



UNIVERSITÀ
DEGLI STUDI
FIRENZE

DAGRI

DIPARTIMENTO DI SCIENZE
E TECNOLOGIE AGRARIE,
ALIMENTARI, AMBIENTALI E FORESTALI

PhD Programme
in Advanced and Sustainable Agricultural-Forest Systems
SAFAS - 40° Cycle

17.08.-19.08.2026 Fairways4Future and H2Mow – Robotic Mowers and resource conservation

Robotic Mowers in research - latest Findings from Scandinavia and Italy

**Mattia Fontani – PhD Student
University of Florence**

Osnabrück, 19.08.2026

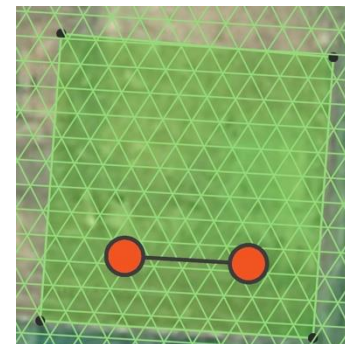
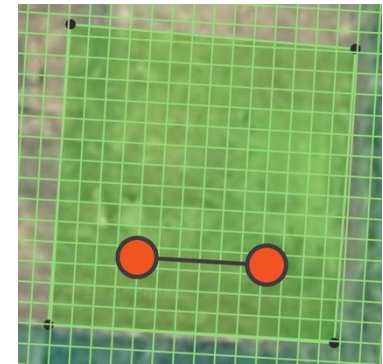
Introduction

Autonomous GPS-guided mowers can be set to mow using different trajectory patterns.

These patterns are:

- **Parallel**
- **Chessboard**
- **Triangle**

The question is: **Are there differences in terms of turf quality and color, as well as operational parameters such as mowing efficiency and area coverage?**



Aim of the Study

The aim of this study was to evaluate the **operational parameters, turf quality and turf color** resulting from the activity of an **autonomous mower** performing **three different mowing patterns** on two different turf species.

Materials and Methods

- **Turf Species:**
 - Tall fescue (*Festuca arundinacea*)
 - Manilagrass (*Zoysia matrella*)
- **Machine:** Husqvarna CEORA
- **Period:**
 - June-July 2025
 - February-March 2026
- **Locations:**
 - Podere Rottaia - Department of Agriculture, Food, and Environment of the University of Pisa (San Piero a Grado, Pisa, Italy— 43°40'N, 10°19'E
 - Bindi Prato Pronto Nord sod farm, San Piero a Grado, Pisa, Italy— lat. 43°64' N, long. 10°35' E



