

# Mobile Processing Trailer

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The Pennsylvania/New Jersey Chapter of the American Chestnut Foundation

Designed by Stephen Hoy, Eric Hagan, Sean Freidhof  
with funding through PA Department of Agriculture's Specialty Crop Block Grant Program

ME#44187246



This design is based off Dr. Greg Miller's chestnut operation at Route 9 Cooperative <https://route9cooperative.com/>

Plans for Dr. Millers chestnut water bath can be found at <http://www.centerforagroforestry.org/weevil.pdf>



## Processing Mobility

While the thought of growing chestnuts to sell is full of potential individuals can become discouraged by the challenges of acquiring the required equipment to process chestnuts. Often the equipment must be custom built or is cost prohibitive. The equipment is a necessary component of delivering quality standardized chestnuts to the consumer. As part of a Specialty Crop Block Grant through The Pennsylvania Department of Agriculture, investigators sought an alternative to this equipment challenge. The result is equipment, created from existing plans by Dr. Greg Miller of Empire Chestnut Company & Route 9 Cooperative.

Pennsylvania is in the native range of the American chestnut and with it, the greater & lesser chestnut weevil. This pest will implant eggs into chestnuts just prior to harvesting and without treatment the nuts become unmarketable. Chestnut weevil larvae hatch from their eggs inside chestnuts and proceed to eat the kernels with no exterior evidence until the larvae emerge from the chestnuts. Anecdotal stories of customers encountering weevils have resulted in refunds and a permanent loss of that customer.

A second issue to address is standardization due to the variation in chestnut size. Commercial chestnut growers have found sizing chestnuts to be more profitable, engage a more diverse customer base, and fill niche market functions. The mobile processing trailer will aid the small grower achieve standardization increasing harvest value.

The mobile processing trailer incorporates solutions to both sizing of chestnuts and weevil treatment while attempting to keep the equipment compact and mobile. The individual components have been mounted to a 6' by 12' trailer allowing multiple growers to access equipment without having to purchase or construct their own. It is the hope that setting up the processing trailer at a few centralized locations small growers can overcome these processing challenges and access a market expressing high demand and low supply.

Below is a list of components used in this equipment. Your individual circumstances may vary. This equipment is experimental and may be modified to improve function. You can support future research like this by becoming a member of [PA/NJ-TACF](#).

# Sorter

ITEM	QUANTITY	DESCRIPTION
<b>ELECTRICAL</b>		
MOTOR	1	1 HP; 115/208-230v; Dayton
BELT	1	4L-81"
BELT	1	4L-31"
PULLEY	2	1.5" diameter; 5/8" shaft
PULLEY	1	8" diameter; 5/8" shaft
PILLOW BLOCK	2	5/8" bore; ball bearing w/ grease fitting
SHAFT COLLARS	1	3pk to secure shaft to pillow blocks
POWER CORD	1	10'-12 gauge 3 wire power cord
PLUG CONNECTOR	1	15-amp/125-volt clamplock 3 prong plug
SWITCH	1	15/20-amp industrial switch
SWITCH COVER	1	outdoor rated switch cover
WIRE RING TERMINAL	6	12-10 AWG spade terminal ends
<b>SORTER TUBE</b>		
BARREL(S)	3	Plastic 55-gal drum
BARREL CONNECTORS	4	Custom made to secure barrels together; made of 16 ga steel; 2 inner bands, 1 outer band with belt channel, 1 end band with run out for end of run
BOLTS	100	Chicago bolts 1/8" dia x 1/4"; used to fasten barrels to barrel connector bands without creating obstructions for nuts
<b>FRAME</b>		
PLYWOOD	1	3/4" exterior grade plywood, cut down to fit snugly under the barrel to channel nuts into container
PLYWOOD	1	1/2" exterior grade plywood; cut down to become ends of sorter; hopper for nuts; dividers below sorter tube
2" X 4" X 10' DIMENSIONAL LUMBER	5	For frame pieces
2" X 4" X 8' DIMENSIONAL LUMBER	2	For frame pieces
2" X 6" X 8' DIMENSIONAL LUMBER	5	For frame pieces
2" X 10" X 8' DIMENSIONAL LUMBER	1	Motor Mount structure
1/4" X 2' ALL THREAD	1	To secure/support table below sorter; allows for some angle adjustment
1/4" NUTS	25	To complete all thread supports
1/4" FLAT WASHERS	50	Part of all thread supports
CASTERS	8	4" polyurethane casters used to support sorter tube
BLACK HARDWARE CLOTH	1	3' x 15' roll of 1/2" hardware cloth
<b>HARDWARE</b>		Individual hardware needs may differ, please use best judgement selecting hardware based on your circumstances and materials

