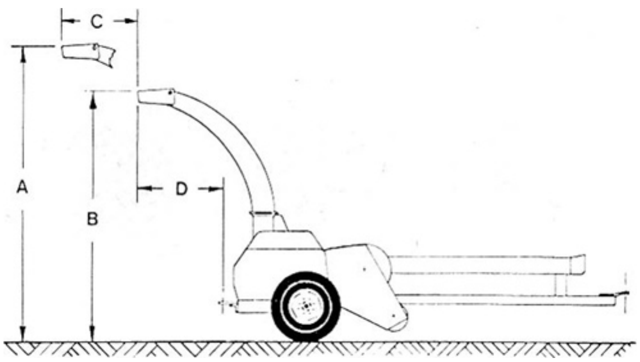


FIGURE 4. Discharge Spout Dimensions: (A) Lift, with vertical extension -- 3250 mm; (B) Lift --3000 mm; (C) Reach Extension --800 mm; (D) Reach -- 1150 mm.

Recutter Screen: A 50 x 305 mm recutter screen was used for about 50 hours of field testing. The recutter screen was effective, provided a close clearance was maintained between the screen and the cutterhead knives. The clearance was adjusted with cam bolts located at the rear of the recutter screen. If the clearance was not properly adjusted after knife sharpening, forage collected on the screen cutting edges, significantly decreasing the workrate.

Removal or installation of the recutter screen was easy. It took an experienced operator about 30 minutes to install the screen and 10 minutes to remove it.

Knife Sharpening: The John Deere 3800 was equipped with a rectangular sharpening stone (FIGURE 5) and a reversing cutterhead drive for knife sharpening. To reverse the cutterhead, two shear bolts on the cutterhead drive were relocated to the reverse drive sprocket and the fan drive shaft block. Removing or installing the shear bolts on the cutterhead forward drive was difficult.

Shear plate clearance was adjusted by loosening two mounting bolts and two cam bolt nuts on the shear plate ends. Adjusting the left shear plate end was difficult as working room was restricted for access to the left mounting bolt and cam bolt. The two protective shields enclosing the cutterhead and feedroll drive also could not be opened simultaneously. The hinged cutterhead drive access shield would not stay open unless the header was completely lowered. It took an experienced operator about 50 minutes to sharpen the cutterhead knives and adjust the shear plate.

The average period, between required knife sharpenings, was about 20 hours. During the 230 hour test period, the knives incurred about 3.5 mm of wear, mainly due to the number of sharpenings needed. No further shear plate adjustment was available at 208 hours, requiring adjustment of cutterhead knives to increase cylinder diameter. The cutterhead knife attaching legs (FIGURE 6) were mounted radially, which made knife reposition-Ing easy, with the adjusting set screws provided. It took one man about two hours to adjust the six knives. A torque wrench was supplied as standard equipment to facilitate adjustment.

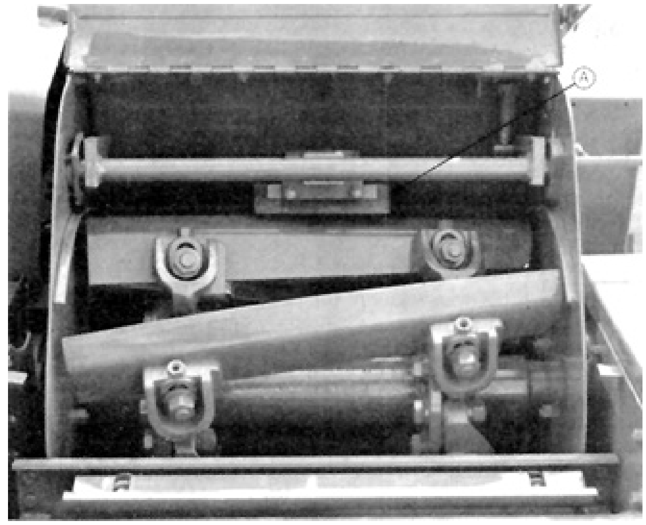


FIGURE 5. Cutterhead Knife Sharpener: (A) Sharpening Stone.

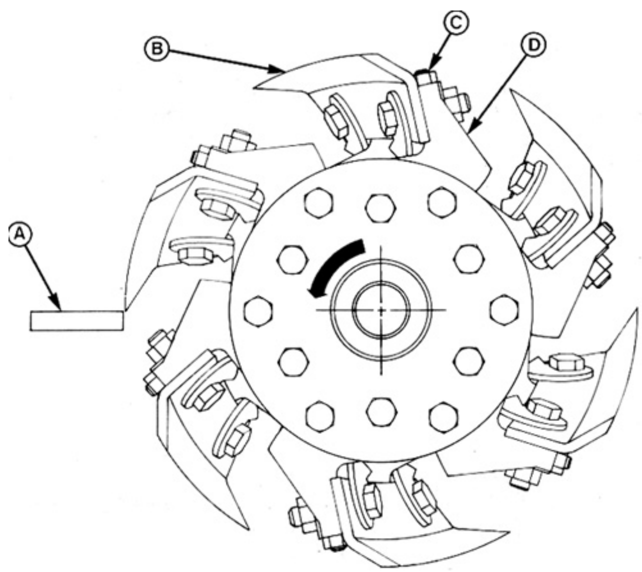


FIGURE 6. Cutterhead Assembly: (A) Shear Plate, (B) Knife, (C) Set Screw, (D) Leg.

