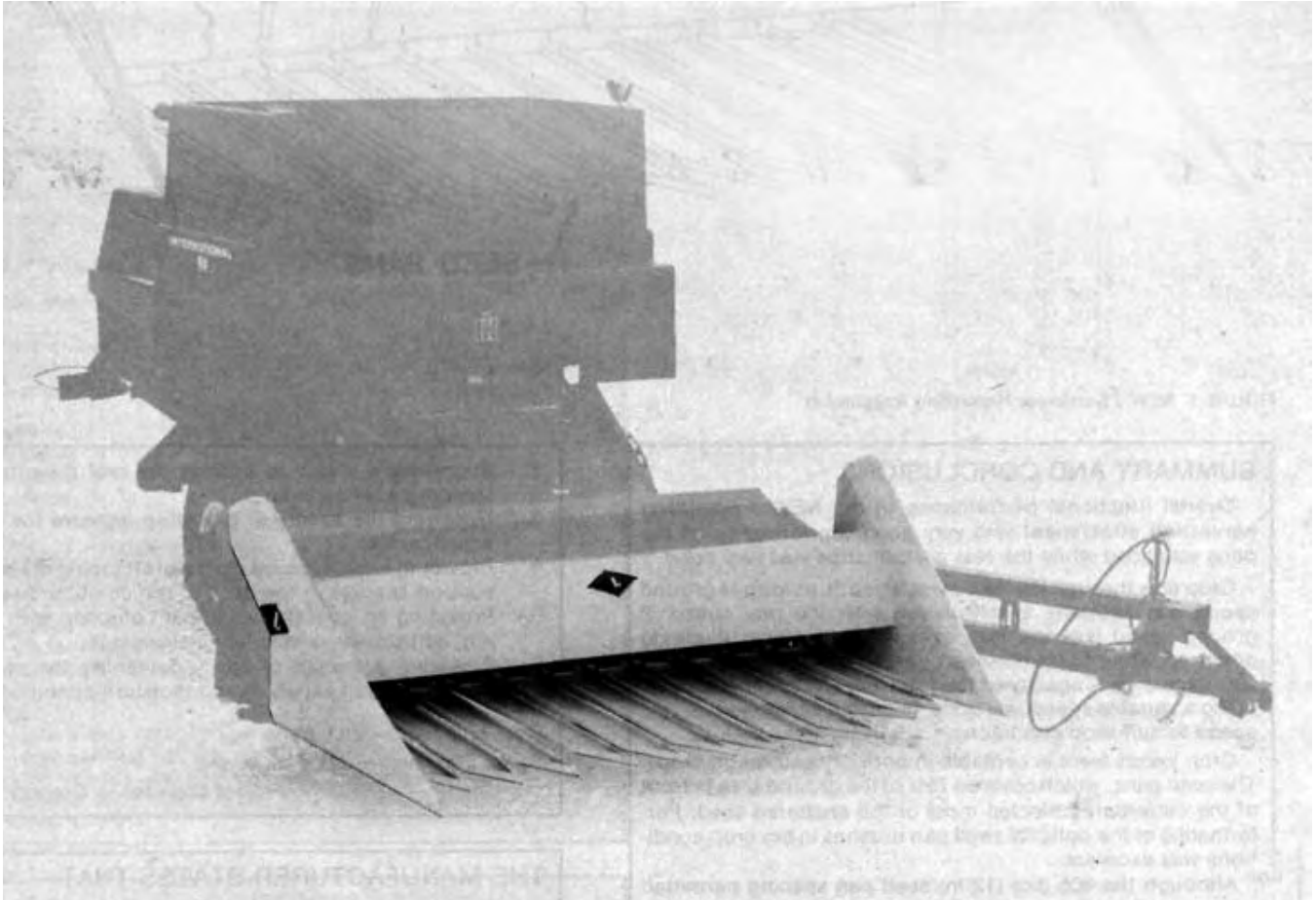


Evaluation Report

161



New J Sunflower Harvesting Attachment

A Co-operative Program Between



NEW J SUNFLOWER HARVESTING ATTACHMENT

MANUFACTURER AND DISTRIBUTOR:

New J. Industries Ltd.
Box 2080
340 Airport Road
Winkler, Manitoba
R0G 2X0

RETAIL PRICE:

\$1,733.00 (July, 1980, f.o.b. Winkler, Manitoba, 3.8 m width with 305 mm row spacing and optional seed pan brushes).

