

Small Scale Oil Seed Press Evaluation



Six presses



Small-Scale Oilseed Presses: An Evaluation of Six Commercially-Available Designs

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What is Cold Pressing ?



Cold
Pressing



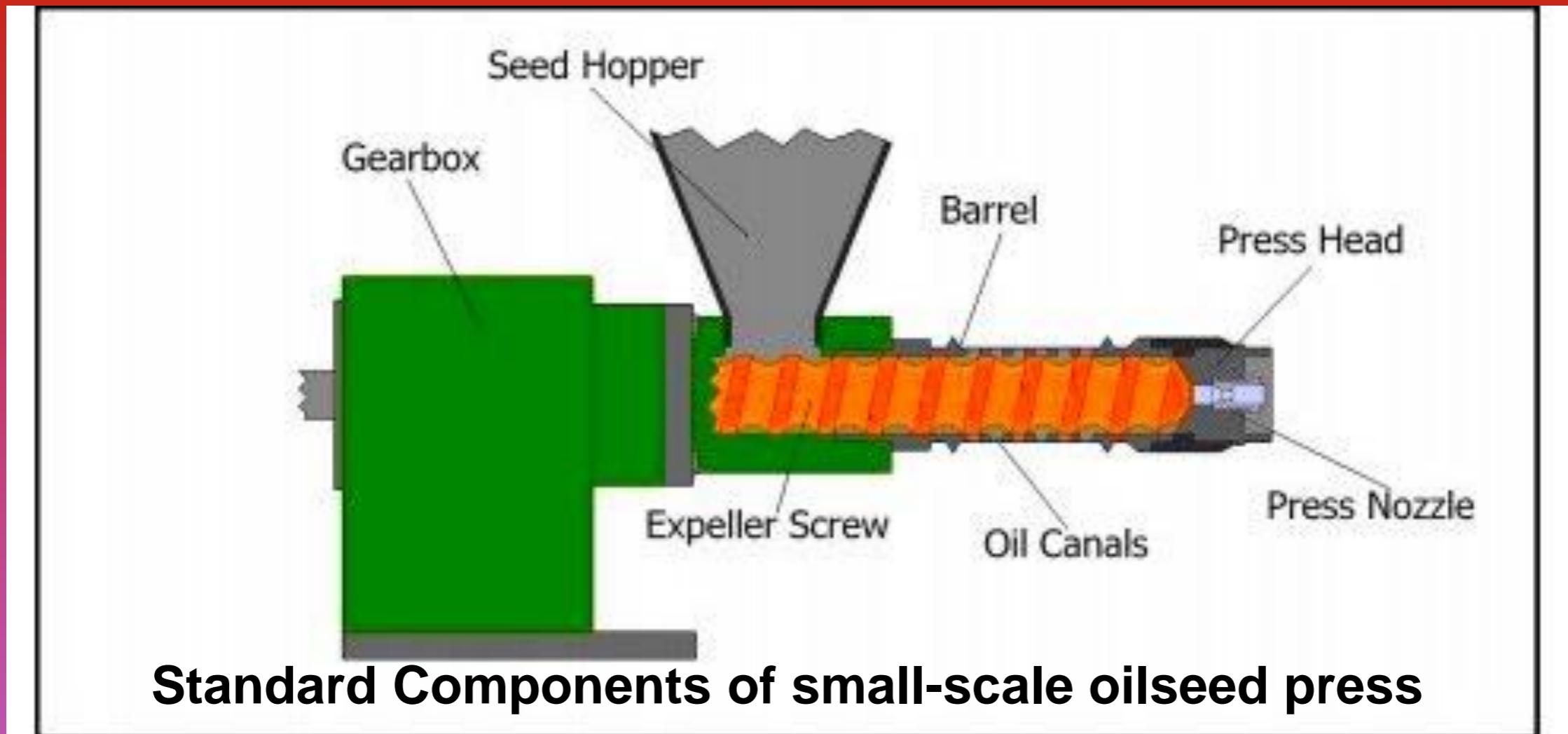
120 Degrees

(Oil Temperature)

