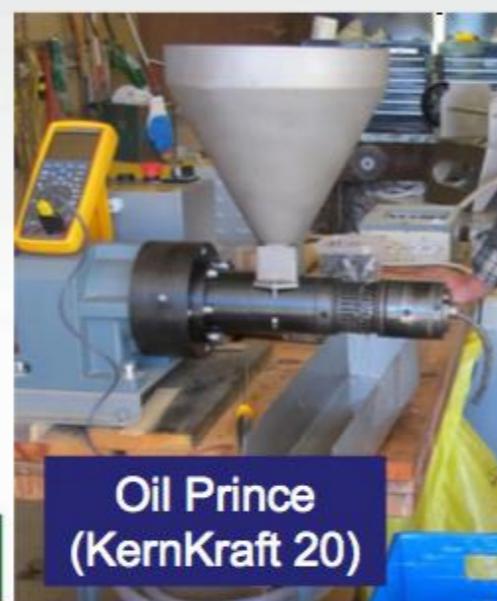


# Small Scale Oil Seed Press Evaluation



## Six presses



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

Chris Callahan<sup>1</sup>

and Hannah Harwood<sup>1</sup>

Heather Darby,<sup>1</sup> Doug Schaufler,<sup>2</sup> Ryan Elias<sup>2</sup>

<sup>1</sup> University of Vermont Extension, Burlington, Vermont

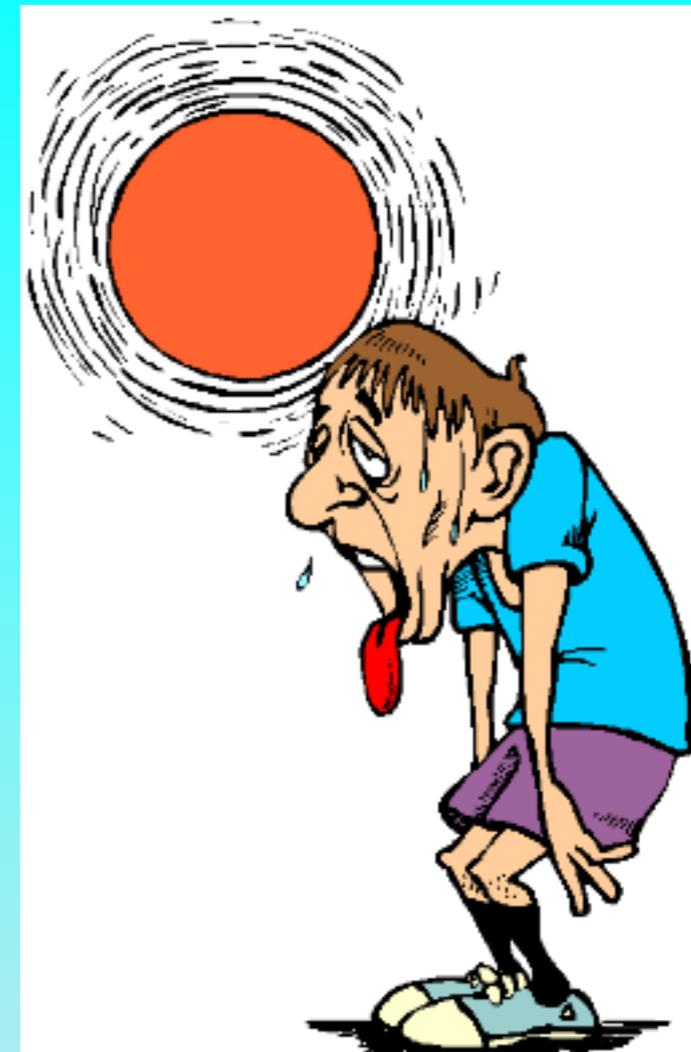
<sup>2</sup> Pennsylvania State University, State College,  
Pennsylvania



