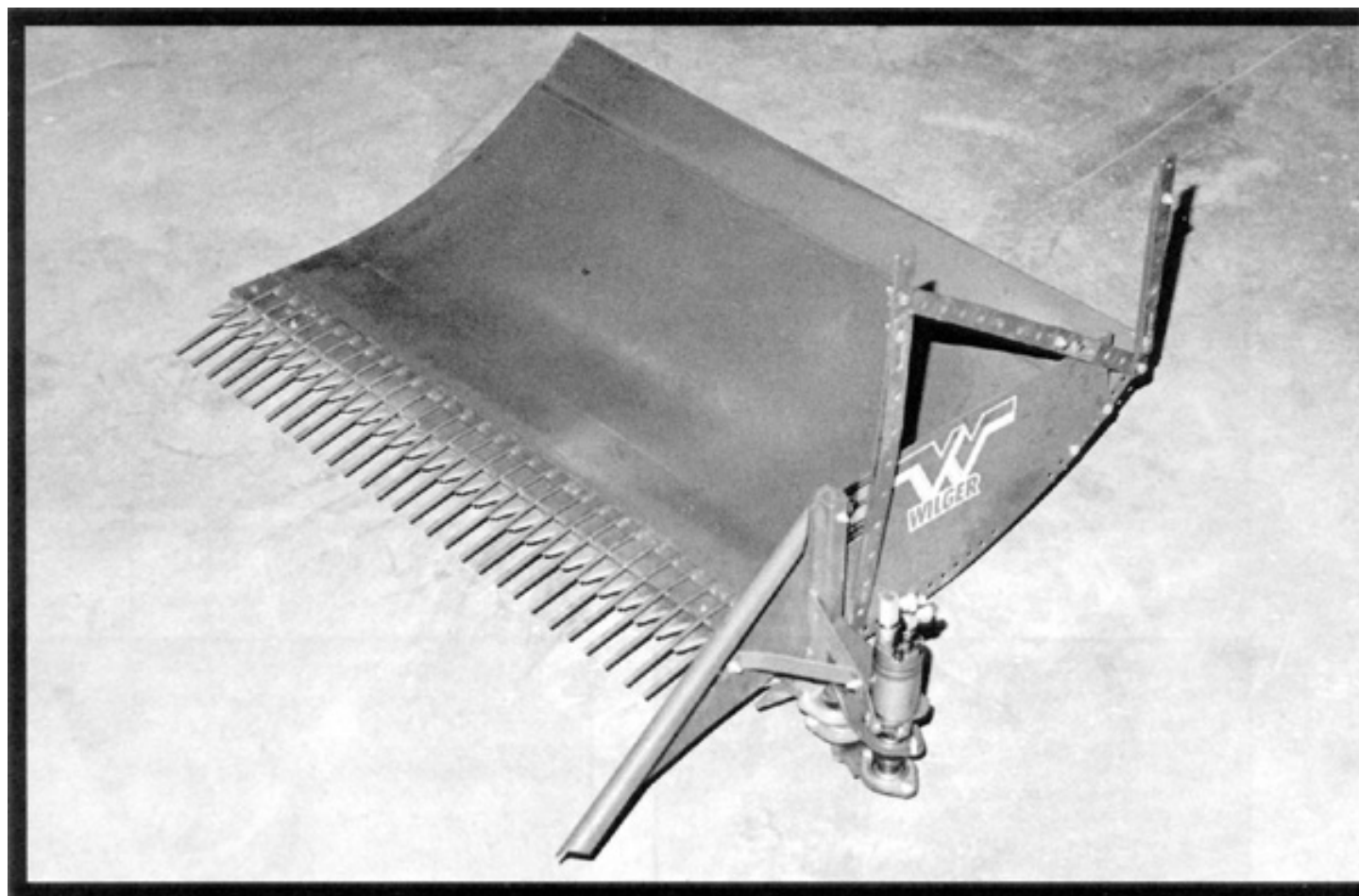


Evaluation Report

592



Wilger Stripper II Snow Trapping Attachment

A Co-operative Program Between



WILGER STRIPPER II SNOW TRAPPING ATTACHMENT

MANUFACTURER AND DISTRIBUTOR:

Wilger Industries Ltd.
2409 Thayer Avenue
Saskatoon, Saskatchewan S7L 5Y1
Telephone: (306) 242-4121

RETAIL PRICE:

\$1,095.00 (December, 1966, f.o.b. Humboldt, Sask.)