210 Degrees

Expeller Press (Screw Press) Cold pressing

As apposed to Chemical extraction



Screw



Barrel



Nozzle



Nozzle



Press Head



Agoil M70

KernKraft 40

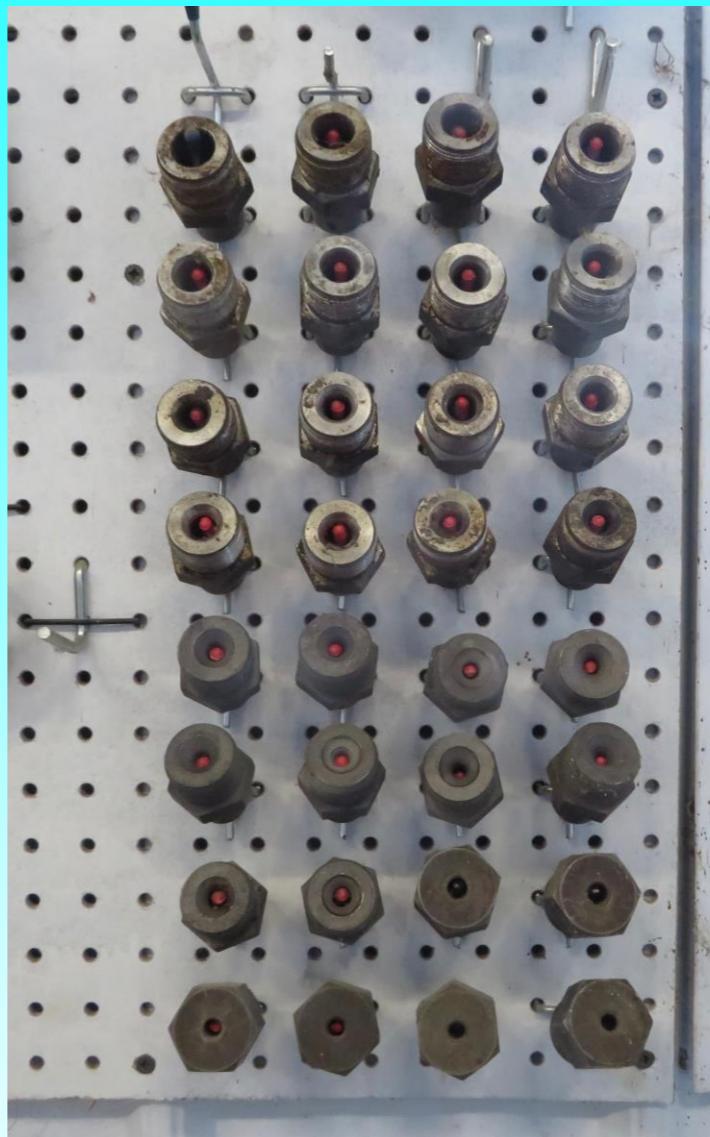


4 Ton Chinese Press

Expeller Screws



Set Nozzle