1-5/8" SCREWS	1	1lb 1-5/8" exterior screws
3" SCREWS	1	1lb 3" exterior screws
1/4" FLAT WASHERS	16	
1/4" X 1-1/4" HEX LAG SCREW	16	
5/16" X 3-1/2" BOLTS	1	25pk
5/16" LOCK NUT	2	25pk
3/8" FLAT WASHERS	1	25pk
5/16" FLAT WASHERS	3	25pk
5/16" X 2-1/2" BOLTS	4	carriage
3/8" LOCK NUT	4	

## Water Bath

ITEM	QUANTITY	DESCRIPTION
<b>PLUMBING</b>		
2" CAM-LOCK FITTING	1	female camlock to female threaded
2" PVC MALE TO 1-1/2" SOCKET	1	Plumbing
POOL FILTER	1	To Capture large debris or nuts that escape the tote
1-1/2" 45° PVC ELBOW	4	Plumbing
1-1/2" TEE	3	1-1/2 with 3/4" threaded "T"
3/4" PVC CAP	1	drill hole into cap to insert grommet for probe
1/8" RUBBER GROMMET	1	becomes port for temp probe
1-1/2" PVC FITTING	2	1-1/2 Female socket to 1-1/2" Male threaded
1/4 HP PUMP	1	115vac circulation pump; gravity fed
1-1/2" PVC UNION	2	allows separation of plumbing from pumps for winterizing/troubleshooting
1-1/2" X 1" BUSHING	2	1-1/2 female socket to 1 Male threaded to connect to circulation pump
1-1/2" 90° PVC ELBOW	1	Plumbing
1-1/2" TO 3/4" BUSHING	2	Plumbing
3/4" PVC FITTING	2	Connector for Sediment Filter; 3/4" PVC socket to 3/4" threaded male
4.5" SEDIMENT FILTER SYSTEM*	1	Removes fine particles that could damage pumps and water heater. See note below.
FILTER CARTRIDGE	2	4.5" filter cartridges, 1 to have in use, 1 as backup
SEDIMENT FILTER MOUNTING BRACKET	1	Secures filter to structure
3/4" 2 HOLE STRAP	1	5 pk to secure pipe to structure
TEFLON TAPE 1/2"	1	to Seal threaded connections
3/4" HOSE CLAMPS	1	5pk to secure tubing on Injection pump pressure fittings
3/4" HOSE BARB	1	3/4" male threaded to 3/4" hose barb fitting
3/4" I.D. TUBING	5	5 ft total to plumb injection loop to water heater
1/25 HP INJECTOR PUMP**	1	See note below.
3/4" BRASS DOUBLE MALE FITTING	3	to connect water lines to/from water heater
3/4" BRASS ADAPTER	1	3/4" hose barb to 3/4" male threaded