Adjusting the Length of Cut: The length of cut could be changed either by adding or removing cutterhead knives or by changing the feedroll drive sprocket. Exchanging the feedroll drive sprocket was the easier method. This was done by reversing the dual sprocket. This standard sprocket produced 6 and 10 mm cut settings, while an optional sprocket gave 9 and 13 mm cut settings. Reversing or exchanging feed roll drive sprockets took one man about 10 minutes. Removal and replacement of the feedroll drive idler shield alone took about 4 minutes.

Exchanging Header Attachments: The windrow pickup head and row-crop head both were easy to mount or remove. Four pins held each attachment in place. There was adequate idler adjustment on the header drive chain to allow it to slip off the sprocket, making chain breaking unnecessary when changing header attachments.

Removing either header attachment took one man about 30 minutes. Mounting either of the attachments took two men about 30 minutes.

Transporting: The drawpole could be placed in transport position or in five different operating positions. Only the transport and extreme left positions were used during tests. Drawpole adjustment was difficult. The spring-loaded, lock pin did not completely lock clear of the positioning holes when retracted. It was necessary for a second man to hold the pin to. free it from the positionIng holes, while the d rawpole was swung. A block, appropriately placed atthe right wheel, was useful when swinging the d rawpole with the tractor. It is recommended that the manufacturer modify the locking pin to permit it to lock completely clear of the positioning holes.

The John Deere 3800 was easy to maneuver and towed well in transport position. Ground clearance was adequate and there was ample hitch clearance for turning sharp corners. A hitch was provided at the rear of the harvester for towing the wagon in line with the harvester when in transport position.

Lubrication: The John Deere 3800 had 60 pressure grease fittings with an additional 12 fittings on the row crop head. Twenty-one required daily lubrication, taking about 10 minutes. Complete lubrication of all other weekly and seasonal fittings took an additional 15 minutes.

Access to the drive chains, for oiling, was inconvenient. It is recommended that more convenient access for lubricating drive chains be provided.

OPERATOR SAFETY

A comprehensive safety section was included in the operator's manual. The John Deere 3800 was safe to operate and service, as long as common sense was used and the manufacturer's safety recommendations were followed.

Shielding on the John Deere 3800 gave good operator protection from all moving parts. Only three of the seven safety shields, over areas requiring frequent service, were hinged and opened easily for servicing, while the other four required removal. The feed roll d rive idler shield was difficult to remove for periodic idler adjustment. The fan drive shaft shield (FIGURE 7) which provided access to the cutterhead door, fell off during operation. This was caused by bending of the shield retaining hinge. It is recommended that the manufacturer modify the feedroll drive idler shield to improve ease of removal and modify the method of securing the fan drive shaft shield.

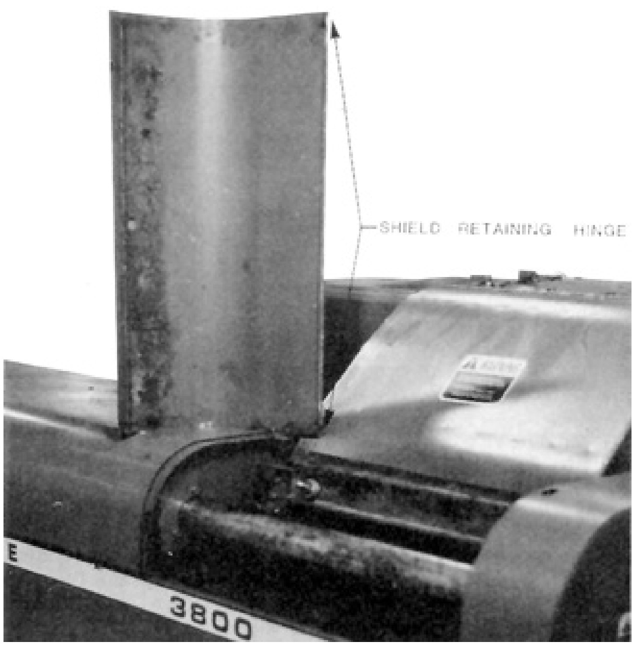


FIGURE 7. Fan Drive Shaft Shield.