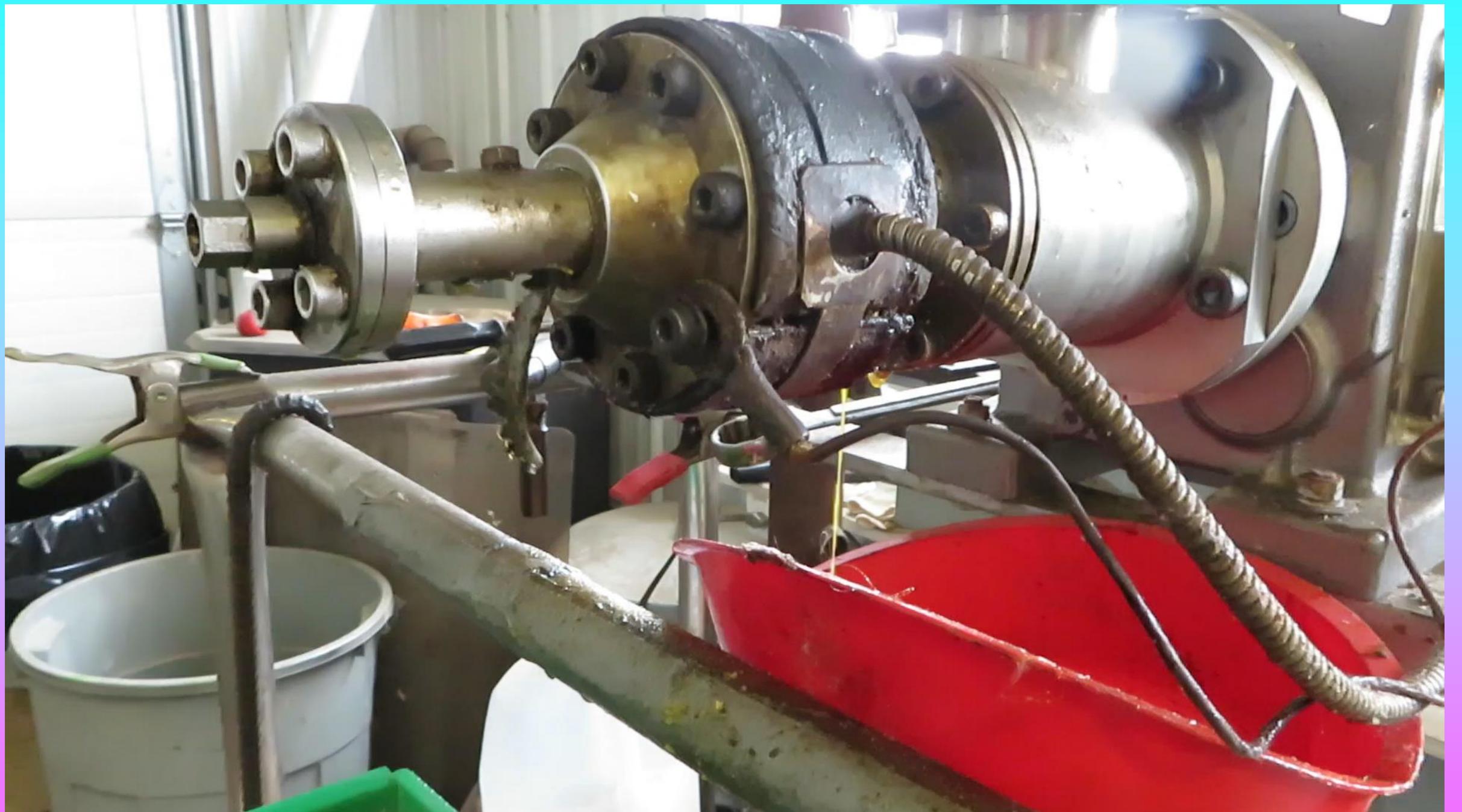


Set Nozzle



Variable Nozzle

Nozzles vary on different press designs



AgOil Screw Press



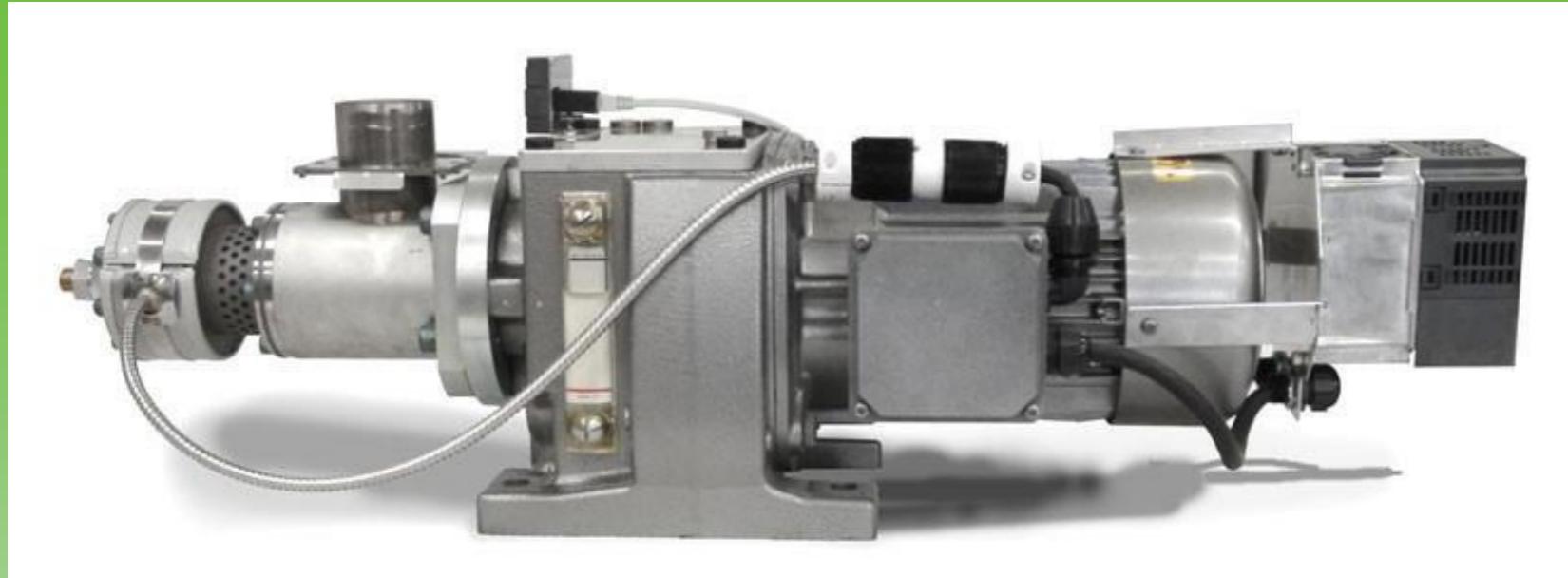
KernKraft 40

Table 1. Specifications for six presses evaluated during the course of this study.

