SWITCHGRASS IN MUSHROOM SUBSTRATE

FIELD TRIALS TO ASSESS THE IMPACT OF SUBSTITUTING SWITCHGRASS FOR WHEAT STRAW ON PARAMETERS OF MUSHROOM PRODUCTION

Growing Forward 2
AAC agriculture adaptation council
Ontario
Canada

Hypothesis

The replacement of wheat straw with up to 40% switchgrass does not impact the schedule of crop cycles or volume and quality of mushrooms harvested. These field trials were designed to verify or disprove this hypothesis.

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For maximum mushroom production, mushroom substrate must contain:

- a source of carbon [wheat straw]
- a source of nitrogen [poultry litter]
- water
- gypsum

The ingredients are blended to promote microbial digestion and heat generation to pasteurize the compost and release elements to nourish mushroom mycelia

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Field Trials [fall of 2014]

A new batch of substrate was started each week and each batch of substrate was followed through the blending, pasteurization, conditioning and spawning phase to specific growing rooms.

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Treatments

- 100% wheat straw [7 crops]
- 15% switchgrass [2 crops]
- 30% switchgrass [2 crops]
- 40% switchgrass [2 crops]

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Measurements

- Batch number and date
- Weights of wheat straw and Switchgrass
- Fall or Spring harvest of Switchgrass
- Switchgrass straw length: Short vs. Long
- Number of days during each phase of production
- Quantities of Poultry litter, Urea and gypsum
- Total yield of mushrooms harvested
- Mushroom quality judgement

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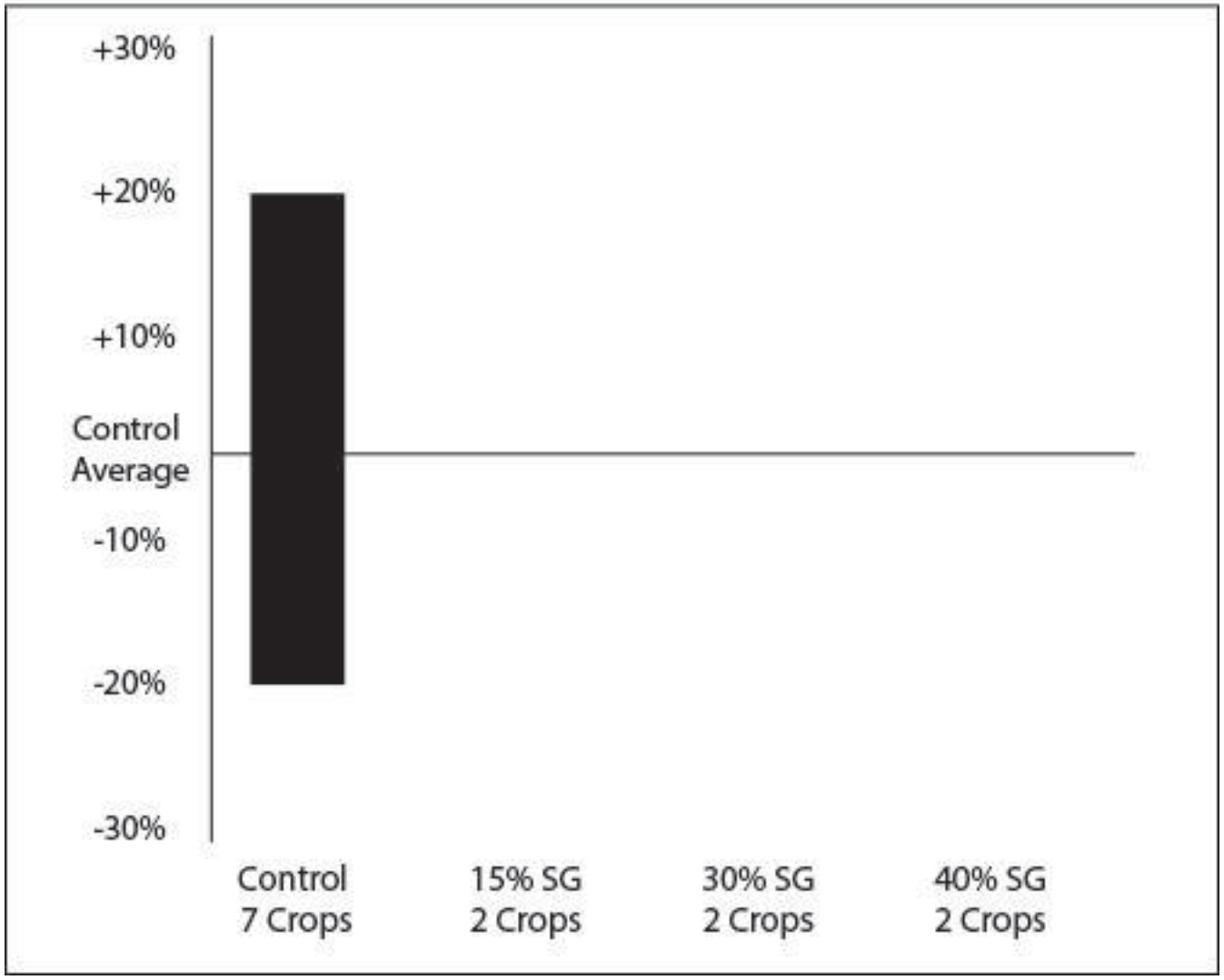
Observations

