

The authors extend their heartfelt gratitude to all the reviewers for their invaluable comments and suggestions aimed at enhancing this manuscript. We have diligently edited and endeavored to address all the provided feedback to improve the quality of the manuscript. Suggestions that cannot be implemented at present will be considered for incorporation in future research endeavors. Thank you for your time and valuable input.

Reviewer 1

Comments on attached file.

Authors response: The authors addressed and incorporated the majority of the comments and suggestions in the manuscripts.

Reviewer 2

There was a large variation in plant population between years, even though the seeding rate was the same. The seeding rate should have been adjusted to seed purity, germination rate, and seed count. Was there a noticeable or significant difference in plant population among the hemp cultivar?

Authors' response: Seeding rate was adjusted to seed germination rate and 1000 seed weight. Even though we seeded same seeding rate plant population varied significantly. Variation of plant population might be associated with other factors e.g., soil moisture content at planting, seeding depth, soil type. In 2020, and 2021 experiment was conducted in no tillage systems with wider row spacing (30 cm) while in 2022 and 2023 experiment was conducted in tilled field with narrow row spacing (19 cm). Because of this plant population inconsistency and variety dissimilarities we analyzed and presented data by year.

It would have been useful to include soil test results for each year. Yes, seeding date, precipitation, plant population, and weed pressure were probably the biggest factors in explaining the results, but how about available N prior to N application?

Authors' response: Yes, as per reviewer's suggestions we have added soil total N content which was measured before each experiment year.

Were the same plots/fields used in 2020 and 2021 and in 2022 and 2023 to conduct the experiments?

Authors' response: Plots were different in each year of the experiment.

It appears that the best results were achieved in 2021, despite the low precipitation (82 mm, which was not much different than the 75 mm received in 2022 during the growing season, although its temporal distribution was slightly different between the two years). The major differences between the 2021 and the 2020, 2022, and 2023 results may have been the earlier seeding date and the lower plant population, which may have resulted in better weed control, and a lower demand for water and nutrients!

Authors' response: Though total precipitation was not much difference in 2021 and 2022 but distribution of precipitation was difference. In 2021, precipitation was distributed throughout the growing season, specially after the field establishment during the vegetative growth stage. However, 2022 though precipitation occurred after the seeding which helped to establish the stand uniformly. However, after the field establishment there wasn't enough precipitation to support the vegetative growth. Though we observed higher precipitation later of the season but by that time already reached reproductive stages and already affected plant growth by the few weeks of dry weather. The Grandi and Joey are early matured type cultivar as they are Canadian originated and started early flowering

because of photoperiod sensitivity. Plant population might be an issue here, as low dense plants produced vigorous plants with lots of branching which can produce greater seeds yield. As we didn't compare plant density by N rates interaction, here data were analyzed and presented by year.

Line 187: There was no Joey or Grandi in 2023.

Authors' response: Yes, in 2023 NWG 2463 and NWG 4113 were tested. Comparison were done by year.

Lines 294-295: Specify the year, which was 2021, I believe.

Authors' response: Edited

Line 298: Needs editing.

Authors' response: Edited

It would have been useful to include cannabinoid concentrations, if tests were done, and how they responded to N rates.

Authors' response: These hemp cultivars are mostly grain type which might have low cannabinoid. We didn't measure cannabinoid by N rate interactions. We will analyze cannabinoid at different growth stages for other studies where these cultivars also included.

In addition to weed pressure, seeding date, plant population, and rainfall; there were also differences in the response (magnitude, correlation) of the hemp cultivars (e.g., Joey vs Grandi) to N rate. May want to discuss this aspect a little more.

Authors' response: Edited

Reviewer 3

The methodology of a scientific experiment requires precisely established varieties, schemes and planting dates, with repeatability of the experiment for a minimum of two years on the same experimental plot. This is a prerequisite for obtaining reliable results. When changing any of the factors of the experiment, such as differences in the climatic characteristics of the year, it requires at least three annual experiments to eliminate the influence of this factor, keeping the same varieties and cultivation schemes. In this experiment, there is a change of varieties and cultivation schemes, which cannot guarantee the reliability of the obtained results.

The change of the experimental part with row spacing of 30 and 19 cm, sowing dates and pre-sowing tillage for the period 2020-2023 are factors that change the influence of nitrogen fertilization, therefore its influence on seed yield cannot be established reliably.

Authors' response: The study spanned from 2020 to 2023, during which the same cultivars (Joey and Grandi) were tested for three years. Due to the unavailability of quality seeds for Joey and Grandi, two other cultivars (NWG 4113 and NWG 2463) were tested in 2023. The study in 2020 and 2021 was conducted under a no-tillage system with wider row spacing (30 cm), while in 2022 and 2023, it was conducted under conventional tillage with narrower row spacing (19 cm). Because of this variation, the data were analyzed and presented separately for each year. The hemp production system is not yet well established, so the authors had to adjust protocols, field production methods, and row spacing based on field conditions and available resources. Based on discussions during recent multi-state hemp

annual meetings, it was noted that other researchers are also encountering inconsistent results regarding nitrogen inputs. There are numerous opportunities to address various issues in hemp production, including further research on nitrogen inputs. The authors will strive for consistency in future research endeavors. Many thanks to the reviewers for their valuable comments.