PRESS	↓ Estimated capacity (lbs seed/24 hrs)	↓ Approximate purchase cost + year	↓ Power source	↓ Rated load	↓ Adjustable speed	↓ Multiple screws available	↓ Heated barrel / head	↓ Adjustable nozzle diameter	↓ Ease of set-up
AgOil M70	700	\$8,500 (2012)	240v	1.5 kW / 2.0 HP	X	X		X	Simple
Keller KEK P0020	1056	\$8,300 (2010)	230v	2.2 kW / 3.0 HP	X			X	Simple
KernKraft 40	1200	\$15,000 (2010)	220v	3.0 kW / 4.0 HP	X	X	X	X	Finicky
Komet CA59G3	260	\$8,000 (2008)	115v AC	1.1 kW / 1.5 HP	X	X		X	Simple
Oil Prince (KernKraft 20F)	1800	\$6,000 (2012)	220v	2.2 kW / 3.0 HP	X	X	X	X	Finicky
Täby 70	1500	\$7,000 (2005)	220-240v	2.2 kW / 3.0 HP	X	X		X	Moderate



Penn State Extension



2019 COST \$8951.00
agoilpress.com

**MANUFACTURER
CONTACT INFORMATION**
[made in U.S.A.]
www.agoilpress.com

AgOil
Mondovi, WI
(877) 645-7737
sales@agoilpress.com

AgOil M70
Borderview Research Farm, Alburgh, VT

Manufacturer's Rated Capacity: 700 lbs/24 hours
Cost: \$8500 (2012)



Pellet



Ribbon



Set Nozzle



Variable Set Nozzle

2019 Cost App. the same
Elwyn Beck



**DISTRIBUTOR
CONTACT INFORMATION**

[made in Germany]
www.keller-kek.de

Distributor in the U.S.:
Elwyn Beck
Sioux Falls, South Dakota
(605) 354-1323

Lloyd Byers - Liverpool, Pa

\$8300.00-2010



Flake



Figure 6. The Keller press has a single barrel and drive.

**DISTRIBUTOR
CONTACT INFORMATION**

[made in Germany]

Distributor in the U.S.:

Circle Energy

Dodgeville, Wisconsin

Eric Hamilton, (608) 574-7449

info@circle-energy.com



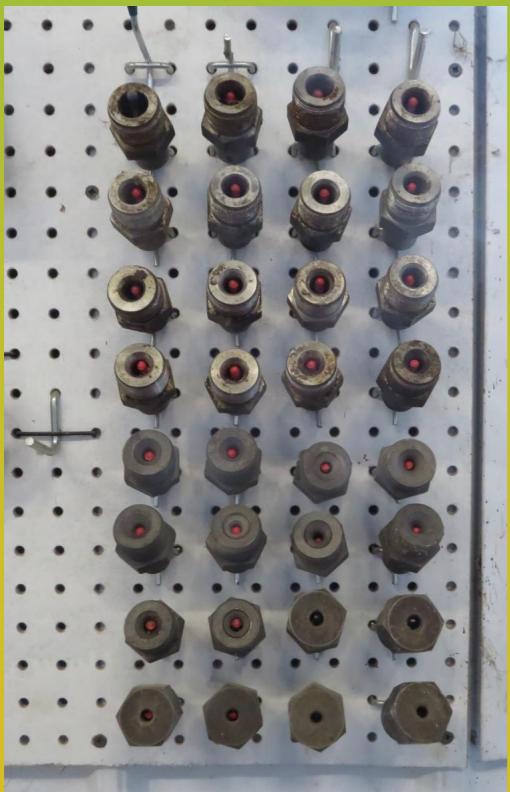
Kern Kraft 40
seed2oil.com

2019 App. cost \$10,500.00

KernKraft 40

Borderview Research Farm, Alburgh, VT

Manufacturer's Rated Capacity: 1200 lbs/24 hours
Cost: \$15000 (2010)



Pellet



Figure 9. Scuffed screws (left) need to be polished (right) to increase press efficacy.