OPERATOR'S MANUAL

The operator's manual was concise and clearly written, containing much useful information on operation, adjustment, servicing and safety.

DURABILITY RESULTS

TABLE 5 outlines the mechanical history of the John Deere 3800 d ur Ing 230 hours of operation while harvesting about 163 ha of forage, and 97 ha of corn. The intent of the test was evaluation of functional performance. The following failures represent those which occurred during the functional testing. An extended durability evaluation was not conducted.

TABLE 5. Mechanical History

ITEM	OPERATING HOURS	EQUIVALENT FIELD AREA (ha)
The fan shaft drive shield retaining hinge bent, causing the shield to fall off at	20	26
The feed auger sprocket retaining bolt was lost and replaced at	80	104
Two pickup tinebar-bolts were lost and replaced at	90	118
The pickup drive chain had worn, necessitating replacement at	125	163
A shear plate adjustment cam bolt was lost and replaced at	143	180
A feedroll pressure spring broke and was replaced at	189	222
The pickup drive shaft bracket attaching bolts loosened, and were tightened at	end of test	
The sharpening stone broke at	end of test	
The drawpole hitch (FIGURE 8) was bent at	end of test	

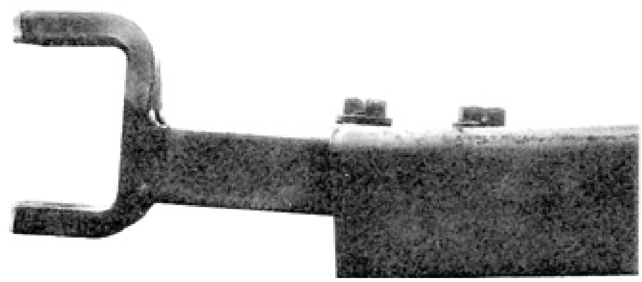


FIGURE 8. Deformed Drawpole Hitch.

DISCUSSION OF MECHANICAL PROBLEMS

Feedroll Pressure Spring: One feedroll pressure spring broke due to fatigue at 189 hours. The spring was easily replaced.

Pickup drive chain: The pickup drive chain wore out due to inadequate lubrication. Lubrication of this chain was inconvenient.

APPENDIX I

SPECIFICATIONS

Make:	John Deere
Model:	*3800*
Serial No.:	399393E
Overall Dimensions:	
-- height (discharge spout removed)	1520 mm
-- length	4440 mm
-- width	
-- without attachments	3050 mm
-- with windrow pickup	3150 mm
-- with two-row row crop head	3300 mm
ground clearance	170, 220, or 270 mm (adjustable)
Windrow Pickup:	
-- serial no.	397348E
-- type	floating cylindrical drum with spring teeth
-- height adjustment	none
-- working width	1460 mm
-- overall width	1880 mm
-- tooth spacing	85 mm
number of tooth bars	3
-- pickup speed	145 rpm
-- tooth tip speed	11.7 km/h
-- tooth type	steel wire
-- tooth length	103 mm
-- auger diameter	560 mm
-- auger length	1625 mm
-- auger speed	103 rpm
Two-Row Row Crop Head:	
-- distance between rows	960 mm
-- type of cutter	oscillating knife
-- cutter speed	240 strokes/min.
-- type of stalk gatherer	rubber belt mounted to chain, gatherer feedroll on standing crop side

-- gathering chain/ ground synchronization speed	6.1 km/h			
Feedrotl Assembly:				
-- throat opening	560 x 180 mm			
-- roll width	530 mm			
	FRONT		REAR	
	Upper	Lower	Upper	Lower
-- roll diameter	235 mm	210 mm	150 mm	126 mm
-- roll speed (at 6 mm cut setting)	117 rpm	48 rpm	76 rpm	86 rpm

Cutterhead:	
-- type	cylindrical
-- number of knives	6
-- width	580 mm
-- diameter	450 mm
-- speed	850 rpm
Recutter Screen:	
-- width	590 mm
-- arc length	300 mm
-- opening	50 x 305 mm angled slots
Knife Sharpener:	
-- type	rectangular stone
-- size	175 x 37 mm
Conveying Assembly:	
-- transfer auger	
-- diameter	250 mm
-- length	1840 mm
-- speed	560 rpm
-- fan	
-- diameter	815 mm
-- blade width	150 mm
-- discharge spout diameter	205 mm
-- speed	820 rpm
Tires:	two, 11L x 15. 8-ply
Wheel Tread:	2765 mm

Weights:	WITH WINDROW PICKUP	WITH TWO-ROW ROW CROP HEAD
-- left wheel	688 kg	650 kg
-- right wheel	862 kg	882 kg
-- hitch	<u>156 kg</u>	<u>186 kg</u>
TOTAL	1706 kg	1718 kg