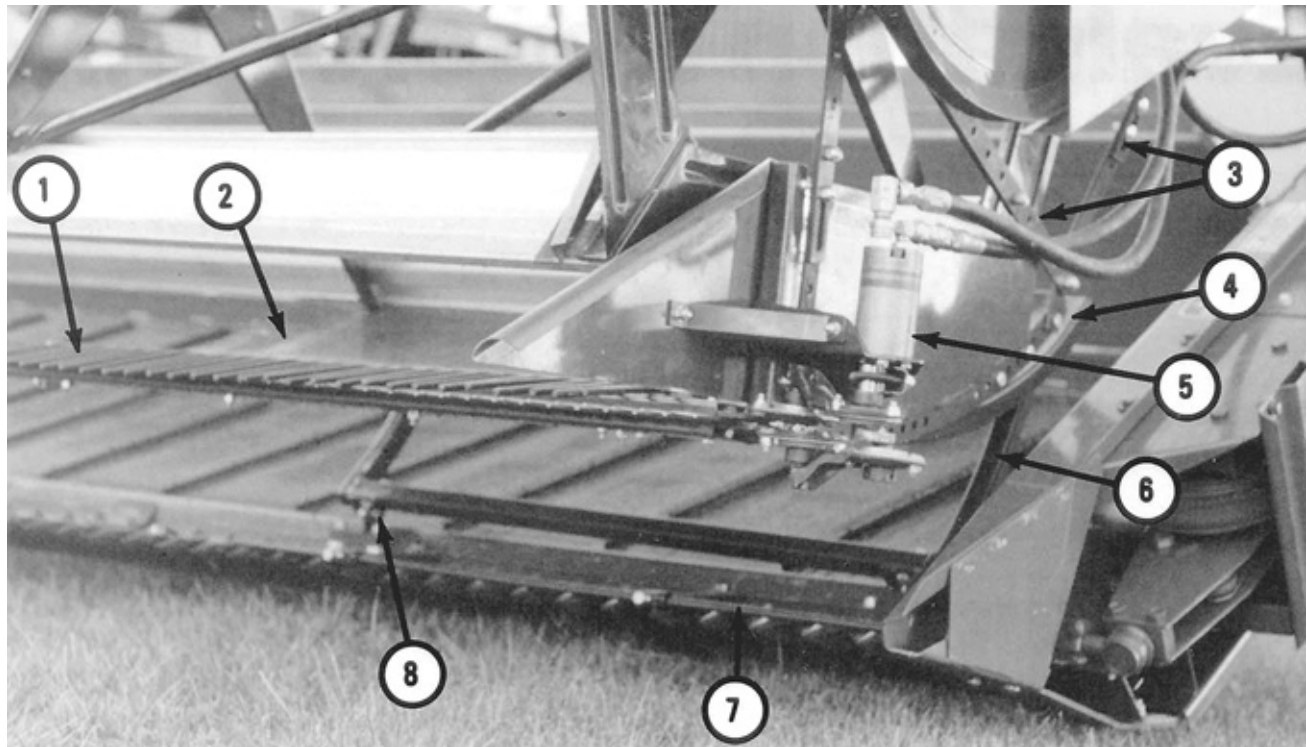


FIGURE 1. STRIPPER II: (1) Cutterbar, (2) Pan, (3) Reel Arm Straps, (4) Pan Extensions, (5) Hydraulic Drive, (6) Hinge Assembly, (7) Stubble Deflector, (8) Foot Brackets.

SUMMARY AND CONCLUSIONS

Rate of Work: The Stripper II could cut up to 7 mph (11 km/h). A few grain heads were missed at speeds over 5.5 mph (9 km/h).