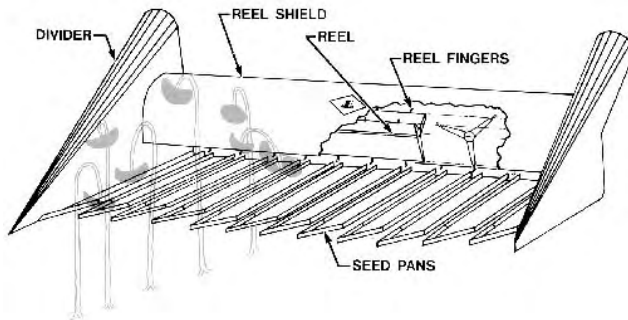


FIGURE 1. NEW J Sunflower Harvesting Attachment.

SUMMARY AND CONCLUSIONS

Overall functional performance of the NEW J sunflower harvesting attachment was very good. Performance of the pans was good while the reel performance was very good.

Crop flow through the New J was smooth, as long as ground speed was properly synchronized with the reel speed. If ground speed was too fast, occasional cutterbar plugging occurred, while if ground speed was too slow, head shattering was excessive. Capacity of the New J could be increased by using a variable speed reel drive, to permit adjustment of reel speed to suit crop conditions.

Crop losses were acceptable in both dry and tough crops. The seed pans, which covered 75% of the ground area in front of the cutterbar, collected most of the shattered seed. Performance of the optional seed pan brushes in dry crop conditions was excellent.

Although the 305 mm (12 in) seed pan spacing permitted on-row cutting for multiples of this row spacing, the seed pans were also suitable for cutting continuously seeded crops, and cross-cutting of row crops on headlands.

Installation was easy. Total installation time for two men was about ten hours.

No operator's manual was available, however detailed mounting instructions were provided. Lubrication was not required.

No serious mechanical problems occurred during the testing.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Manufacturing two seed pans the same length as the left divider, for pull-type combine headers, to eliminate tractor tire interference on sharp right turns.
2. Supplying a shield to protect the reel drive from the standing sunflower crop.
3. Modifying the seed pan braces to improve the ease of adjustments.
4. Providing a more secure means of attaching the seed pan support bracket to the back of the combine header.
5. Providing an operator's manual complete with operating, adjustment, and safety instructions.
6. Providing a means of easily detaching the seed pan brushes to suit variable crop moisture conditions.

Chief Engineer -- E.O. Nybrog

Senior Engineer -- J. C. Thauberger

Project Engineer -- Gregory R. Pool

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. We are reviewing this recommendation to determine whether or not we should go ahead with a modification to this extent. International Harvester is the only combine where this becomes a factor, all other pull types have a longer hitch and therefore do not require the two seed pans.
2. We are closely looking at this one and hope to have a shield available for the 1980 model year.
3. These seed pan braces have been modified for ease of adjustment as well as for greater stability.
4. We are currently reviewing our back attaching points. We have modified them for 1980 and feel that the modification is adequate.
5. We have updated our instruction sheets to provide a little more information and are currently looking at a complete operator's manual.
6. We are currently investigating this recommendation.

MANUFACTURER'S ADDITIONAL COMMENTS

New instruction sheets have been introduced indicating a different format of seed pan assembly, which greatly eases assembly time. The only difference is procedure, but it does eliminate the awkwardness in handling each seed pan and brace assembly.