Materials and Methods

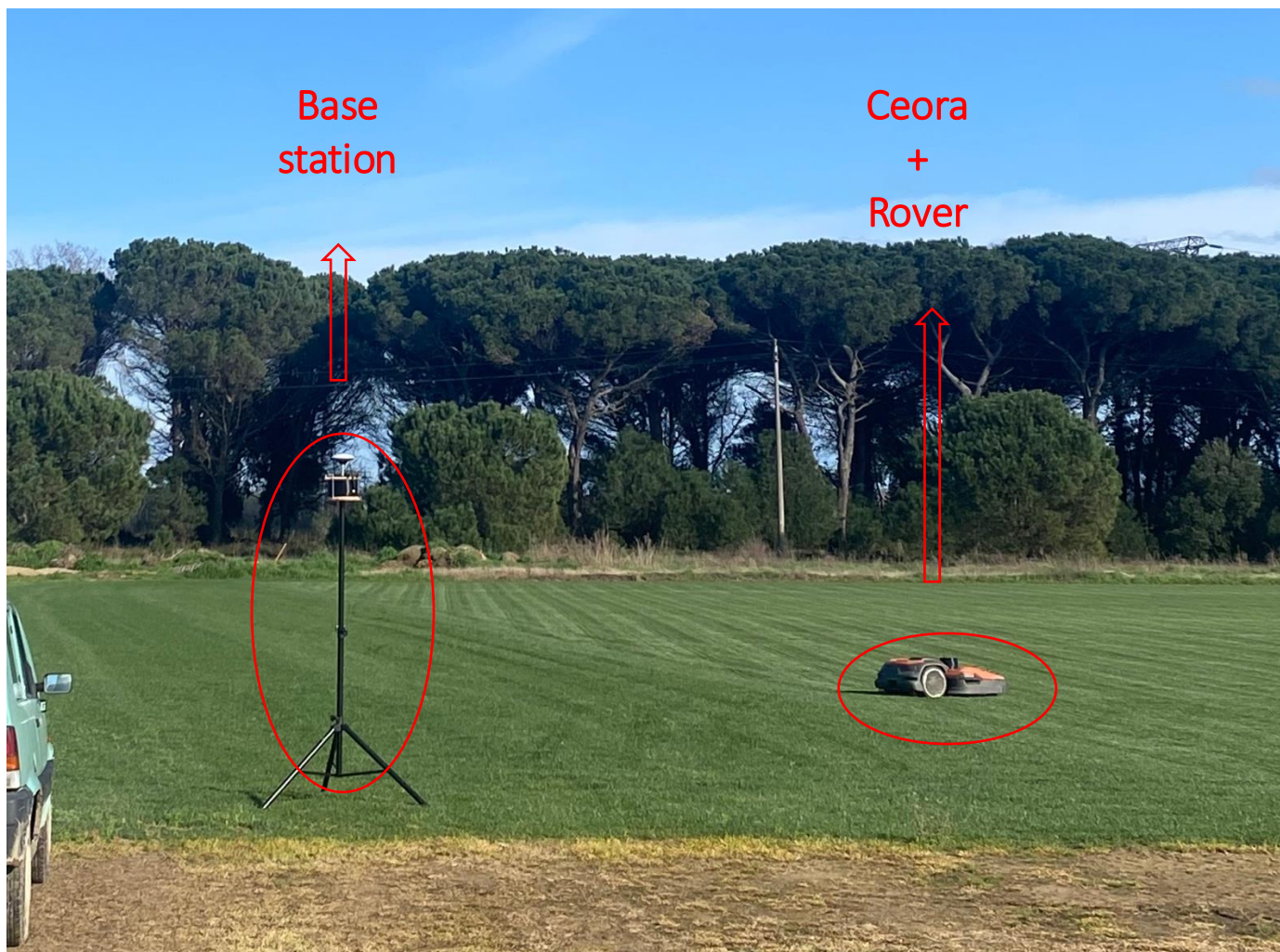


Husqvarna CEORA