*What is Cold Pressing ?*



## Cold Pressing



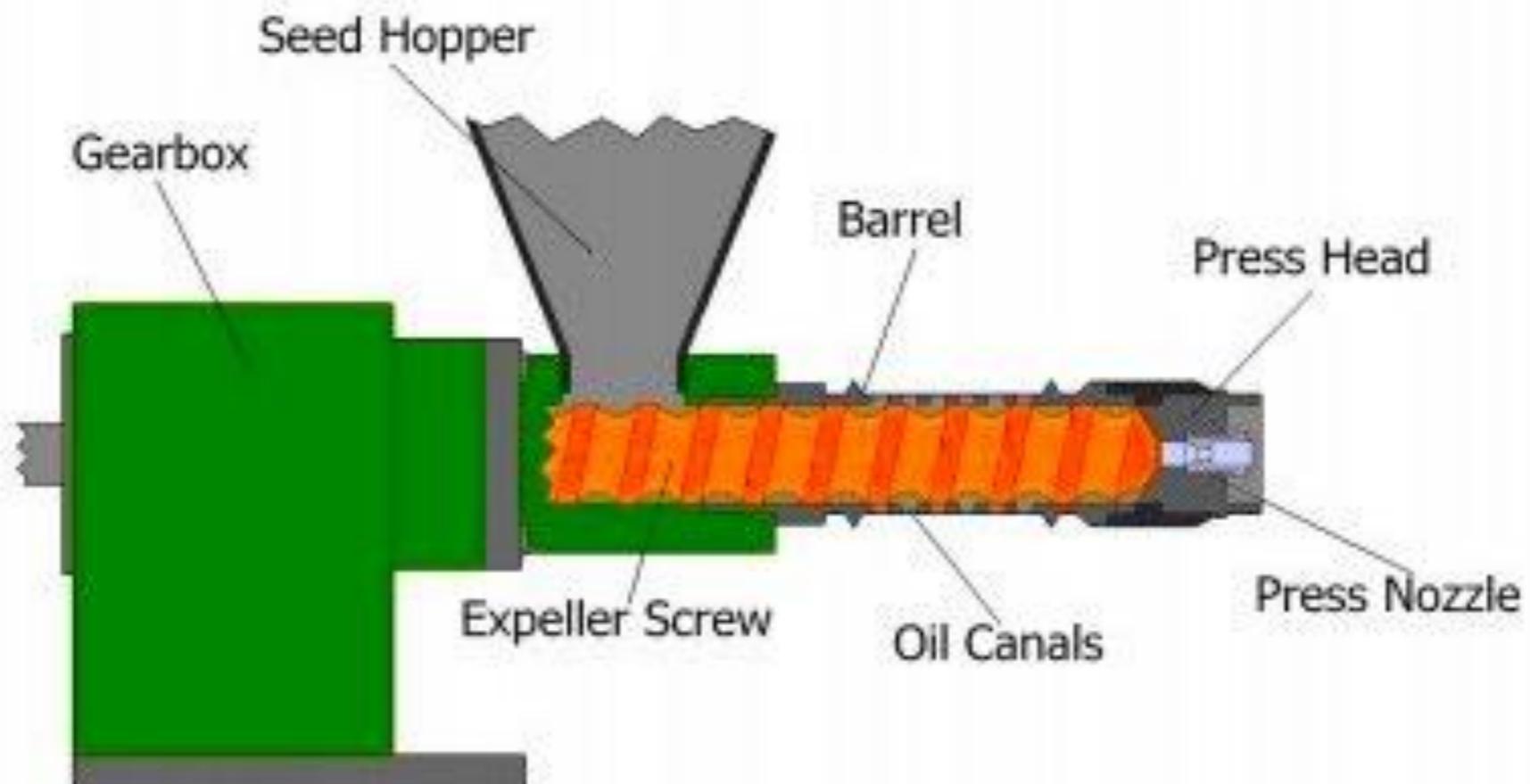
120 Degrees

(Oil Temperature)

