

# The Effect of Power System on Potato Production for Small Farms



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# New Interest in Animal Power



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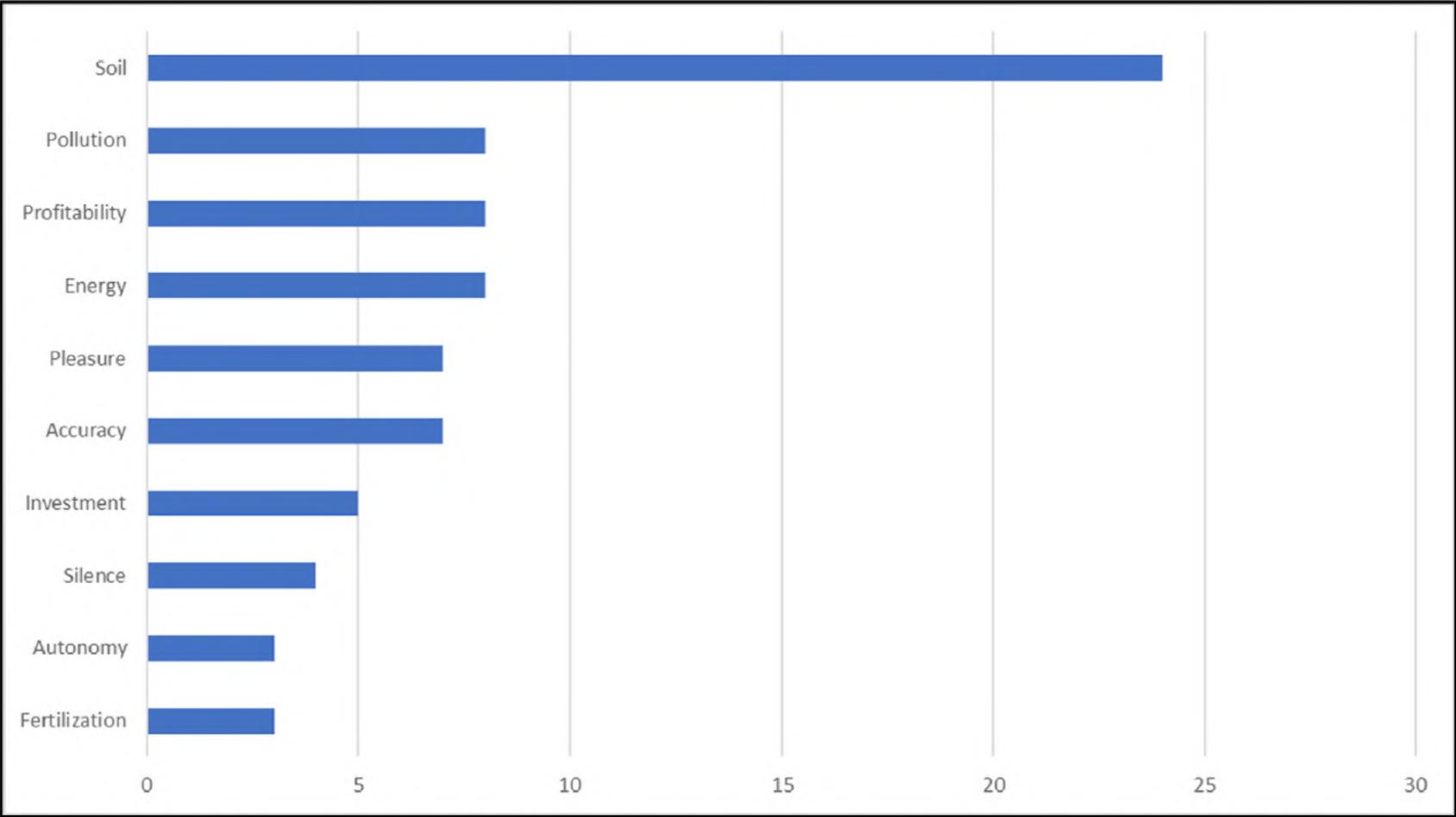
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I'm Still Doing What I Wanted to do When I Was 12	47:29
We're Not Luddites, We Just Like Horses	55:08

# Perceived Benefits and Reasons for New Interest in Animal Traction



*Miara et al. (2023)  
Animal traction in developed countries: The reappropriation of a past practice through agroecological transition. Journal of Rural Studies*

**Fig. 6.** Occurrence of benefits of animal traction cited in randomly selected general press articles (n = 36).

## Previous Research

- Greenhouse gas emissions lower with animal power;
  - 5 Tg change in CO<sub>2</sub> emissions in the move transition from animal to tractor traction (*Aguilera et al, 2019*)
  - 96 % reduction in global warming impact with draft power (*Cerutti et al, 2013*)
- Tractors are more efficient but reduce self sufficiency and use more fossil fuel (*Rydberg and Jansen 2002; Rydberg and Hayden 2006; Harchaoui and Chatzimpiros, 2018*)

# The Case for Animal Power

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- Needs Assessment:
  - “Do you feel it would be beneficial for extension educators and specialists to have training or information on use of draft animal power?”