Quality of Work: Cutting ability was very good. The knife had adequate power and stubble was level and uniform. Short plants were missed if the reel was set too high. Crop delivery to the windrow was very good. The cut grain heads were placed on the windrow, and easily picked by the combine. The 4 ft (1.2 m) wide barrier strips were spaced one windrower width apart. Barrier height varied with reel height. Research on barrier stripping attachments has shown dramatic increases in soil moisture and yield.

Power Requirements: The hydraulic knife drive required 0.5 to 0.9 hp (0.4 to 0.7 kW). Flow at 600 rpm was 3.1 US gpm (0.20 L/s). Maximum hydraulic pressure was 500 psi (3500 kPa).

Ease of Operation and Adjustment: Ease of installing was very good. It was assembled and mounted by one man in 4 hours. It fit most makes of windrowers, but hydraulic hookups varied. Ease of operating was excellent. No separate controls were needed. Ease of adjusting was good. Some awkward adjustments were required during initial operation. Ease of servicing was very good.

Safety: The cutterbar was shielded for safe installation. The operator's manual emphasized safety. A safety decal was supplied.

Operator's Manual: The operator's manual was very good. It was complete and well organized.

Mechanical History: Two minor problems occurred. The stubble deflector was bent and some bolts on the hinge loosened.

RECOMMENDATIONS

It is recommended that the manufacturer consider:

1. Modifying the stubble deflector to prevent crop build-up and rod damage.
2. Modifications to prevent the hinge assembly from loosening.

Senior Engineer: J. D. Wassermann

Project Engineer: M. E. Jorgenson

THE MANUFACTURER STATES THAT

With regard to recommendation number:

1. Future models will have the deflector rod supports modified to hold the rod near the tips of guards for optimum function and minimum vulnerability; also, more rod supports will be provided.
2. Future models will have jam nuts provided to lock the nuts on all pivot bolts.

GENERAL DESCRIPTION

The Wilger Stripper II (FIGURE 1) is an attachment which mounts on a windrower for cutting a strip of tall cereal grain stubble with each pass. The stubble strips act as wind barriers which use drifting action to enhance over-winter snow catch. Grain heads from the strip are cut and conveyed to the windrow.

The Stripper II mounts under the left end of the reel and raises and lowers with the reel. It is supported by three pairs of straps fastened to the reel arm and a hinge assembly fastened to the guard bolts on the windrower cutterbar. The hinge assembly provides the lateral stability and folds up under the pan when the Stripper II is lowered. Opposed action upper and lower knives are hydraulically driven from the windrower or tractor, or with an optional belt driven pump. A lateral rod is attached to the section of windrower cutterbar directly beneath the Stripper II. This prevents the barrier strip from being cut by the windrower. Grain heads are swept by the reel across the pan onto the rear of the draper and therefore are placed on top of the windrow. Barrier strip height is controlled by raising and lowering the windrower reel to suit crop height. Grain head delivery is controlled by adjusting the clearance between the reel and pan, or by extending the pan.

Detailed specifications are provided in APPENDIX I.

SCOPE OF TEST

The Stripper II was mounted and tested on a Hesston 8100 self-propelled windrower, and on a Westward 3000 pull-type windrower. The optional hydraulic pump kit was used when installed on the Westward 3000. The Stripper II was operated for 30 hours while windrowing about 420 ac (170 ha) of Katepwa spring wheat varying in height from 12 to 48 in (300 to 1200 mm). It was evaluated for rate of work; quality of work; power requirements; ease of installing, operating, and adjusting; safety; and suitability of the operator's manual. Although extended durability testing was not conducted, *mechanical* failures during the test were recorded.

RESULTS AND DISCUSSION

RATE OF WORK

The Stripper II cut well at speeds up to 5.5 mph (9 km/h). At faster speeds, a few grain heads were left in the barrier strip. Although the missed heads were not significant, most operators slowed down to avoid the ragged appearance of the strip. In tall, uniform stands of wheat, travel speeds up to 7 mph (11 km/h) were achieved with minimal missed heads.

Since the Stripper II was positioned over a portion of the existing windrower cutterbar, width of cut was not affected.