210 Degrees

Expeller Press (Screw Press) Cold pressing

As apposed to Chemical extraction



**Standard Components of small-scale oilseed press**



**Screw**



**Barrel**



**Nozzle**



**Nozzle**



**Press Head**



**Agoil M70**

**KernKraft 40**

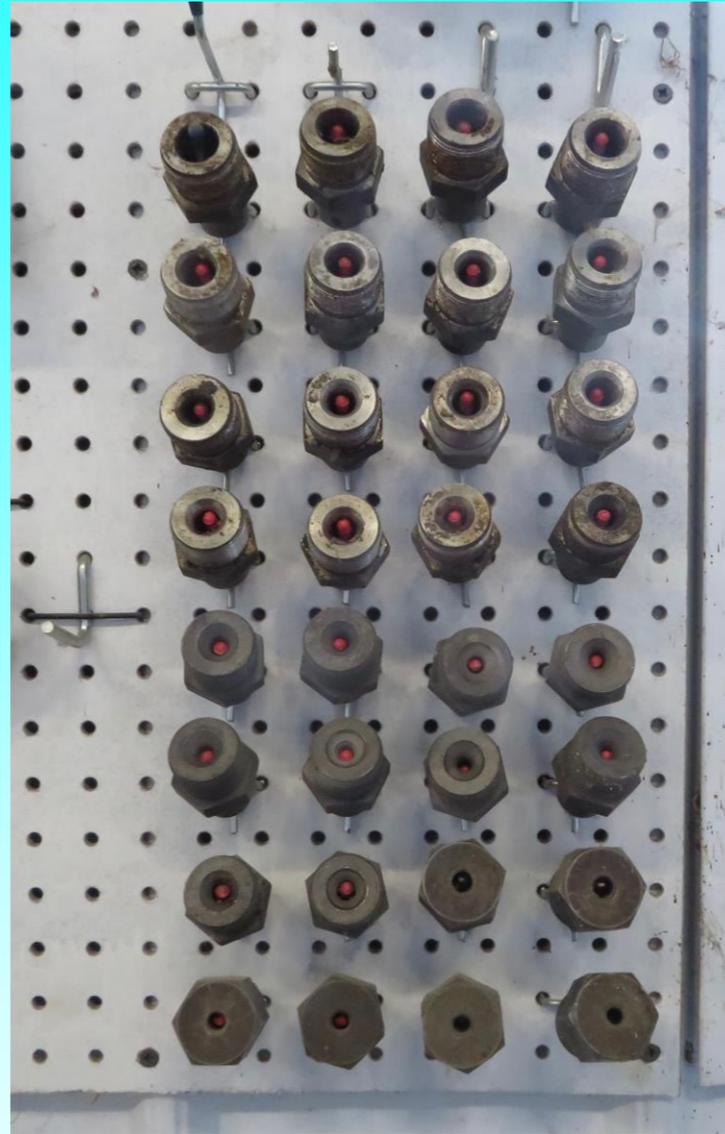


**4 Ton Chinese Press**

## Expeller Screws



**Set Nozzle**

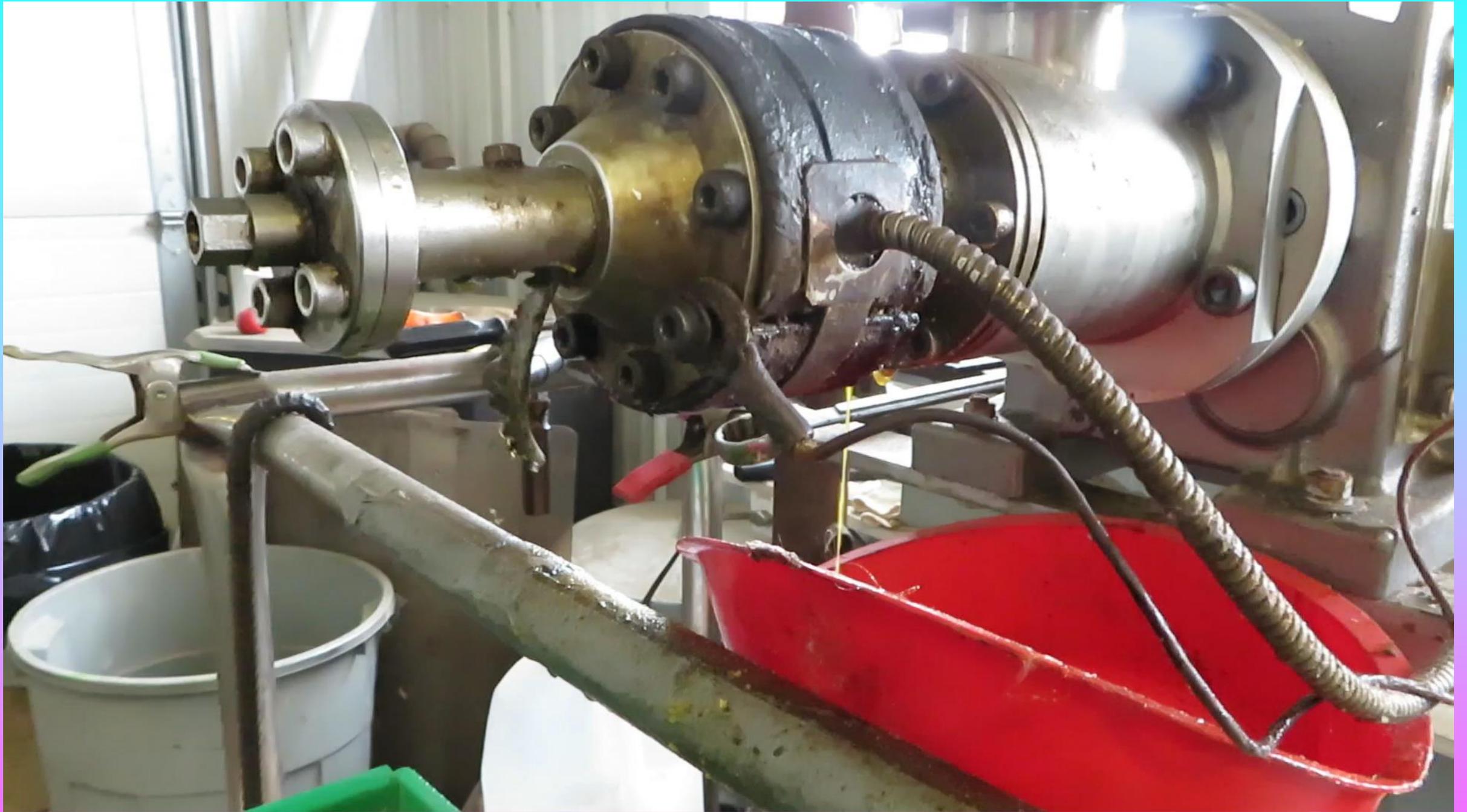


**Set Nozzle**



**Variable Nozzle**

**Nozzles vary on different press designs**



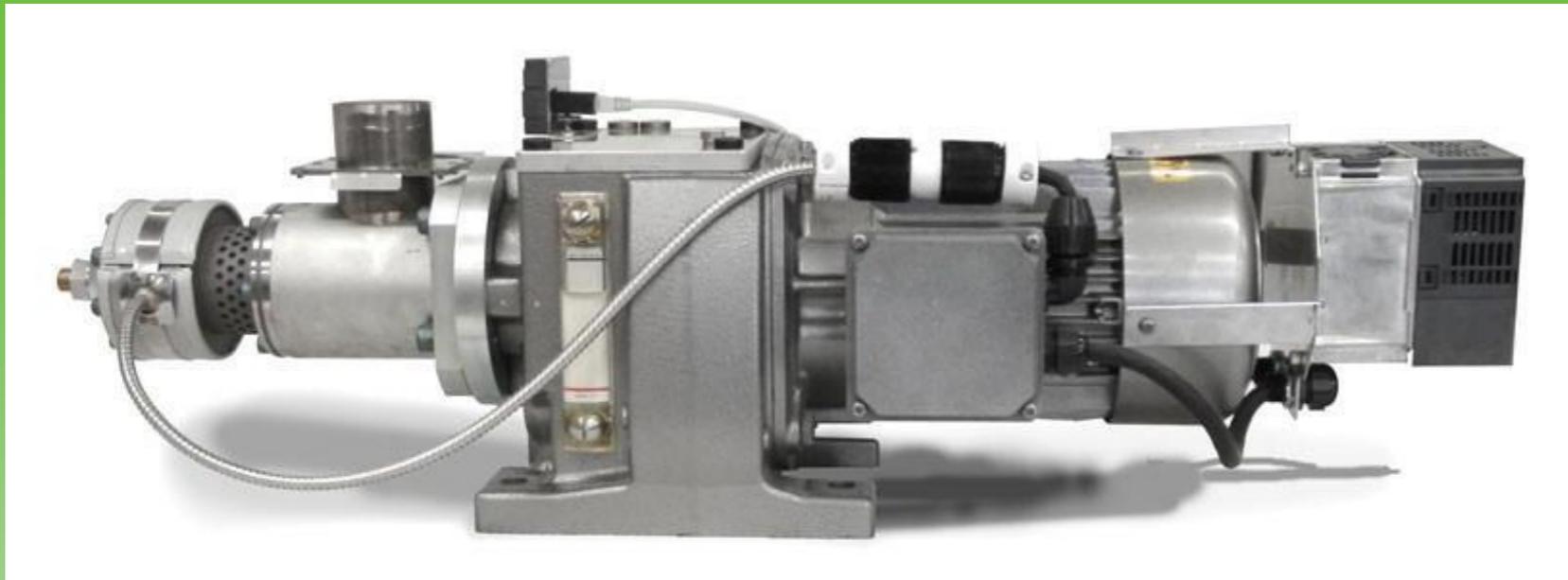
**AgOil Screw Press**



**KernKraft 40**

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