# Objectives

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- **Objective 1:** Provide hands on and intensive training on animal traction methods for market gardeners and woodlot owners in the Midwest through a collaborative effort among the Sustainable Horticulture Lab, the Wendell Berry Farm and Forest Institute, and Tillers International.
- **Objective 2:** Implement animal traction-based research and demonstration plots at Purdue University
- **Objective 3:** Create extension materials

# Methods

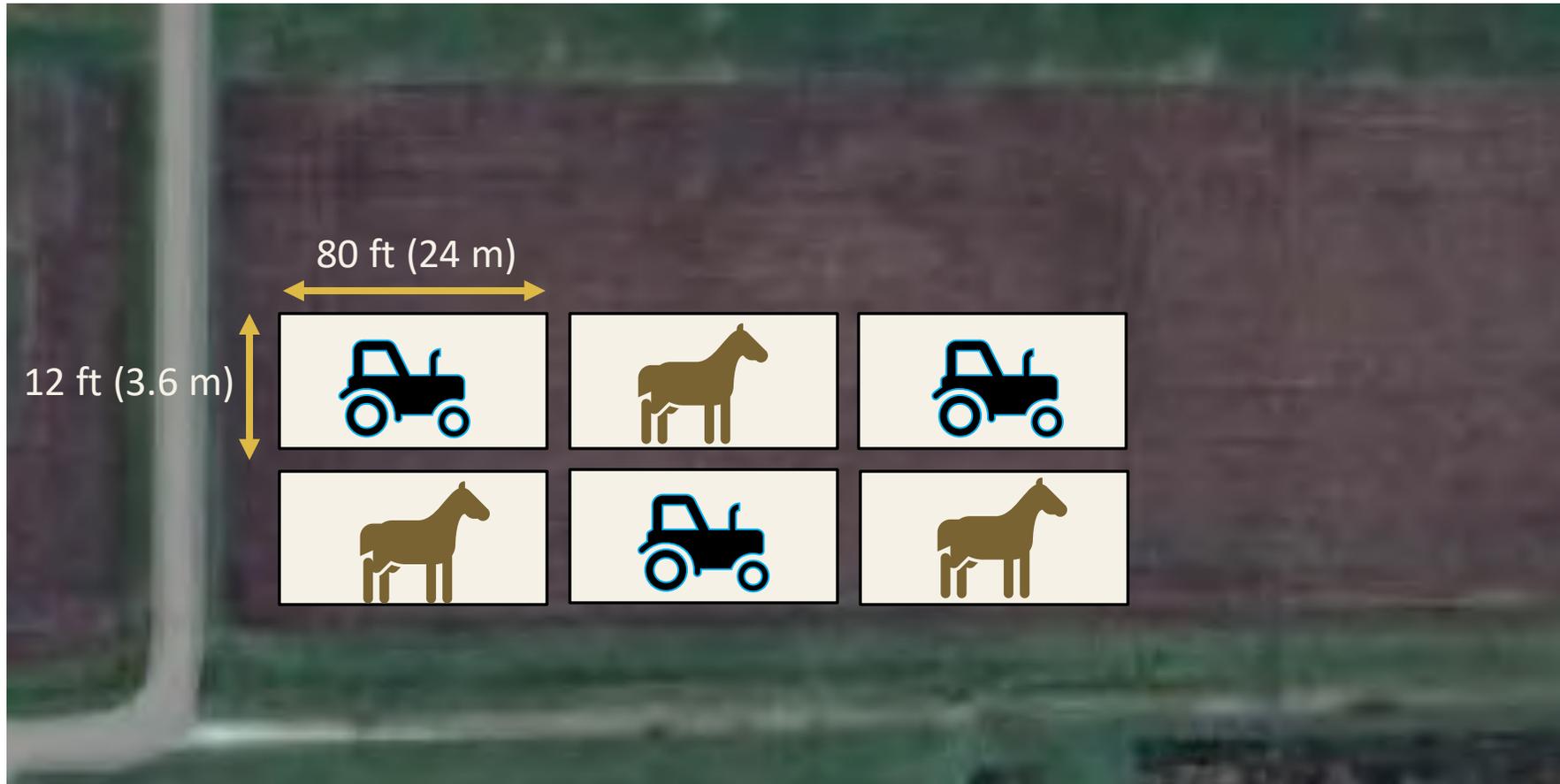




Figure 2a. Animal traction field activities from the side-by-side, randomized and replicated tractor-animal traction comparison at the Meigs Horticulture Facility 2024. A). Percheron team used for planting and hilling in the animal traction treatment; B). Potatoes in the hopper; C). Planting using horse drawn potato planter; D). Hilling using McCormick straddle row cultivator; E). Harvesting using mules and walk behind potato plow.