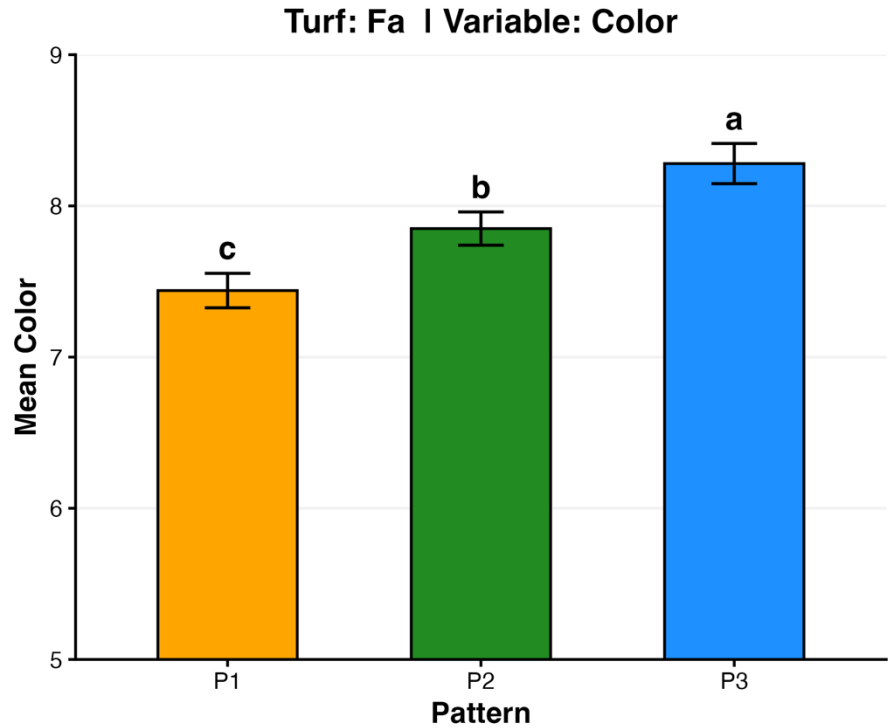
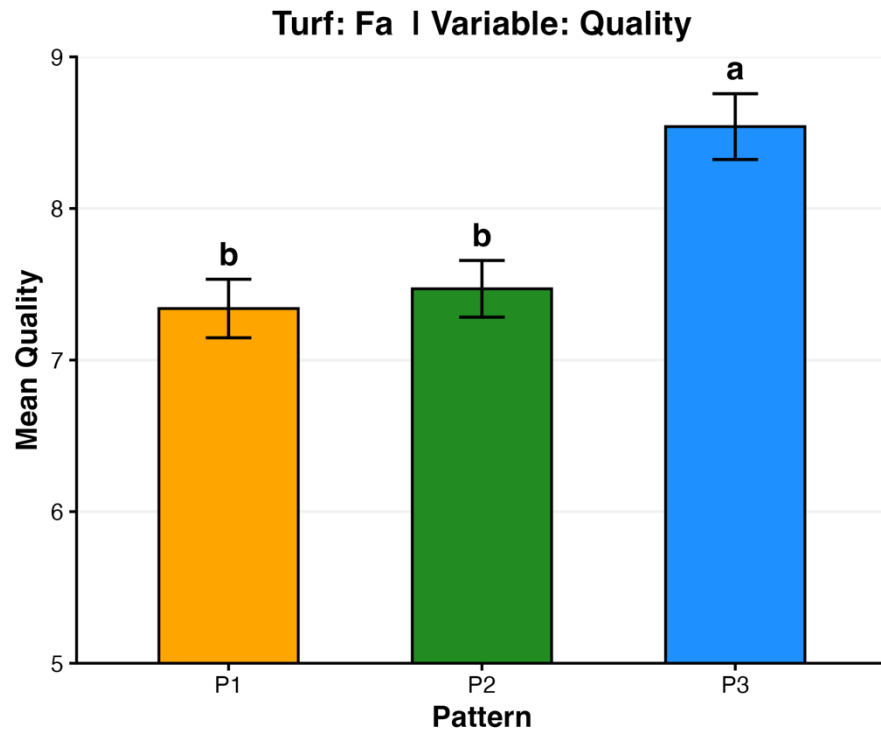