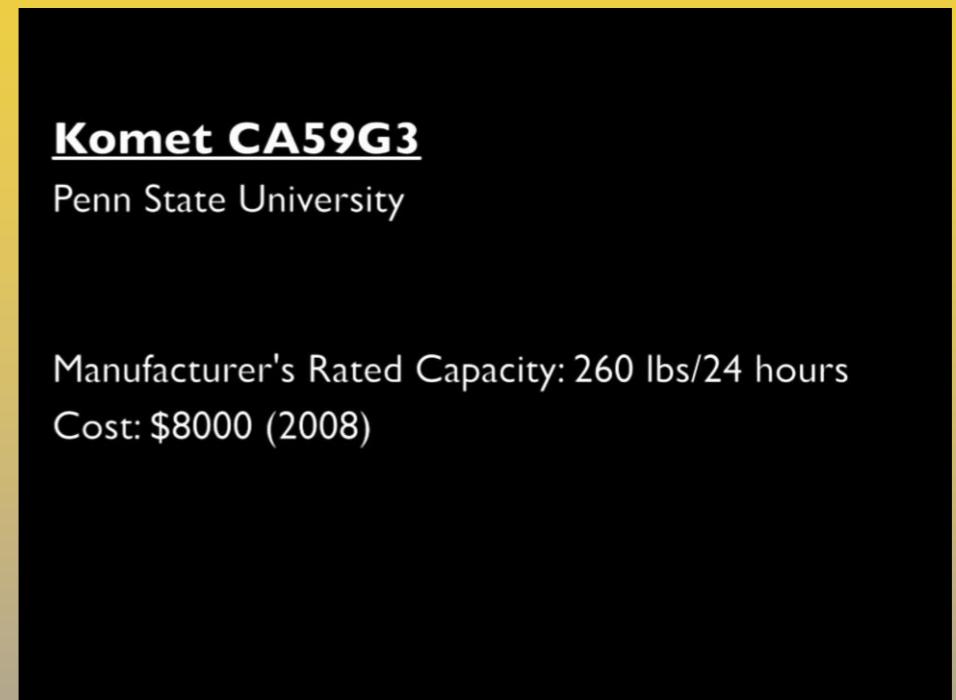


Several set nozzle sizes



Komet CA59G3
2019 \$6,000.00

Nebraska Screw Press



Komet CA59G3

Penn State University

Manufacturer's Rated Capacity: 260 lbs/24 hours
Cost: \$8000 (2008)

**DISTRIBUTOR
CONTACT INFORMATION**

[made in Germany]
www.oekotec.ibg-monforts.de/

Distributor in the U.S.:
Nebraska Screw Press
Lyons, Nebraska
(402) 307-0280
rbyrnes@nebraskascrewpress.com



Pellet



KernKraft 20F

2019 App.Cost \$7800.00

Seed2Oil.com

Oil Prince (KernKraft 20F)

Coppal House Farm, Lee, NH

Manufacturer's Rated Capacity: 1800 lbs/24 hours
Cost: \$6000 (2012)



Pellet

DISTRIBUTOR CONTACT INFORMATION

[made in Germany]

Distributor in the U.S.:

Circle Energy

Dodgeville, Wisconsin

Eric Hamilton, (608) 574-7449

info@circle-energy.com

State Line Farm

2019 Cost \$12,200.00

Magic Mill



DISTRIBUTOR CONTACT INFORMATION

[made in Sweden]

www.oilpress.com

Distributor in the U.S.:

 Magic Mill
 Upper Saddle River, NJ
 (201) 785-8840
 contact@magicmillusa.com



Pellet



Figure 14. Side-mounted control panel.



**Chinese oil press - 15 HP motor - Vacuum pump -
8000 pounds in 24 hours
2007-\$3,900.00**



Flake

Protocol

3 CROPS

- Canola
- Soybeans
- Sunflower



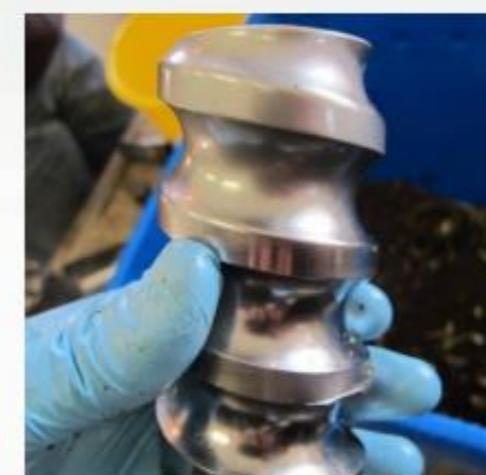
3 METHODS (RPM settings)

- Method 1: Operator's preferred tuning
- Method 2: Faster processing
- Method 3: More oil