3/4" X 24" STEEL BRAIDED PIPE	3	Connects to the Injection pump loop and the Water Heater
3/4" CHECK VALVE	1	3/4" Check Valve to prevent backflow into water heater
1-1/2" PVC VALVE	1	Used as shut off to build pressure in system at startup.
1-1/2" BUSHING	1	1-1/2" PVC socket male to 1" socket female
1" PVC 90° ELBOW	2	direct flow into water bath tote/ increase pressure slightly
1-1/2" PVC PIPE	1	10' Length of pipe to be cut and inserted as needed to complete plumbing loop
1' PVC PIPE	2	10' Length of pipe to be cut and inserted as needed to complete plumbing loop; basket construction
<b>CHESTNUT BASKET</b>		
1" PVC SIDE OUTLET ELBOW	8	basket frame
1" PVC TEE	10	basket frame
SHOWER CURTAIN HANGERS	1	10pk of basic metal curtain hangers to attach basket door
ACRYLIC SHEET	1	11" x 14"; used to create door on basket
ZIP TIES	2	25 pks 8" exterior grade
BLACK HARDWARE CLOTH	1	3' x 15' roll of 1/2" hardware cloth
BRASS ROD	1	1/8" x 36" brass rod to make basket door latch
CABLE CLAMPS	3	2pks
WIRE ROPE	1	20' length of coated wire rope to form attachment point of basket
CRANE	1	GIB crane 500lb capacity
<b>WATER HEATER EQUIPMENT</b>		
REMOTE LP VENT SUPPLY KIT	1	Supply line to connect Grill sized LP bottles to water heater; includes regulator and some adapter hardware
3" PVC	1	5' section to be used to vent the water heater
3" PVC 90° ELBOW	1	Water Heater Vent
8" X 8" 90° METAL BRACKETS	7	Anchors for Water Heater support & sorter anchors
1/8"THICK 2"X2" ANGLE STEEL 3'	3	Water Heater support uprights
1/2" GAS BALLVALVE	1	Gas shutoff installed at water heater
1/2" GAS NIPPLE	1	LP Supply Plumbing
1/2" TO 3/8" FITTING	1	LP Supply Plumbing
1/2" OD FLARE TO 3/8" FITTING	1	LP Supply Plumbing
RATCHET STRAPS	2	To secure water heater to supports
1" POLY PIPE INSULATION 6' HYBRID	4	Protective Layer between Water Heater supports and Water Heater
TANK/TANKLESS WATER HEATER†	1	Wesinghouse-130 Gal/Hr. 6 Year High Efficiency/High Output Liquid Propane 20 Gal Hybrid Water Heater 100k BTU W/Stainless Steel Tank
METAL PLATE	2	18" x 18" 12 gauge metal plate to reinforce mounting points on trailer for crane and water heater
<b>HARDWARE</b>		Individual hardware needs may differ, please use best judgement selecting hardware based on your circumstances and materials

3/8" LOCK NUT	2	25pk
3/8" X 2-1/2" BOLT	1	25pk
1/2" FLAT WASHER	16	
5/16" X 2-1/2" BOLTS	4	carriage
1/2" X 2-1/2" BOLTS	8	hex
5/16" FLAT WASHER	8	
1/2" LOCK NUT	8	
5/16" LOCK NUT	8	
3/8" X 1-1/2" BOLT	9	
3/8" X 2" BOLT	9	
3/8" FLAT WASHER	1	25pk
3/8" X 1" BOLT	9	
5/16" X 2" BOLTS	4	

\*Sediment Filter Note-Use the 4.5" diameter filter model. 2.5" filter model becomes clogged very quickly causing downtime to change out filters and reset equipment.

\*\*Injection Pump Note-More powerful pump recommended, this size barely meets minimum GPM, pressure necessary, check home brewing transfer pumps as alternatives.

†-Hybrid selected because of high BTU generation, and first hour gallons heated ratings; traditional LP water heaters will work but require significantly longer start-up times.

## Electrical Box

ITEM	QUANTITY	DESCRIPTION
WIRE	1	10'-10 gauge wire
WIRE	1	6'-12 gauge wire
OUTLET	1	GFCI
OUTLET COVER	1	GFCI outlet cover
SWITCH/OUTLET COMBO COVER	4	Wall switch and outlet combo
SWITCH/OUTLET COMBO COVER	4	Cover for wall switch/outlet combo
WIRE NUTS	2	10-12 gauge wire nuts
WIRE RING TERMINAL	18	12-10 AWG spade terminal ends
TEMP CONTROLLER	1	Digital Thermostat Outlet Switch LCD Simple Stage Plug in Temperature Controller Thermometer 110V 15A
PLUG CONNECTOR	2	15-amp/125-volt clamplock 3 prong plugs
BOX	1	10 x 12 sprinkler head cabinet
DISCONNECT SWITCH	1	30 Amp 120/240-Watt Fused AC Disconnect