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Figure 2b. Tractor traction field activities from the side-by-side, randomized and replicated tractor-animal traction comparison at the Meigs Horticulture Facility 2024. A). Tractor and potato planter used for planting in the tractor traction treatment; B). Tractor and potato digger for harvesting potatoes in the tractor traction treatment.

Table 2a. Estimated equipment costs of tractor and animal power machinery used in the side-by-side trial.

Machine/Implement	Cost USD \$	
	Animal Traction	Tractor Traction
Potato planter	-	2,320
Hiller	350	-
Potato digger	100	9,827.30
John Deere 5055 E, 55 HP		30,000
Forecart	1,600	-
Team Percheron horses	15,000	-



Table 2b. 2024 time estimates for field activities

Field Activity	Time in the Field (mins)	
	Animal Traction	Tractor Traction
Planting	60	30
Hilling 1	45	20
Hilling 2	45	-
Harvesting <sup>1</sup>	240	60



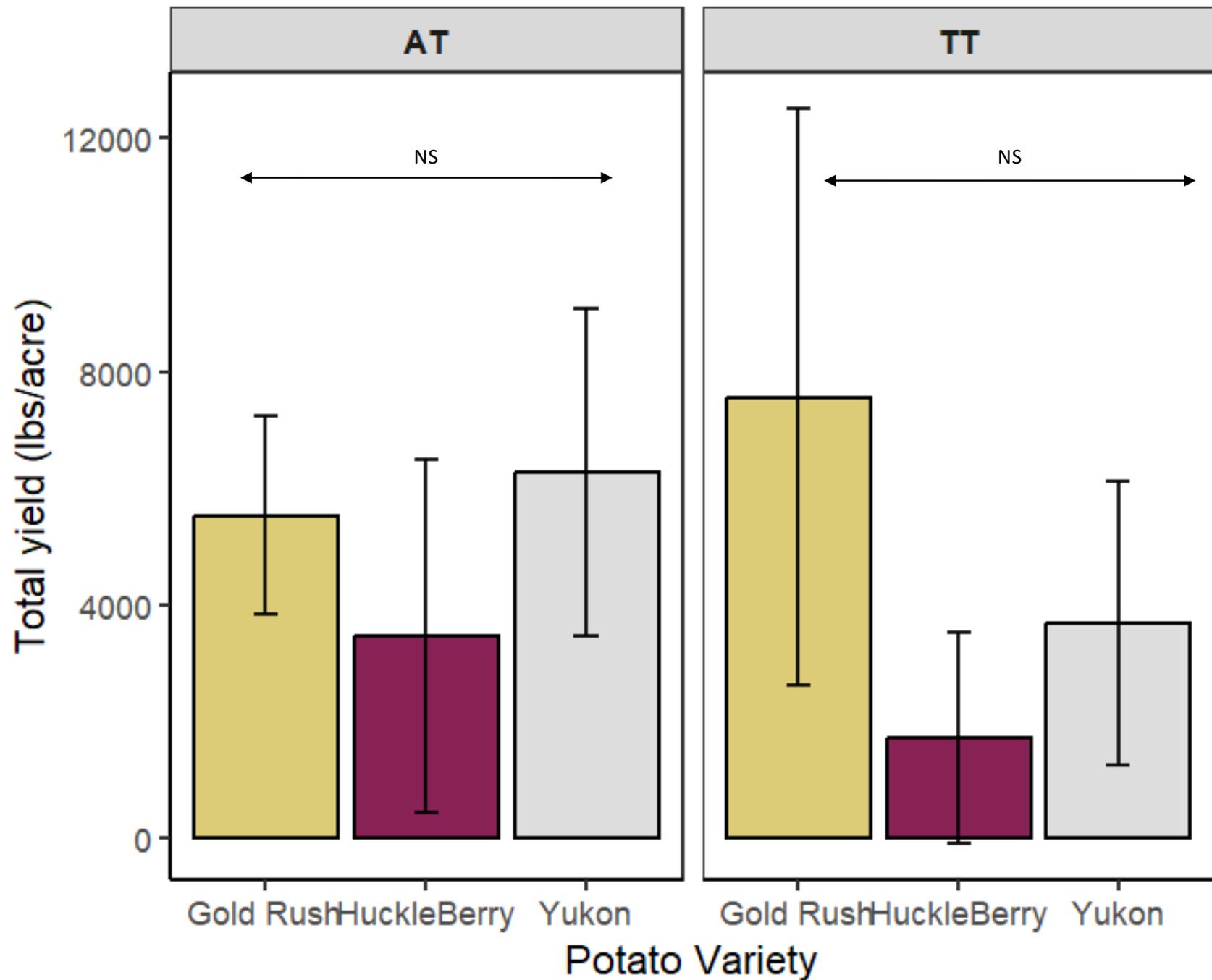


Fig 1. Total potato yield from AT (animal traction) and TT (tractor traction) treatments. Upper case letters that are the same indicate no statistical difference between AT and TT at  $P \leq 0.05$  according to Tukey HSD. Bars: +/- standard deviation.

## Questions?

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