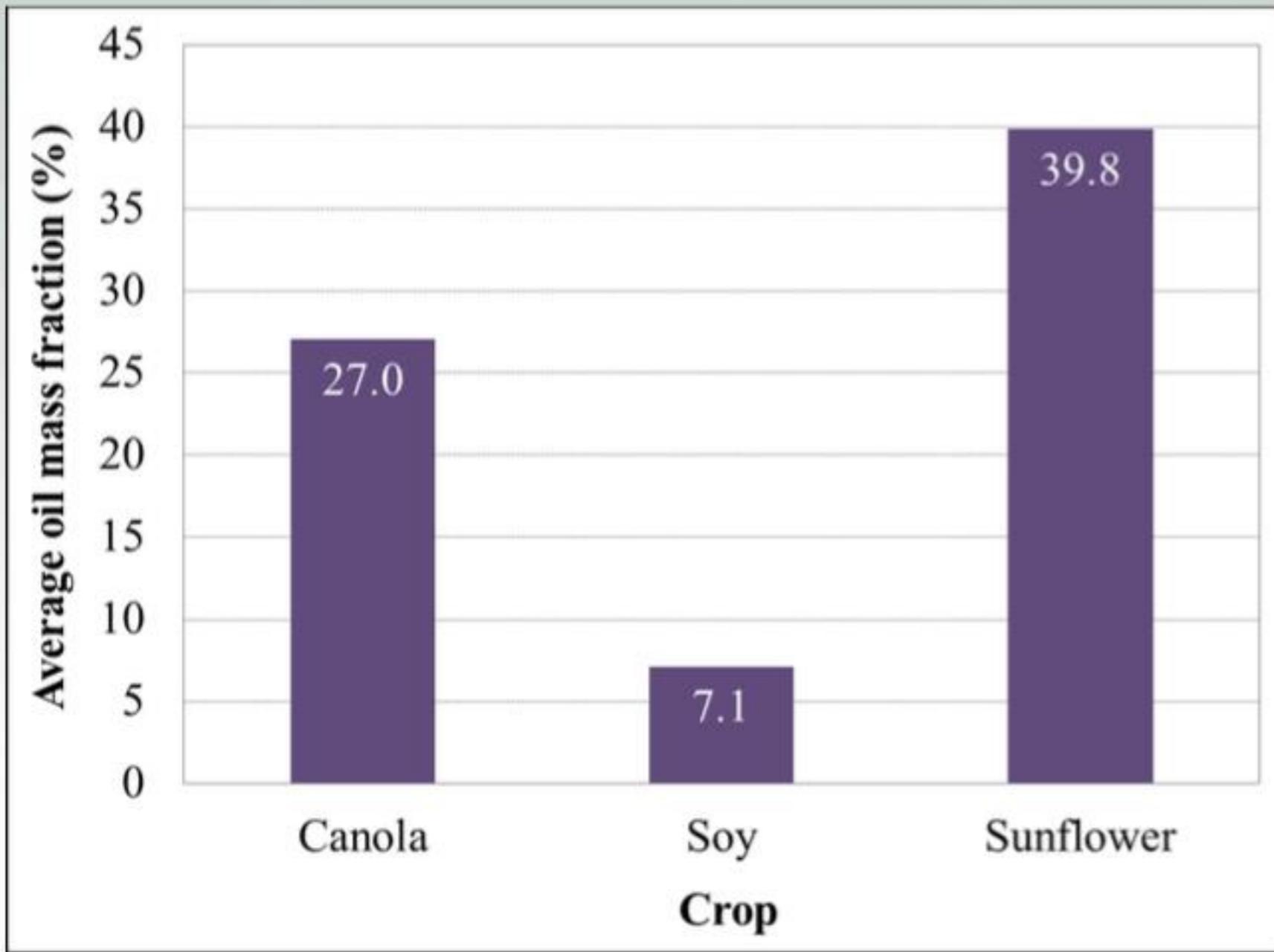
Press setup

- Data represent one configuration of many possible nozzle and screw setups

PRESS	CROP		
	Canola	Soy	Sunflower
AgOil M70	7	7	7
Keller KEK P0020	N/A	N/A	N/A
KernKraft 40	6.5 Shallow, soft shell screw	9 Deep, hard shell screw	8 Deep, hard shell screw
Komet CA59G3	5	<i>Failed test</i>	5
Oil Prince / KernKraft 20	10	<i>Failed test</i>	10
Täby 70	5	5	8