<b>PRESS</b>	⇓ <b>Estimated capacity (lbs seed/24 hrs)</b>	⇓ <b>Approximate purchase cost + year</b>	⇓ <b>Power source</b>	⇓ <b>Rated load</b>	⇓ <b>Adjustable speed</b>	⇓ <b>Heated barrel / head</b>	⇓ <b>Multiple screws available</b>	⇓ <b>Adjustable nozzle diameter</b>	⇓ <b>Adjustable gap between head and screw</b>	⇓ <b>Ease of set-up</b>
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	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	X	Finicky
Täby 70	1500	\$7,000 (2005)	220-240v	2.2 kW / 3.0 HP	X	X	X	X	X	Moderate



**2019 COST \$8951.00**  
[agoilpress.com](http://agoilpress.com)



**MANUFACTURER  
CONTACT INFORMATION**  
[made in U.S.A.]  
[www.agoilpress.com](http://www.agoilpress.com)  
  
AgOil  
Mondovi, WI  
(877) 645-7737  
[sales@agoilpress.com](mailto: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](http://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.

# Kern Kraft 40

[seed2oil.com](http://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)

## DISTRIBUTOR CONTACT INFORMATION

[made in Germany]

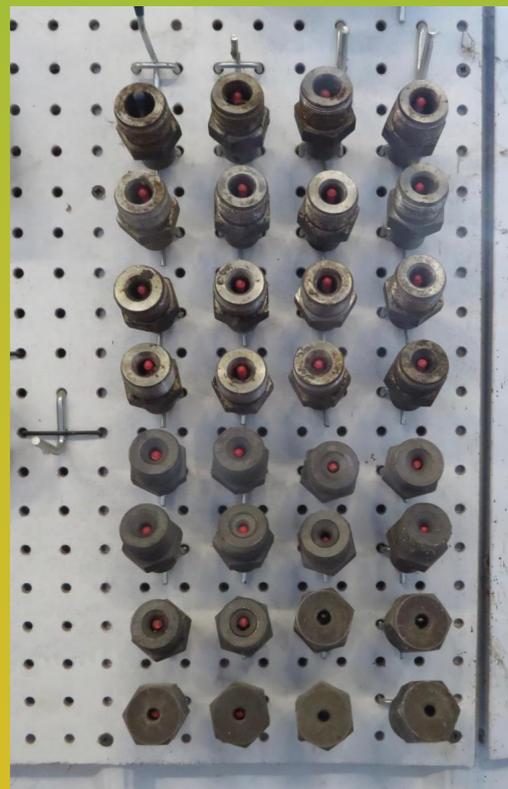
*Distributor in the U.S.:*

Circle Energy

Dodgeville, Wisconsin

Eric Hamilton, (608) 574-7449

[info@circle-energy.com](mailto:info@circle-energy.com)



**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/](http://www.oekotec.ibg-monforts.de/)

*Distributor in the U.S.:*

Nebraska Screw Press  
Lyons, Nebraska

(402) 307-0280

[rbyrnes@nebraskascrewpress.com](mailto:rbyrnes@nebraskascrewpress.com)