As well as different procedure for assembly of the seed pans, the 1980 model has all holes pre-drilled in the support bracket at the back of the pans. This further reduces installation time.

The recommendation was to use a variable speed reel drive. This drive is available from the combine manufacturer and is, in fact, standard equipment on most combines. The variable speed drive on most combines is hydraulic or electric-mechanical. This allows the New J to operate at maximum capacity in all crop conditions at all speeds, and is a recommendation which we make to every customer that we work with.

The 1980 model has a major change on the seed pans. We use a larger bolt at the adjust points. This allows a person to tighten the bolt properly, thus eliminating the need for additional adjustments during operation.

GENERAL DESCRIPTION

The New J Sunflower Harvesting Attachment (FIGURE 1) is designed to mount on straight-cut combine headers. It consists of seed pans, which attach to the combine cutterbar, dividers, a reel with three rows of metal fingers, and a reel shield in front of the reel. The reel is powered by the combine reel drive.

The seed pans are spaced to correspond with sunflower row spacing. The sunflower plants pass between the seed pans to the cutterbar, where the heads are severed from the stalks. The reel and reel shield hold the heads down for cutting, and deliver the heads to the combine header. The seed pans, which extend ahead of the reel and the optional brushes attached to the pans, collect shattered seed dislodged during cutting.

The attachment tested was 3.8 m (12.5 ft) wide, between divider points, with twelve row openings, spaced at 305 mm (12 in). Attachments with various header and seed pan widths are available, to suit existing combines and cultural practices. Detailed specifications are given in APPENDIX 1.

SCOPE OF TEST

The New J was mounted on an International 914 pull-type combine, with a 3.8 m (12.5 ft) header. It was operated in the conditions shown in TABLE 1 for 34 hours while harvesting about 53 ha (130 ac) of sunflowers, sown at 760 mm (30 in) row spacing. It was evaluated for ease of installation, quality of work, ease of operation and adjustments and operator safety.

RESULTS AND DISCUSSION

EASE OF INSTALLATION

Installation Time: It took about 20 man hours to attach the New J to the combine header, using tools normally found in farm shops. Mounting instructions were provided which made installation

easy.

TABLE 1. Operating Conditions

Crop Type	Soil Conditions	Hours	Field Area	
			ha	ac
Open Pollinated Hybrid	Loamy Sand Clay	6.5	13	32
		27.5	40	98
Total		34.0	53	130

Reel: The reel was mounted on bearing brackets, which bolted to the two crop dividers. Wooden bearings, which supported the reel shaft, were bolted to these brackets. In addition, a reel drive hub and pulley had to be obtained from a hardware supplier, to complete the installation.

Seed Pans: The seed pans were fastened to the cutterbar with extra long guard bolts. They were supported from underneath by metal braces (FIGURE 2), to provide rigidity and to permit vertical adjustment. One end of each brace was bolted to the back of the seed pan and the whole assembly was installed on the header. The pan and brace assemblies were awkward to handle, making them difficult to install.

The other end of each brace was fastened to a long support bracket, which was suspended on hangers at the back of the combine header.