QUALITY OF WORK

Cutting: Performance of the Stripper II cutterbar was very good.

Cutting height was critical to obtain the maximum height of barrier strip without missing heads. It was usually necessary to cut about 8 to 12 in (200 to 300 mm) below the crop height in order to harvest all the grain heads (FIGURE 2). This ensured that shorter plants were not missed, and that enough straw remained with the grain heads for support in the windrow.

Barrier strip stubble was level and uniform with very few missed grain heads up to 5.5 mph (9 km/h). At higher speeds, the stubble became more ragged and the occasional head was missed by the cutterbar.

The opposed action knives had adequate power, stalling only in heavy patches of Canada thistle. Stalling could usually be avoided by slowing down through weedy patches. Increasing cutterbar speed also provided more power, but the manufacturer warned against excess speed as it may accelerate wear on the knives and hydraulic motor. A speed of roughly 600 rpm was suitable for normal crops.



FIGURE 2. Typical Cutting Height.

Clearance between the upper and lower knife sections varied from 0 to 1/8 in (0 to 3 mm) across the cutterbar width. This variation in clearance did not appear to diminish cutting performance. Adjusting the clearance had no noticeable effect. The finger guards, however, were very important to cutting effectiveness and must be left in place at all times.

Delivery: Crop delivery to the windrow after being cut was very good.

Reel to pan clearance was adjusted to no more than 1/4 in (6 mm) near the front of the pan, and 3/4 in (19 mm) at the rear. The tight front clearance ensured that crop did not pile up on the pan. A few kernels of grain were rubbed out between the reel and pan. The wider rear clearance kept crop from being flipped around by the reel as it left the pan (FIGURE 3).

The pan extension could be adjusted for different windrowers to place the crop at the rear of the draper. This ensured that the crop from the Stripper II landed on top of the long-strawed part of the windrow. In the PAMI tests, the extension was set in the mid position.

Flow was generally uniform. In short or thin crop, material built up on the pan before being swept off by the reel, but the windrow was not noticeably affected.

Grain heads from the Stripper II were placed on the left side of the windrow primarily on top of the long-strawed windrow material. Normal draper speeds of 400 to 600 fpm (2 to 3 m/s) on the windrower were satisfactory. About 8 to 12 in (200 to 300 mm) of straw was left with the grain heads to keep them from falling through the stubble. The windrows were easily picked up by the combines with no noticeable increase in picking loss.



FIGURE 3. Typical Crop Delivery Off the Pan.

Barrier Formation: Barrier formation was very good. Researchers have suggested that one of the best snow trapping methods is with the tall stubble barrier strip. Ideally, barriers should be 2 to 6 ft (0.6 to 2 m) wide, at regular intervals, and spaced perpendicular to the prevailing winds to take advantage of drifting action. Barrier height and spacing recommendations vary, but generally taller barriers permit greater spacing and increase the amount of trapped snow.

The Stripper II produced rectangular tall stubble strips on the left end of each windrow pass (FIGURE 4). Barrier height depended on reel adjustment and crop height, but was generally 8 to 12 in (200 to 300 mm) less than full crop height.



FIGURE 4. Barrier Strip Formation and Position.

Depending on the make and width of the windrower, the edge of the barrier strip was positioned 3 to 14 ft (1 to 4.3 m) to the left of the windrow. On the Westward 3000, where the barrier was 11 ft (3.4 m) to the left, the wheels of some combines trampled part of the 48 in (1.2 m) wide strip, but the barrier rebounded nearly to its original height.

Snow Trapping: Considerable research is available that documents the increases in snow catch, soil moisture, and crop yields with proper stubble management.

The practice of barrier stripping, as performed by the Stripper II, is one of the most successful stubble management techniques according to Agricultural Canada research across the prairies. Increases in soil moisture and crop yield have consistently exceeded 30%. Yield increases as high as 150% have been reported in years of drought when conventionally farmed fields produce little or no crop.

Snow catch was not recorded during the PAMI evaluation. FIGURE 5 illustrates typical snow catch from the Stripper II when mounted on a 30 ft Westward 3000 pull-type windrower.