In this study, long straw clogged the pre-wet machine. That was not confirmed by other growers who have incorporated switchgrass at low levels.

Standard Range of Production

Chart #1: Volume of Mushrooms Harvested.



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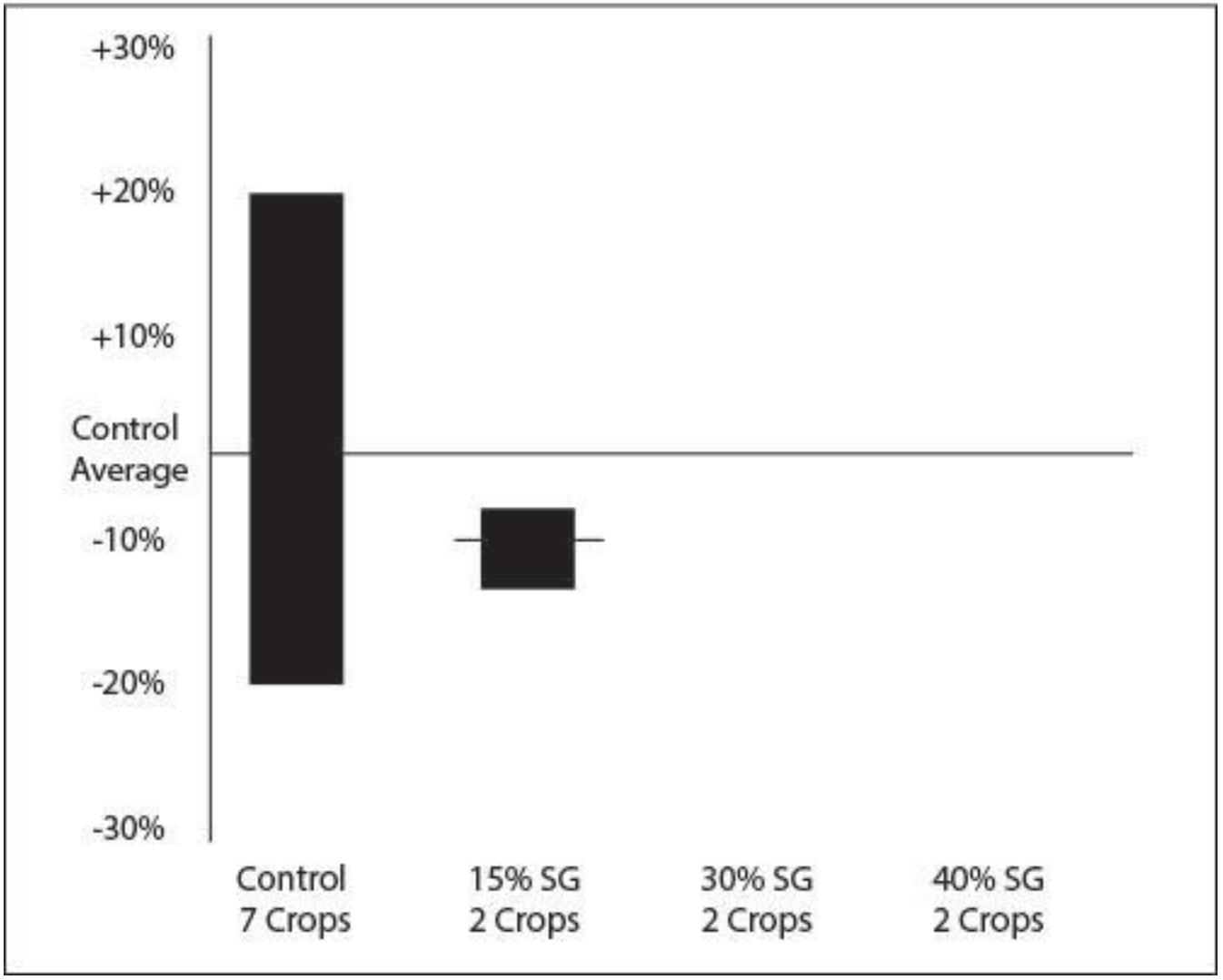
15% Switchgrass