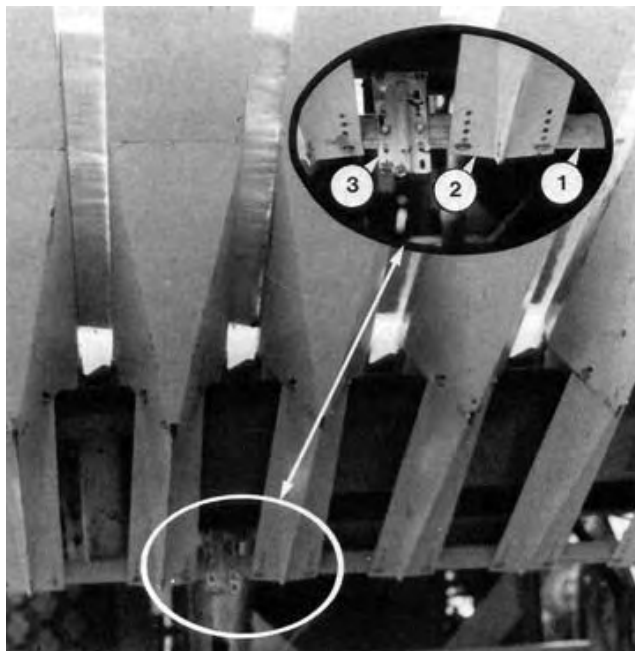


FIGURE 2. Seed Pan Support: (1) Support Bracket, (2) Pan Brace, (3) Hanger Bracket.

The mounting hardware for the support bracket, including the hangers, was inadequate for the loads imposed on it by the seed pans. The support bracket had to be lengthened to extend the whole width of the combine header. As well, all mounting holes had to be drilled in the bracket before installation.

Dividers: The dividers were easy to install. They were bolted to the cutterbar and the combine reel arms. The mounting arrangement was rigid and secure.

Shield: To install the reel shield, the distance between the dividers had to be equal to the length of the shield, and the dividers had to be mounted perpendicular to the cutterbar. Due to the flexibility of the shield, two men were needed to mount it. It was mounted close to the reel, with about 250 mm clearance between the shield and the pans.

Brushes: The optional seed-saving brushes were installed on the sides of the seed pans, to cover the spaces between the pans and catch any shattered seed. The brushes were installed with pop rivets.

QUALITY OF WORK

Feeding: The flow of crop into the combine was smooth as

long as ground speed was properly synchronized with the single available reel speed. It was important to maintain a reel index* between 0.9 and 1.1.

At high ground speeds, with a reel index below 0.9, the reel could not effectively clear the crop from the cutterbar, resulting in occasional plugging. At lower ground speeds, with a reel index above 1.1, the reel was too aggressive, causing some shatter loss and head damage.

Operating the New J in weedy crops did not affect feeding performance or cause plugging. The 215 mm (8.5 in) drive pulley and the 460 mm (18 in) reel pulley provided a reel speed of 50 rpm, which gave a working speed range of 5.7 to 6.9 km/h (3.5 to 4.3 mph), within the suitable range of reel indices. This did not provide an adequate working speed range for most crop conditions. Capacity of the New J could be increased by using a variable speed reel drive, to permit adjusting the reel speed to suit crop conditions.

Stubble Length: For uniform feeding, the reel was operated with about 100 mm (4 in) clearance between the reel and the cutterbar. The 50 mm (2 in) reel finger length permitted running the reel close to the cutterbar. The amount of stalk cut off with each head averaged about 300 mm (12 in) or less, depending on crop conditions. To maximize combine capacity, the stubble should be as long as possible with only the sunflower heads fed into the combine. The New J attachment was also equipped with a reel shield, which helped gently ease the taller plants down to the level of the seed pans, where they were cut off.

Shatter Loss: The seed pans were very effective in reducing seed loss, especially in dry crops. Individual pans were 230 mm (9 in) wide, with a 75 mm (3 in) row space between pans. The seed pans covered 75% of the ground area in front of the reel and cutterbar.

In dry crops, shattering can be very significant, and maintaining a proper ground speed is very important in reducing shatter loss. Optional pan brushes, which prevented losses between the pans, performed extremely well in dry crops. They significantly reduced the effective open area between the seed pans.

The amount of shatter loss was very dependent on the moisture content of the crop. Losses were negligible in tough crops, however the tough crop caused plugging and uneven feeding when using the pan brushes. Removing the brushes eliminated the plugging problem in tough crops.

Dividers: The crop dividers performed very well. Their size and shape ensured that few plants were pushed down. The narrow half-pans, attached to the dividers, occasionally filled with seeds and would not clean properly.