Qprel Tracking System

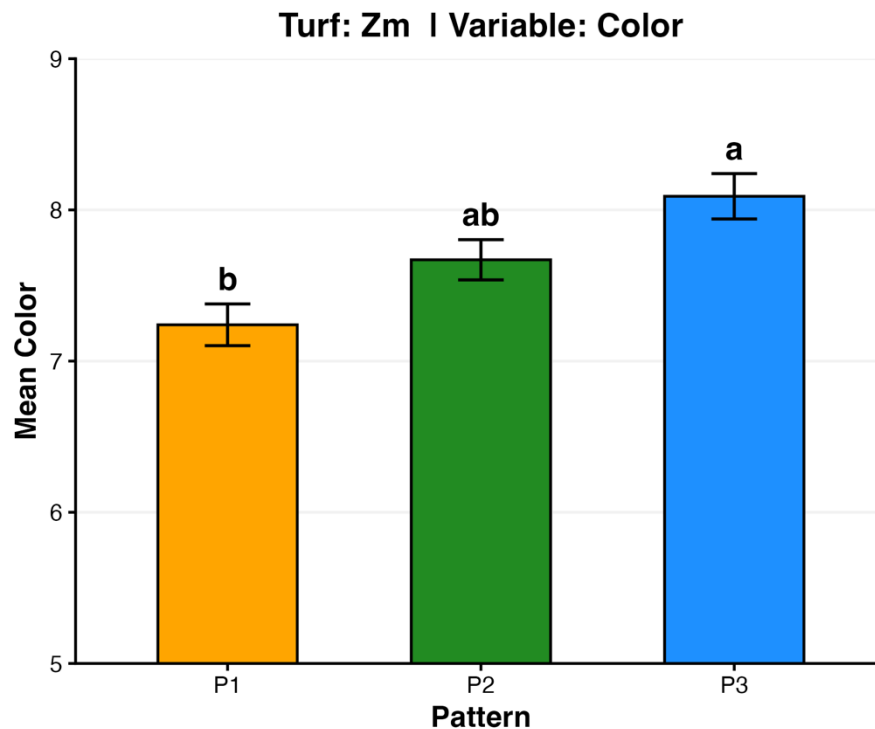
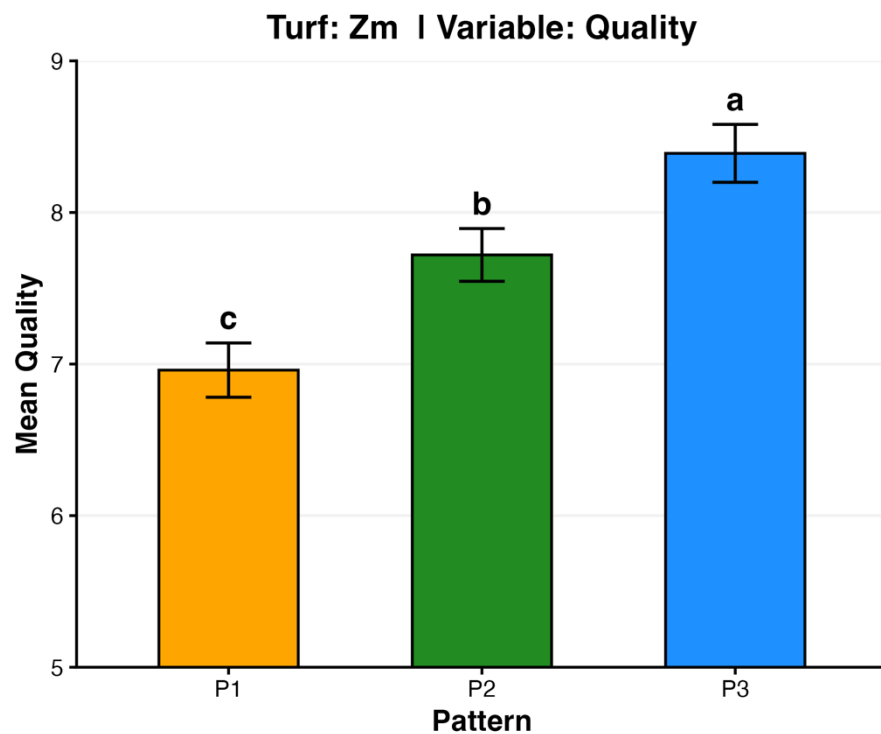
Materials and Methods