FIGURE 5. Barrier Strips in Katepwa Wheat Stubble with 30 ft (91 m) Spacing.

POWER REQUIREMENTS

Power required to operate the Stripper II was 0.5 to 0.9 hp (0.4 to 0.7 kW). The hydraulic knife drive required 3.1 US gpm (0.20 L/s) at a knife speed of 600 RPM. Hydraulic pressure varied from 300 to 500 psi (2000 to 3500 kPa). Most tractors and self-propelled windrowers should have adequate supply, though method of hook-up will vary. The Stripper II was easily powered in series with the reel drive circuit on the self-propelled Hesston 8100. On the pull-type windrower, a tractor with three sets of remote outlets was needed for the Stripper II, the reel lift, and table lift. For tractors with only two remote outlets, the optional belt-driven pump and reservoir performed well.

EASE OF OPERATION AND ADJUSTMENT

Installing: Ease of installing the Stripper II was very good.

Complete assembly and mounting took one man about 4 hours. The unit fit most makes of windrowers without any modifications. All mounting bolts and brackets were supplied, although some additional hydraulic fittings, a flow control, or the optional pump were required with some installations. Mounting instructions in the operator's manual were clear and well organized, with some illustrations.

On the Hesston 8100, one hole had to be drilled through the reel arm for attaching the rear pan strap. Also, a flow control was needed for proper regulation of knife drive speed. On the Westward 3000 pull-type windrower, brackets had to be fabricated by PAMI to attach the optional hydraulic pump and reservoir. A pulley had to be attached to a shaft on the windrower, to belt drive the pump. The Stripper II was easily installed without power tools.

The Stripper II was easily removed or reinstalled in about 15 minutes if all settings were carefully noted and the reel arm straps remained fixed to the pan.

Operating: Ease of operating was excellent.

No additional controls were necessary. The operator had to occasionally check for grain heads in the barrier strip and raise or lower the reel accordingly. Usually, the reel was simply operated just beneath the grain heads as in normal windrowing.

Adjusting: Ease of adjusting was good.

Several adjustments were needed when first installing the unit, but

there were very few routine adjustments.

Clearance between the pan and reel was easily adjusted at the front with the slotted holes on the reel arm straps. Clearance at the rear of the pan was difficult to adjust, since loosening the straps caused the pan to rotate forward. Also, the pan extension could not be adjusted without removing the rear reel arm strap bolt. These adjustments were made infrequently.

The cutterbar clearance was easy to adjust by squeezing the channels together. Cutterbar speed was easily adjusted without attaching a meter by visually synchronizing the Stripper II knife with the windrower knife as described in the operator's manual. Although speed could only be set crudely by this method, the cutting performance was not adversely affected.

Servicing: Ease of servicing was very good.

Daily inspection and greasing of the cutterbars took less than one minute. All bolts, especially on the hinge assembly had to be checked regularly, since a loose mount could damage the windrower draper.

The knives were easily removed if sickles had to be replaced.

SAFETY

No safety hazards were apparent on the Stripper II, provided all warnings and safety messages were observed. The Stripper II was supplied with a shield over the cutterbars to protect the operator during installation. A safety decal was prominently displayed near the cutterbar. The operator's manual emphasized safe practices such as blocking the header and reel during installation.

OPERATOR'S MANUAL

The operator's manual was very good.

It was clearly written and well organized. Information was provided on safety, installing, operating and adjusting, servicing, troubleshooting, and replacement parts. More detailed illustrations or photographs may have helped to further clarify the installation.

MECHANICAL HISTORY

The Stripper II was evaluated for functional performance. An extended durability test was not conducted. TABLE 1 outlines the mechanical problems encountered during the 30 hours of operation.

TABLE 1. Mechanical Problems

ITEM	OPERATING HOURS
Straw hairpinned under the cutterbar fingers. A rod was welded across the back of the fingers to prevent this at	1
The stubble deflector rod was bent due to stones and was restraightened by hand several times	During the Test
A bolt came loose on the hinge assembly and the hinge contacted the draper, breaking several slats. The bolt was replaced at	30

Stubble Deflector: The manufacturer had suggested installing the deflector above the guards, but this caused straw to pile up on the windrower cutterbar. Moving the deflector under the guards eliminated crop build-up, but the rod bent easily from stones and ridges, especially when cutting short crop. It is recommended that the manufacturer consider modifying the stubble deflector to prevent crop build-up and rod damage.