Oil mass fraction by crop



Canola



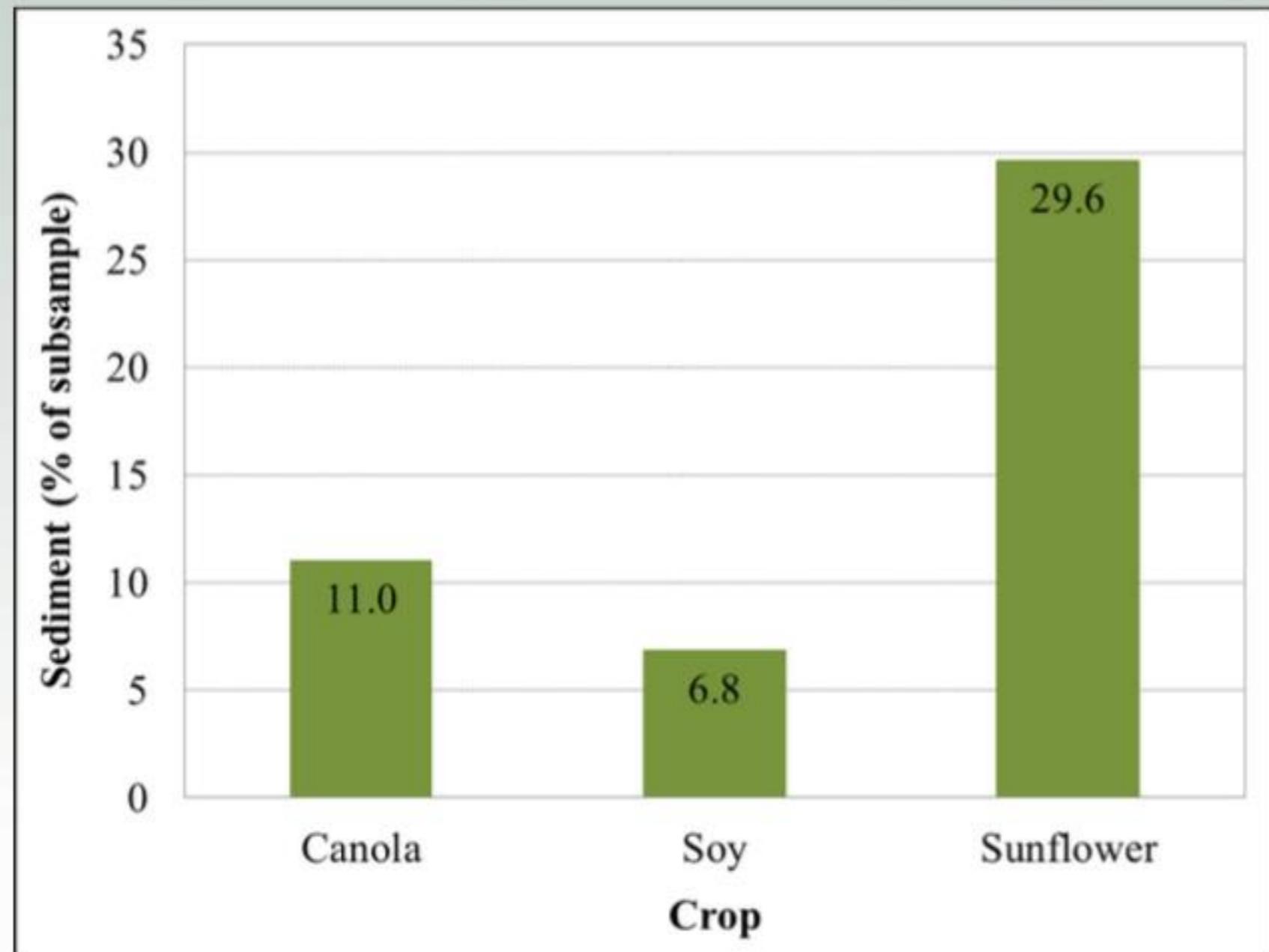
Soy



Sunflower

Estimated sediment in oil

- Most sediment in sunflower oil
- Very minimal sediment in soy oil

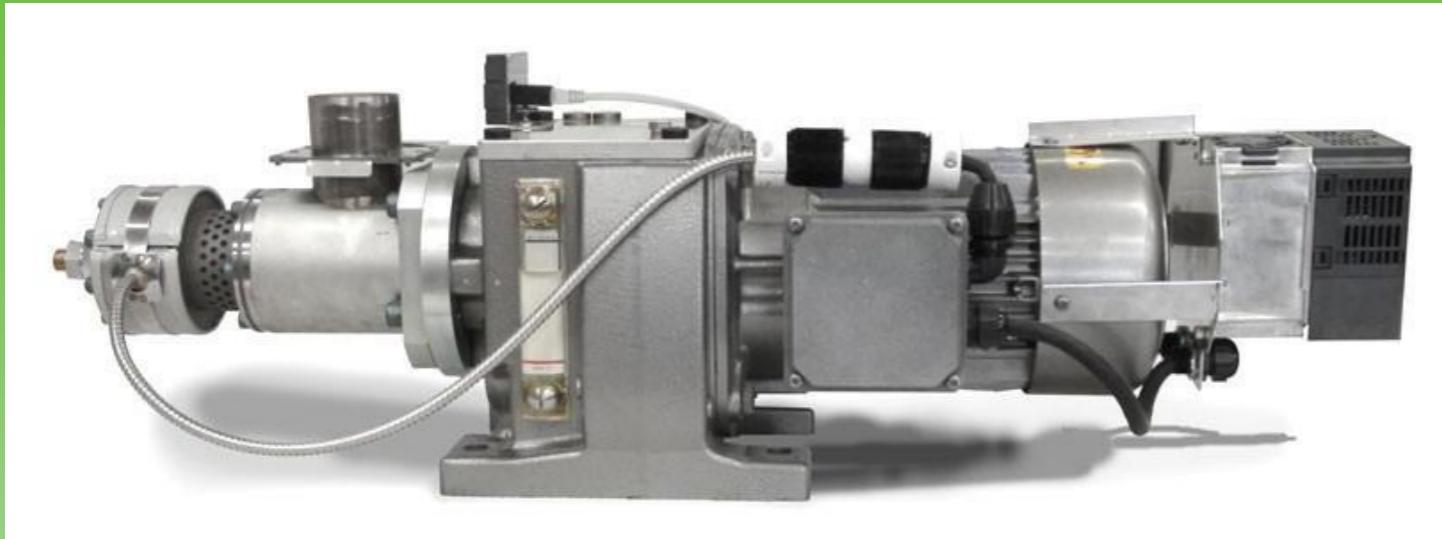


Capacity by speed

- All presses evaluated have variable speed
- Capacity increases with press speed