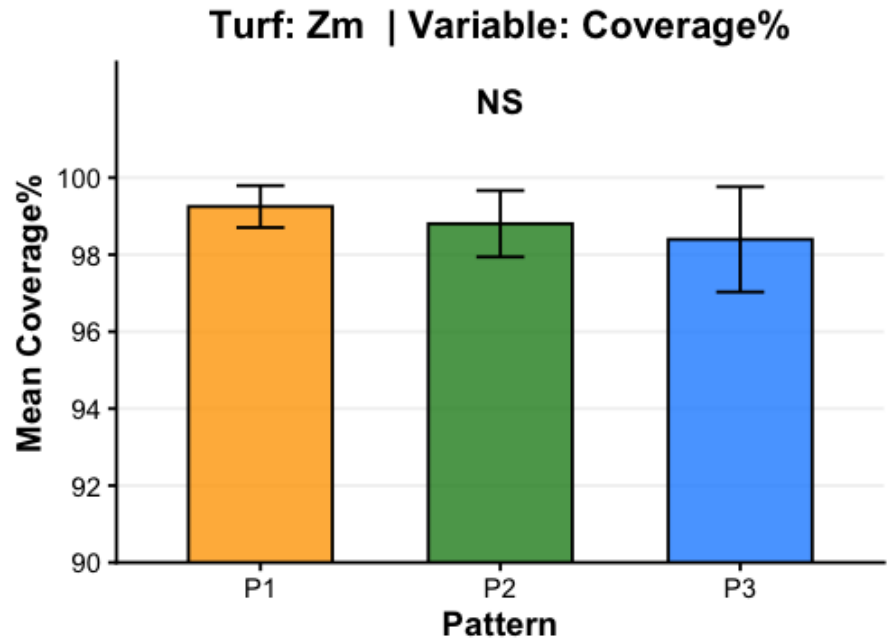
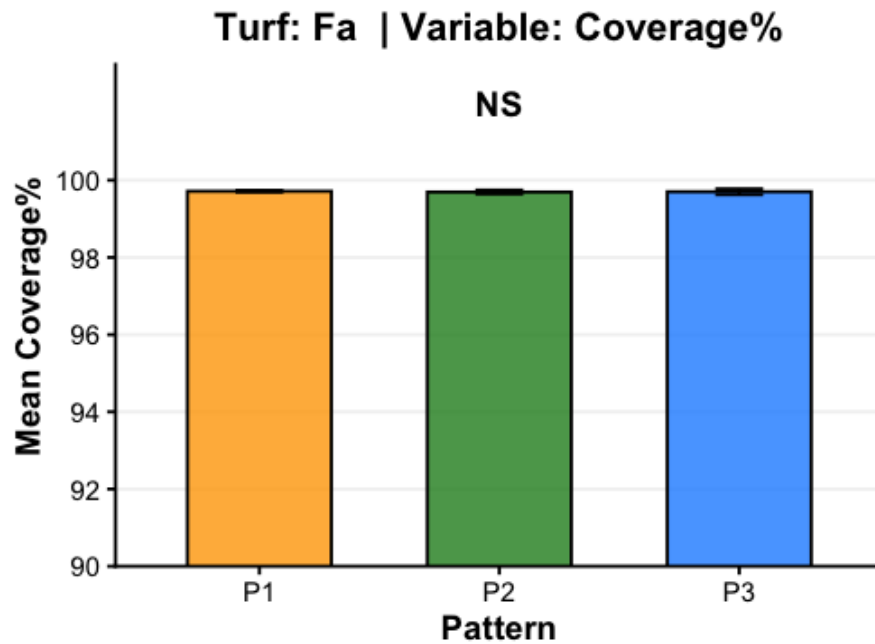
Results and Discussion