Hinge Bolts: The hinge assembly was fastened to the base and pan with 3/8 x 1-1/2 NC bolts and nylon lock nuts. The bolts had to be checked often since loose hardware could allow the Stripper II to drop onto the windrower drapers breaking slats or stopping the draper. It is recommended that the manufacturer consider modifications to prevent the hinge assembly from loosening.

APPENDIX I

SPECIFICATIONS

Make and Model:	Wilger Stripper II
Serial Number:	N/A
Manufacturer:	Wilger Industries Ltd. 2409 Thayer Avenue Saskatoon, Saskatchewan S7L 5Y1
Cutterbar:	
- motor type	Chariygn model 128-0020-002
- motor displacement	1.21 in ³ (19.8 mL)
- drive type	opposed action dual pitman crank
- stroke	0.94 in (23.8 mm)
- speed	fully adjustable, 600 to 800 RPM recommended
- knife section	
- width	3 in (76 mm)
- length	3.25 in (83 mm)
- type	Kondex twin point, overserrated
- number	16 top, 16 bottom
- width of cut	4.0 ft (1.2 m)
Pan:	
- construction	16 ga (1.6 mm) mild steel sheet
- length	23 to 29 in (580 to 740 mm)
- width	48 in (1200 mm)
- radius of curvature	28 in (710 mm)
Reel Arm Mounting Straps:	
- size	three at 1.25 x 0.19 x 20 in (32 x 5 x 500 mm) three at 1.25 x 0.19 x 12 in (32 x 5 x 300 mm)
- range of length adjustment	12 to 38 in (300 to 970 mm)
Hinge Assembly:	
- width	44.5 in (1130 mm)
- length	21.5 in (550 mm)
- construction	1.25 x 1.25 x 0.1 in (32 x 32 x 2.5 mm) steel tube
- maximum lift height	35 in (890 mm)
Stubble Deflector:	
- construction	0.5 in (12 mm) diameter steel rod
- width	4.0 ft (1.2 m)
Overall Dimensions:	
- length	49 in (1240 mm)
- width	56.5 in (1435 mm)
- height	13 in (330 mm)
- weight	64 lb (29 kg)
Optional Pump:	
- make and type	Webster gear pump
- displacement	0.74 in ³ (12.1 mL)
- output at rated speed	8 gpm US (0.5 L/s) at 2500 RPM 2.6 gpm US (0.16 L/s) at 800 RPM
- tank capacity	1 gal Imp. (4.5 L)

SUMMARY CHART

WILGER STRIPPER II SNOW TRAPPING ATTACHMENT

RETAIL PRICE	\$1,095.00 (December 1988, f.o.b. Saskatoon, Sask.)
RATE OF WORK	Up to 7 mph (11 km/h), cut best below 5.5 mph (9 km/h)
QUALITY OF WORK	
Cutting	Very Good; adequate power, stubble level and uniform, short plants missed if cut too high
Delivery	Very Good; grain heads supported on left side of windrow, easily picked up
Barrier Formation	4 ft (1.2 m) wide, rectangular, spaced one windrower width, barrier height determined by reel height
Snow Trapping	research on barrier strips has shown dramatic increases in soil moisture and yield.
POWER REQUIREMENTS	0.5 to 0.9 hp (0.4 to 0.7 kW)
EASE OF OPERATION AND ADJUSTMENT	
Installing	Very Good; took one man 4 hours
Operating	Excellent; no separate controls needed
Adjusting	Good; some initial adjustments were awkward
Servicing	Very Good; less than one minute daily
SAFETY	Cutterbar was shielded for installation, safety decal was supplied
OPERATOR'S MANUAL	Very Good; thorough and well organized
MECHANICAL HISTORY	Two minor problems occurred



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