Press and Screw Speed (RPM)	Crop		
	Canola	Soy	Sunflower
AgOil M70			
18.75			184
25.00	335		
31.25	427		311
37.50	533		
50.00	716	609	545
62.50		932	
75.00	568	1245	773
100.00	1284	1520	1018
Keller			
16.00			35
32.00			86
46.00			270
KernKraft 40			
18.00			382
25.00	967	665	527
40.00	1041	1081	835
60.00	2365	1588	1201
Komet			
30.00			86
37.50	118		
67.50			161
72.50	348		
76.25	217		
95.00			228
Oil Prince			
31.25			899
37.50			891
56.25	718		500
112.50	997		1140
125.00	1136		1166
Täby			
40.00			565
50.00	636	482	717
80.00	920	817	1103
120.00	1513	1361	1415



AgOil M70

Borderview Research Farm

Conclusion

Simple

The AgOil has a simple design, with a single screw and an in-line Variable Frequency Drive (VFD) mounted on the gear box. With relatively few adjustments to be made, the press is simple to get running and with the variable set nozzle it is easy to switch between seed sources. A clear feed hopper allows processors to watch seed flow into the press, observing cleanliness and any potential malfunctions. A “blast gate” stops seed flow when necessary.



Keller KEKP0020

Lloyd Byers - Liverpool, Pa

Conclusion Simple

The German-designed Keller KEKP0020, which is approximately 51"x12"x27", is simple, with very few adjustments. Only the screw speed and the distance or gap between the head and the collar leave room for fine-tuning, making the press streamlined and effective. Byers reports that the Keller is easy to set up for pressing, and requires very little supervision once running. When the press is running for long periods of time, he checks a few times a day to make sure seed flow and press operation are optimal, but can generally leave it unattended with a large quantity of seed to press.



Kern Kraft 40

Borderview Research Farm

Conclusion

Finicky

The KK40 is a workhorse design with high capacity and little supervision required.

A large hopper built into the press allows for smooth flow of seed into the two screw chambers. There is a slide closure between the hopper and screw to stop seed flow if necessary. Many adjustments are possible with the KK40: operators can modify speed, nozzle/die size, the distance between the screw end a nozzle, and two screw sizes available.

In research trials and with small batches, the dual barrels and multiple possible adjustments sometimes led to frustration. Screws need polishing to operate efficiently.



KernKraft 20F (Oil Prince)

Coppal House Farm, Lee, NH

Conclusion

Finicky

This is a smaller, single-screw KernKraft model with similar adjustability and operation to the KK40. On the day of the press trial, operators could not press soybeans effectively, despite an all day attempt at data collection. The problem could have been in the moisture level of the soybeans. This press, relatively new to its operators, has a learning curve. During the process of troubleshooting, the team also discovered a fracture in the collar which may have been linked to a prior issue with a ball bearing being passed through the machine; this damage may have been preventing effective pressing of soybeans. While it runs extremely well and is reliable with canola and sunflower, other crops may take some adjustment.



State Line Farm

Taby 70

Conclusion

Moderate

Täby's seed hopper has a built-in magnet to prevent any metal from flowing into the press. A heater control on the gear housing stops the press from running if the collar temperatures exceed 302°F. Maintenance requirements are minimal with this machine. Approximately every 10,000 operating hours, the gear oil should be changed. The spiral seed screw can become worn over time, and Täby suggests shipping the screw in for repair (re-hardening). One stumbling block with the Täby 70 is the language barrier. Manufactured in Sweden, Toby presses come with an instruction manual (installation instructions, safety warnings, and technical advice on troubleshooting and maintenance) in broken English and customer service can be delayed with minimal domestic support.



Komet CA59G3

Penn State

Conclusion

Simple

The Komet is a small reliable press with a screw bringing seed through the shaft to press oil out of it. While there is no adjustment in the gap between the tip of the nozzle and the screw, there are multiple nozzles, with varying diameters for specific crops. Though Penn State University never received installation and operation manuals from the manufacturer, email response from customer service has been prompt and thorough.

	Ideal Pressing Moisture (%)	Average Extraction Rate (%)
Canola	6-9	25-30
Soybeans	8-12	8-12
Sunflower	8-12	35-40

Very Important



Help to Prevent This

Rules Of Thumb

-Start with clean seed.

**Screen seed for stones and metal.
(Nuts,bolts etc.)**

Use of Magnets while screening highly recommended.

- Test and take note of moisture
(this will vary by crop and press)**

- Take note of seed temperature.**

- Make small adjustments as you go, rather than big changes.**



Excessive Pressure on Oil Press Barrel



Hemp Oil



Photo by John Bruce

Sunflower-Canola- Soybean oil

QUESTIONS