## **Pellet**



# KernKraft 20F

2019 App.Cost \$7800.00

[Seed2Oil.com](http://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.:*

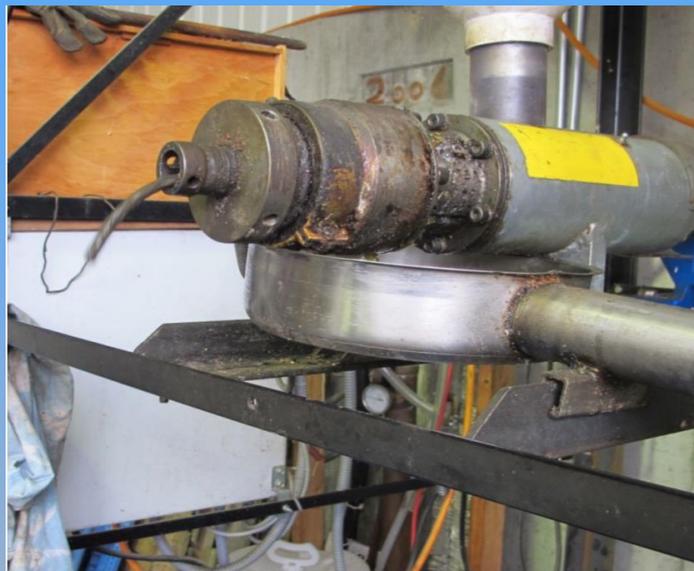
Circle Energy

Dodgeville, Wisconsin

Eric Hamilton, (608) 574-7449

[info@circle-energy.com](mailto:info@circle-energy.com)

Täby 70



**State Line Farm**  
**2019 Cost \$12,200.00**

*Magic Mill*

**Täby 70**

State Line Farm Biofuels, Shaftsbury, VT

Manufacturer's Rated Capacity: 1500 lbs/24 hours  
Cost: \$6500 (2005)

**DISTRIBUTOR  
CONTACT INFORMATION**

[made in Sweden]  
[www.oilpress.com](http://www.oilpress.com)