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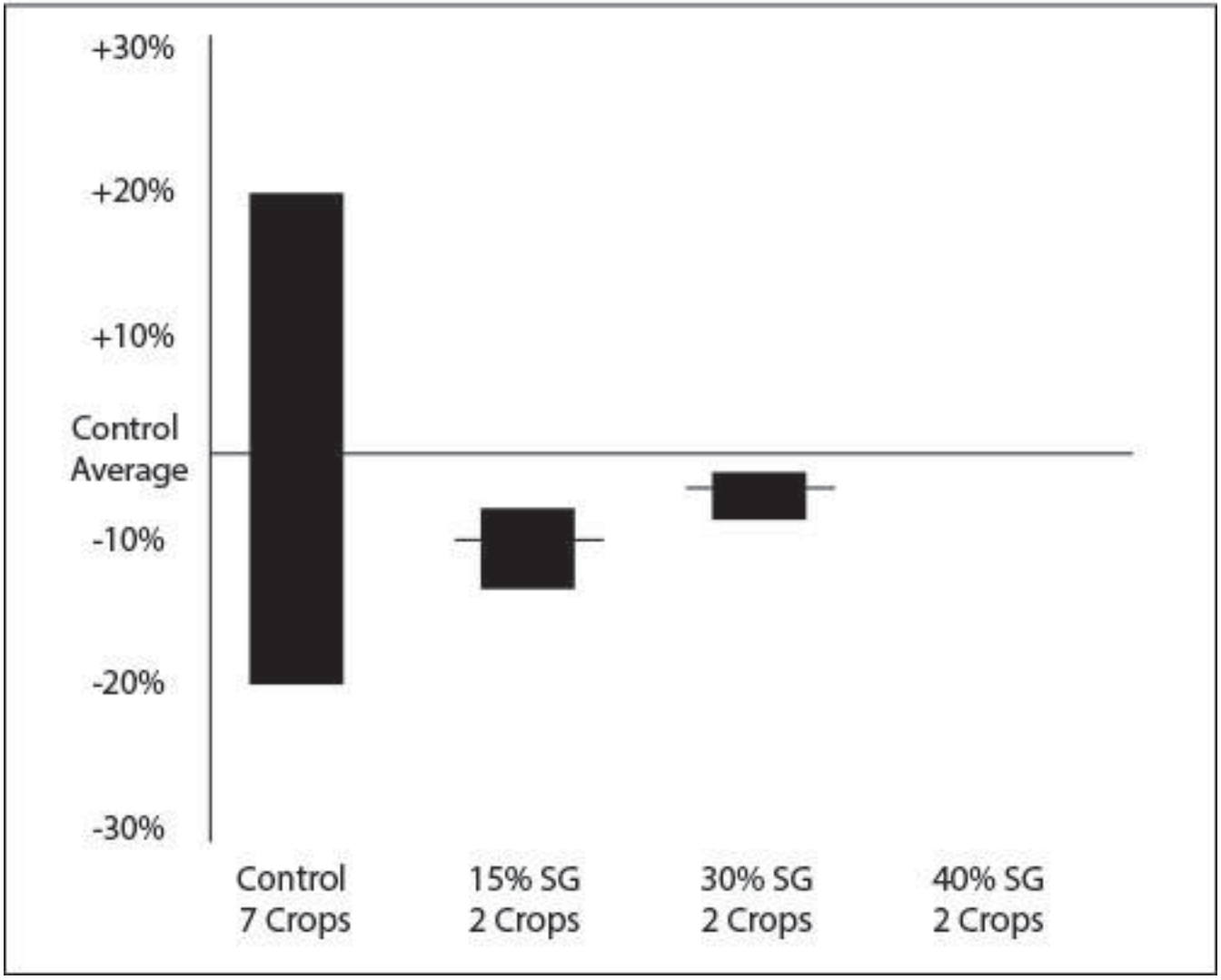
30% Switchgrass

Chart #3: Volume of Mushrooms Harvested.