EASE OF OPERATION AND ADJUSTMENT

Row Spacing: All tests were conducted in sunflowers seeded at 760 mm (30 in) row spacing. Although the 305 mm (12 in) seed pan spacing on the New J permitted on-row cutting for this row spacing, this seed pan spacing was also suitable for cutting continuously seeded crops, or cross-cutting row crops. When not following rows, the seed pan points occasionally knocked down some large sunflower plants.

Turning: To facilitate right turns with a pull-type combine, the left divider was 255 mm (10 in) shorter than the pans. This eliminated some of the interference with the right tire on sharp right turns, however the tire sometimes contacted the adjacent seed pans. It is recommended that the first two seed pans on the left side be shortened to the same length as the left divider, for mounting on some pull-type combines.

Seed Pans: The seed pan angle was very difficult to adjust. The slotted holes at the back of the pan braces were inconveniently located. The time required for two men to adjust all pans was more than 30 minutes. To properly adjust the pan angle, one person was required to hold the pan point up, while the other person installed and tightened the bolts at the back of the pan brace. The pans required additional adjustments, for angle and for gap spacing, many times during the test. It was important to have the seed pans sloping toward the combine header, to permit collected seeds to be conveyed into the combine. It was also important to have all seed pans at the same level to prevent sunflower heads from falling between them. It is recommended that the manufacturer consider modifications to the seed pan braces to improve the ease of adjustment.

*Reel Index is the ratio of reel tip speed to forward travel speed.

Seed pan vibration was desirable to convey the collected seeds into the combine. Operation on rough fields caused considerable vibration of the seed pans, however no failures occurred. Cutting ability and feeding characteristics were not affected by field roughness.

Reel Drive: The reel drive belt, on the right side of the header, was exposed to the standing sunflower crop. As a result, plants often caught in the drive, causing the belt to jump off the drive pulley. A reel drive shield (FIGURE 3) was installed by PAMI, which eliminated the problem.

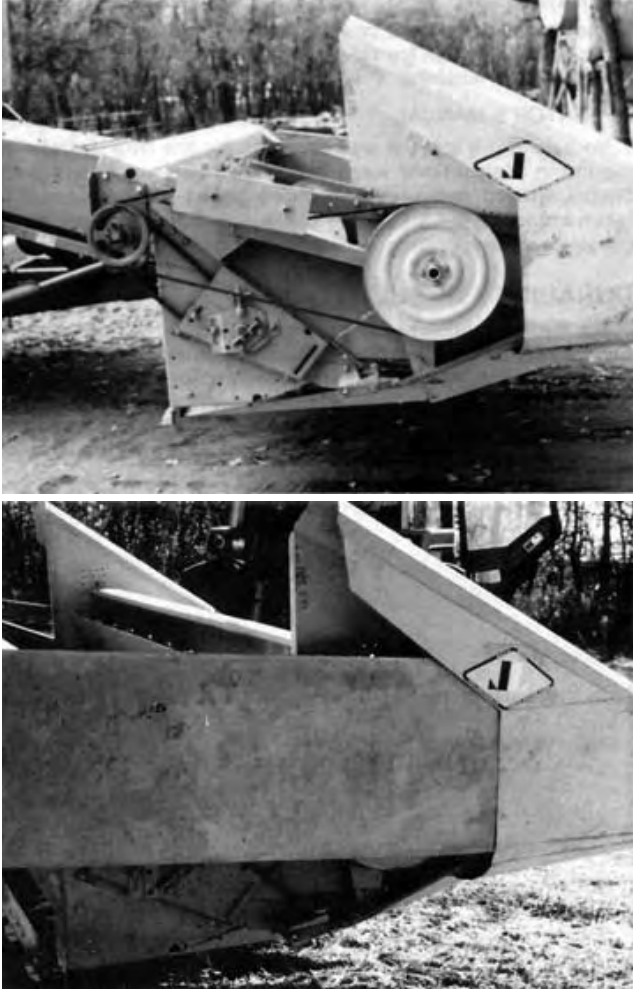


FIGURE 3. Exposed Reel Drive (top) and PAMI Drive Shield (bottom).