*Distributor in the U.S.:*

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

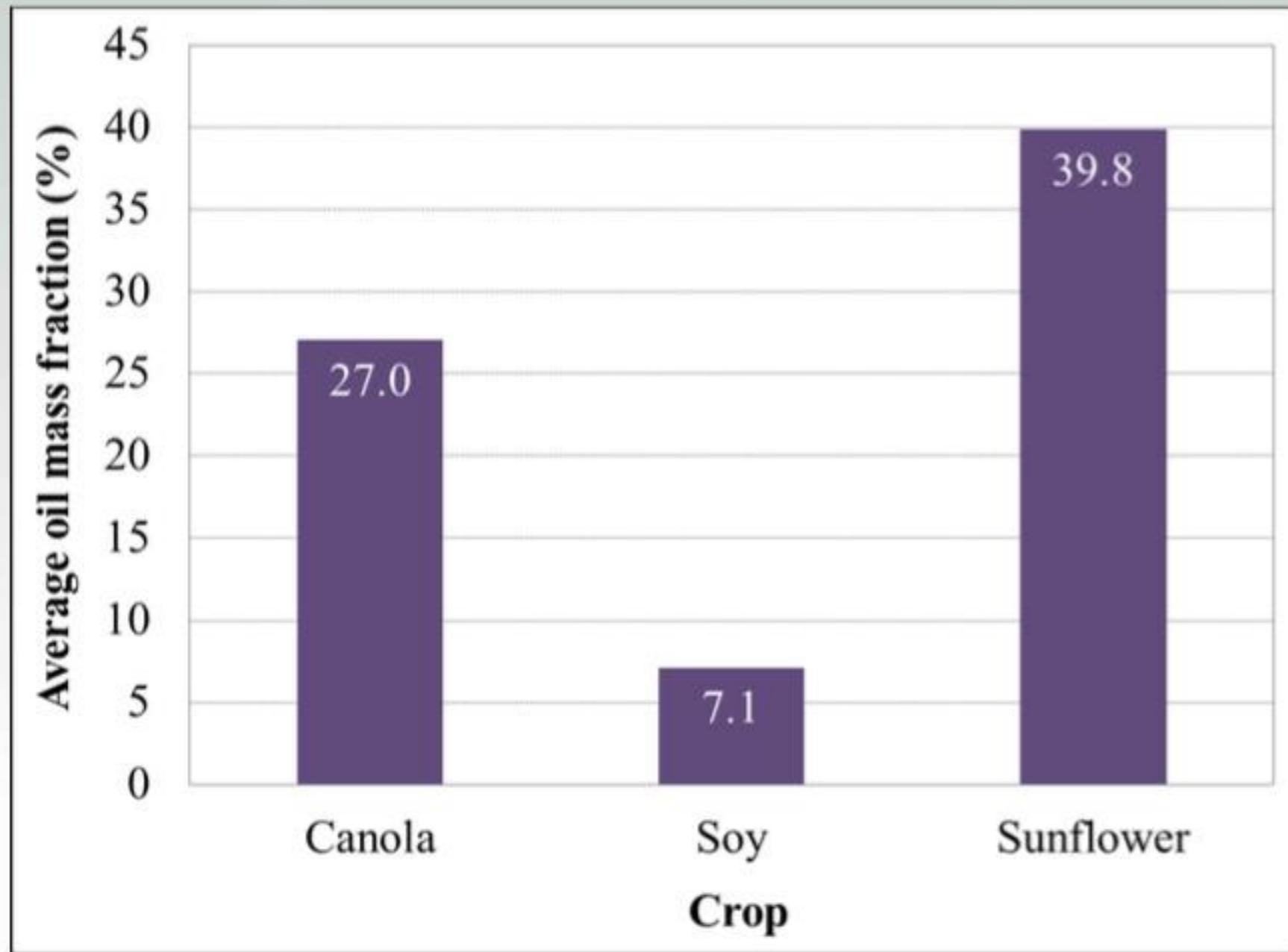
# Press setup

- 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	9	8
	Shallow, soft shell screw	Deep, hard shell screw	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