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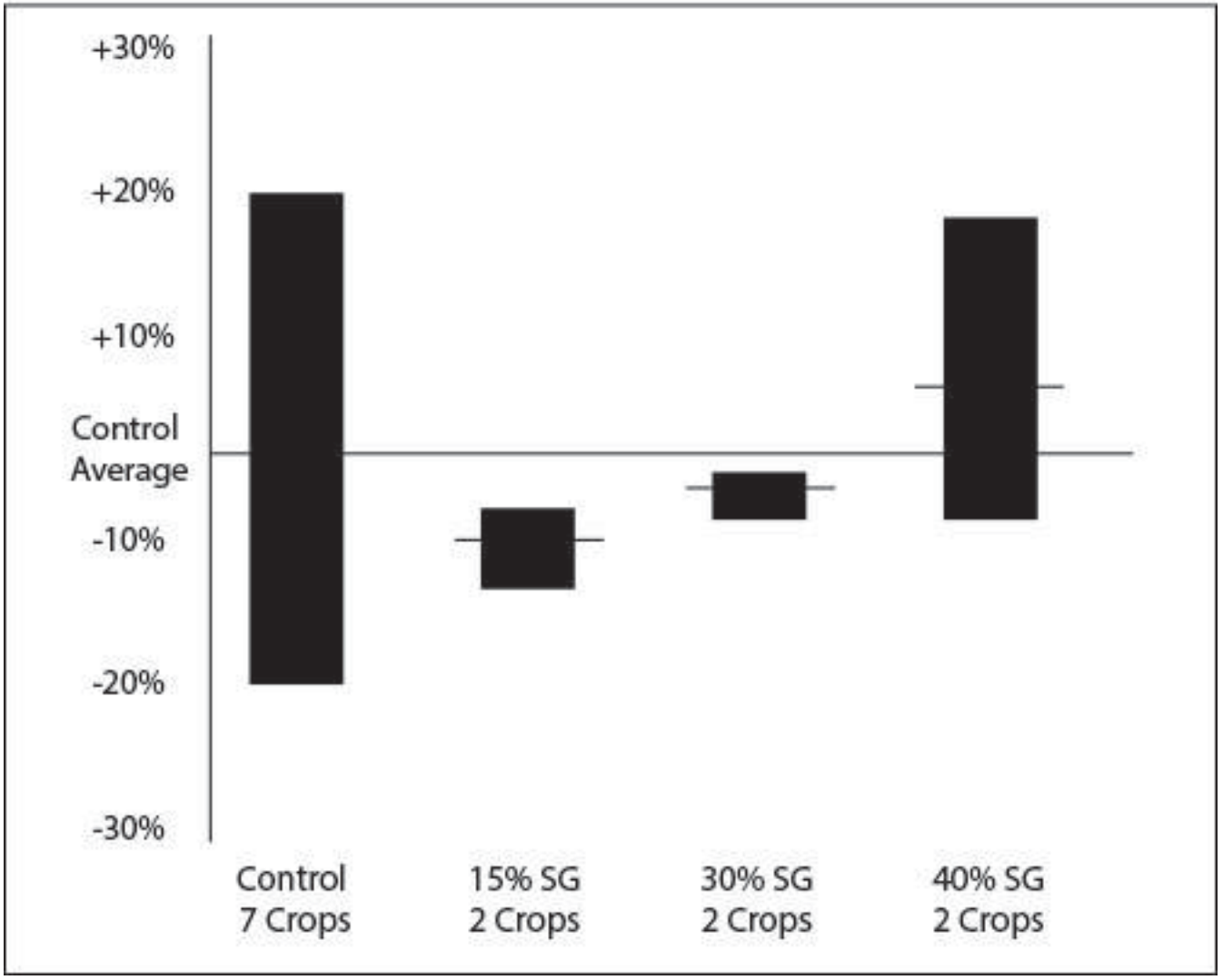
40% Switchgrass



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Conclusions

The volume of mushroom produced from all Switchgrass crops fell within the normal range of production from 100% wheat straw crops.

The replacement of up to 40% of the wheat straw with Switchgrass does not impact the schedule of crop cycles or volume and quality of mushrooms harvested.

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Sample Contract

1. Duration of the contract: Ten (10) years from date of seeding the switchgrass field.

2. Switchgrass supplier:
a) Local grower (single source)
b) Biomass Producers (BP) Co-op. (multiple sources)
Estimated yield per acre/ hectare: _____ tons/tonnes

3. Basis of purchase:
a) Switchgrass standing in the field (harvested by mushroom grower) ____
b) Switchgrass in the field in windrows (fall cutting) ____
(baled by mushroom grower) ____
c) Switchgrass in field, baled by grower:
- Fall baled ____ - Spring baled ____ -Transported by mushroom grower ____
d) Switchgrass baled [Fall ____ or Spring ____] and delivered to mushroom grower by switchgrass grower ____
- Moisture content of bales [specified range %]
- Bale size [specify 3'x3', 3'x4', 4'x4', other]

4. Basis of purchase:
a) Number of acres ____
b) Number of tonnes ____

5. Specify straw length:
a) Long (≈ 24 inches) ____
b) Short (≈ 12 inches) ____

6. Guarantees & Penalties:
1. Failure to deliver quantity contracted [switchgrass grower]
2. Failure to accept delivery [mushroom grower]
3. Quality
4. Contaminants: Molds, other