It is recommended that the manufacturer supply a suitable shield as part of the divider assembly. The belt and pulley on the reel drive acted as a slip clutch in the event of reel plugging.

Brushes: The optional seed-saving brushes performed very well in dry crop conditions. Occasional hair-pinning of stalks occurred at the front of the brushes where they were attached to the seed pans (FIGURE 4).

In tough crop conditions, the brushes caused plugging at the reel, and they were not necessary, as shattering was very minimal. However, they were very useful in dry crops. It is recommended that the brushes be quickly detachable, to suit variable crop moisture conditions.

Unhooking: The complete combine header assembly, with the New J attachment in place, could easily be unhooked from the combine and placed on the ground without damage. However, care had to be taken that the rear-mounted pan brace support brackets were not bent when the header was set down.

Lubrication: No lubrication was required on the New J. The reel was supported on both ends by pre-lubricated wooden bearings.

OPERATOR SAFETY

The New J was safe to operate provided normal safety

procedures were followed. No safety decals or instructions were supplied with the machine.



FIGURE 4. Seed Pan Brushes.

OPERATOR'S MANUAL

No operator's manual was available for the New J. Detailed mounting instructions were provided, however. These were clearly written and provided much useful information. It is recommended that a suitable operator's manual be provided, complete with operating, adjustment and safety instructions.

DURABILITY RESULTS

The New J sunflower harvesting attachment was operated in the field for 34 hours, while harvesting about 53 ha (130 ac) of sunflowers. The intent of the test was functional evaluation and no extended durability evaluation was conducted. No mechanical problems occurred during testing, however the support bracket that anchored the seed pan braces was supplied with mounting hardware that bent during operation.

**APPENDIX I
SPECIFICATIONS**

Make: New J
Model: 12 row, 305 mm spacing
Serial Number: 2562

Overall Dimensions:
 -- length 2130 mm
 -- width 4120 mm
 -- height 1240 mm
 Total Weight: 350 kg

Feeding System:
 -- type seed pans and drum reel with shield
 -- attachment to straight-cut combine header

Seed Pans:
 -- width 230 mm
 -- length 1820 mm
 -- depth 35 mm

Reel:
 -- length 3520 mm
 -- diameter
 - drum only 620 mm
 - with fingers 670 mm
 -- speed 50 rpm
 -- number of fingers per row 3
 -- drive V-belt from combine header

Options:
 -- 3050 mm to 7315 mm width units
 -- seed pan brushes, reel, reel shield 230 mm, 305, and 685 mm seed pan widths
 -- wonder bar
 -- crop savers

**APPENDIX II
MACHINE RATINGS**

The following rating scale is used in PAMI Evaluation Reports:

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

**APPENDIX III
CONVERSION TABLE**

1 metre (m)	= 3.3 feet (ft)
1 millimetre (mm)	= 0.04 inches (in)
1 kilogram (kg)	= 2.2 pounds mass (lb)
1 kilometre/hour (km/h)	= 0.6 mile/hour (mph)



**ALBERTA
FARM
MACHINERY
RESEARCH
CENTRE**

3000 College Drive South
 Lethbridge, Alberta, Canada T1K 1L6
 Telephone: (403) 329-1212
 FAX: (403) 329-5562
<http://www.agric.gov.ab.ca/navigation/engineering/afmrc/index.html>

Prairie Agricultural Machinery Institute

Head Office: P.O. Box 1900, Humboldt, Saskatchewan, Canada S0K 2A0
 Telephone: (306) 682-2555

Test Stations:
 P.O. Box 1060
 Portage la Prairie, Manitoba, Canada R1N 3C5
 Telephone: (204) 239-5445
 Fax: (204) 239-7124

P.O. Box 1150
 Humboldt, Saskatchewan, Canada S0K 2A0
 Telephone: (306) 682-5033
 Fax: (306) 682-5080