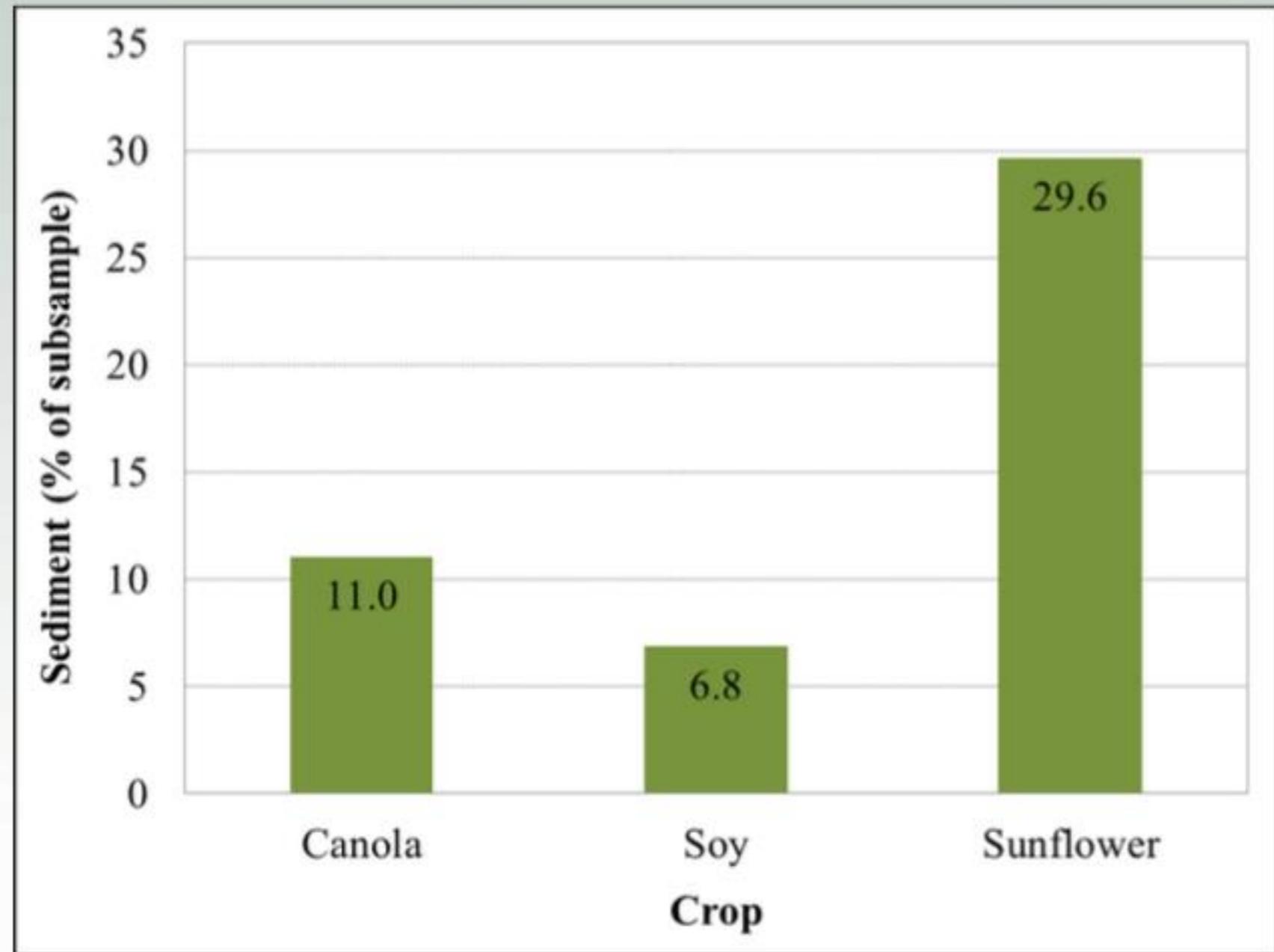


Sunflower

*2013 press evaluation data*

# Estimated sediment in oil

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

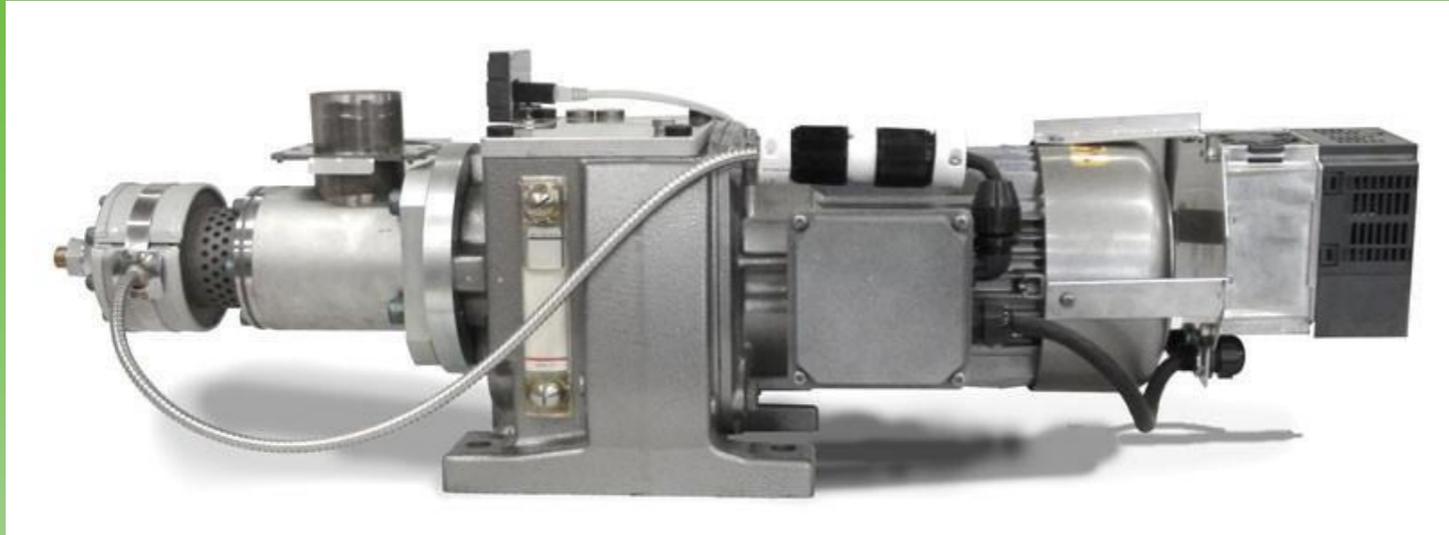


# Capacity by speed

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



Press and Screw Speed (RPM)	Crop		
	Canola	Soy	Sunflower
<b>AgOil M70</b>			
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
<b>Keller</b>			
16.00			35
32.00			86
46.00			270
<b>KernKraft 40</b>			
18.00			382
25.00	967	665	527
40.00	1041	1081	835
60.00	2365	1588	1201
<b>Komet</b>			
30.00			86
37.50	118		
67.50			161
72.50	348		
76.25	217		
95.00			228
<b>Oil Prince</b>			
31.25			899
37.50			891
56.25	718		500
112.50	997		1140
125.00	1136		1166
<b>Täby</b>			
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.

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

**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**