Lubrication:	
-- main unit	
-- grease fittings	7, every 10 h; 29, every 100 h
-- chains	6, every 10 h
-- wheel bearings	2, seasonally
-- gear boxes	3, every 100 h, and seasonally .
-- windrow pickup	
-- grease fittings	1, every 10 h
-- two-row row crop head	
-- grease fittings	7, every 10 h; 5 every 100 h

Optional Equipment:

2100 mm windrow pickup; 1800 mm mower bar head; three-row row crop head, 760 mm spacing; two-row corn head, 760 mm and 960 mm spacing; recutter screens, sizes 70, 50, 38, 25, 19, 13, 9 mm openings, electric remote control; spout extensions, horizontal -- 1400 mm, vertical -- 250, 500, 1000 mm; automatic wagon hitch; hydraulic outlets (for use with high-dump wagon), 150 and 330 mm RHS'axle extensions.

APPENDIX II

MACHINE RATINGS

The following rating scale is used in PAMI Evaluation Reports:

(a) excellent
(b) very good
(c) good
(d) fair
(e) poor
(f) unsatisfactory

APPENDIX III

METRIC UNITS

tn keeping with the Canadian Metric Conversion program, this report has been prepared in SI units. For comparative purposes, the following conversions may be used:

1 hectare (ha)	= 2.47 acres (ac)
1 kilometre/hour (kin/h)	= 0.62 mile/hour (mph)
1000 miltimetres (mm) = 1 metre (m)	= 39.37 inches (in)
1 kilowatt (kW)	= 1.34 horsepower (hp)
1 kilogram (kg)	= 2.20 pounds mass (lb)
1 tonne (t)	= 2204.6 pounds mass (lb)
1 newton (n)	= 0.22 pounds force (lb)
1 tonne/hour (t/h)	= 1.10 ton/hour (ton/h)
1 tonne/kilowatt hour (t/kW-h)	= 0.82 ton/horsepower hour (ton/hp-h)

DISTRIBUTION OF PARTICLE LENGTHS

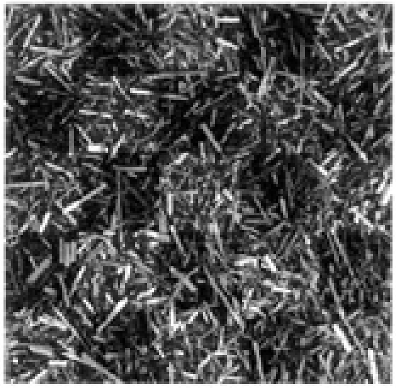


FIGURE 9a
Less than 4 mm

FIGURE 9b
4 to 9 mm

FIGURE 9c
9 to 13 mm

FIGURE 9d
13 to 26 mm

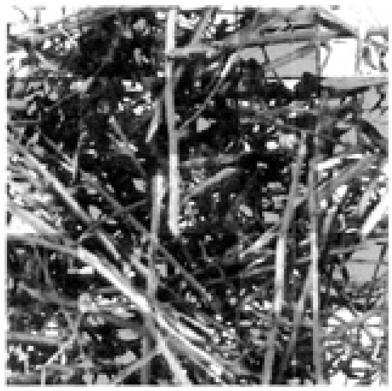


FIGURE 9e
26 to 100 mm

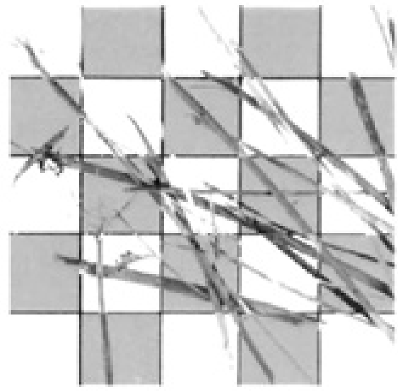


FIGURE 9f
Greater than 100 mm

FIGURE 9. Typical Distribution of Particle Lengths in Alfalfa (20 mm grid).

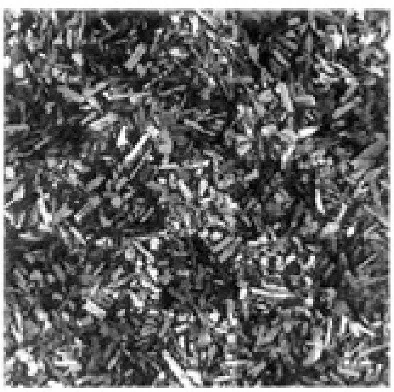


FIGURE 10a
Less than 5 mm

FIGURE 10b
5 to 7 mm

FIGURE 10c
7 to 9 mm

FIGURE 10d
9 to 13 mm

FIGURE 10e
13 to 26 mm

FIGURE 10f
Greater than 26 mm

FIGURE 10. Typical Distribution of Particle Lengths in Corn (20 mm grid).

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