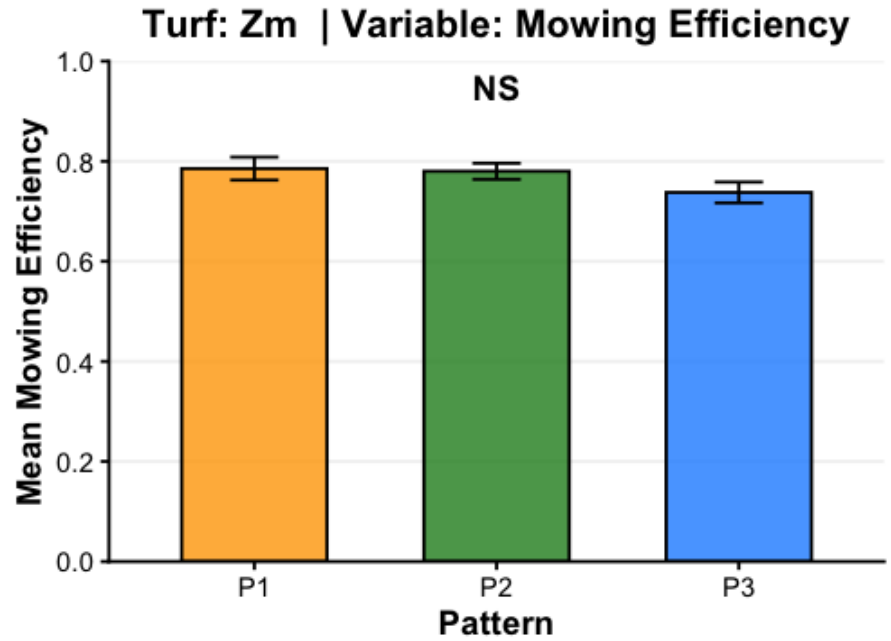
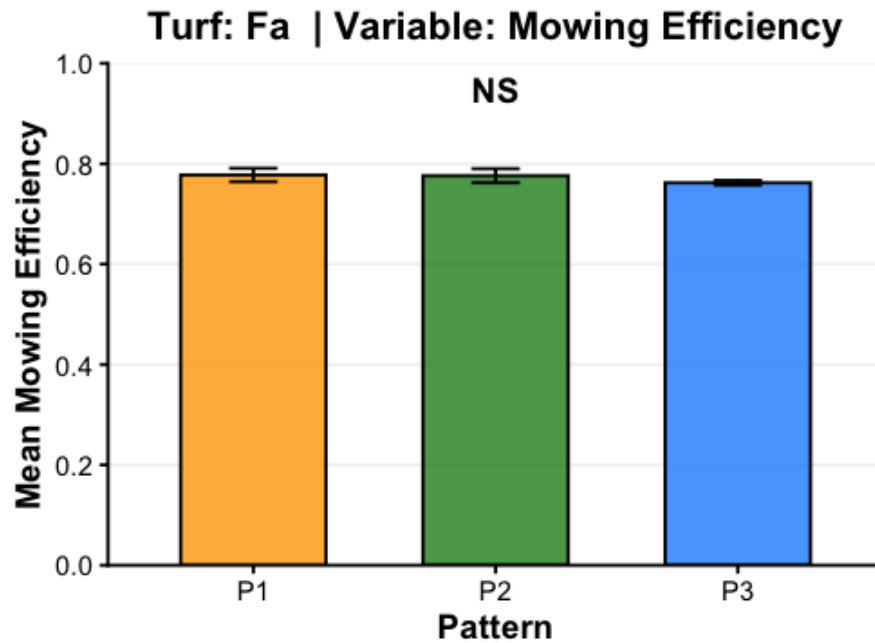
Results and Discussion



Results and Discussion

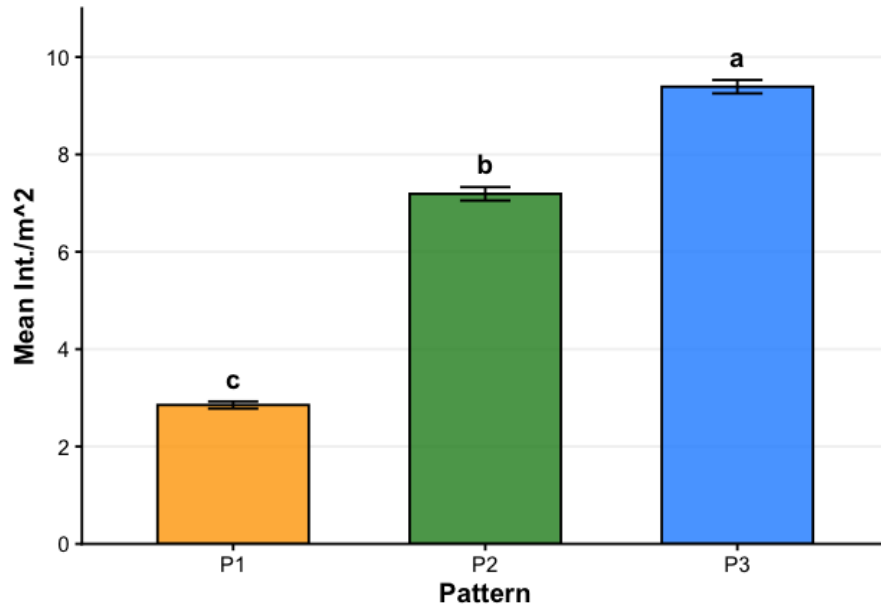


Results and Discussion

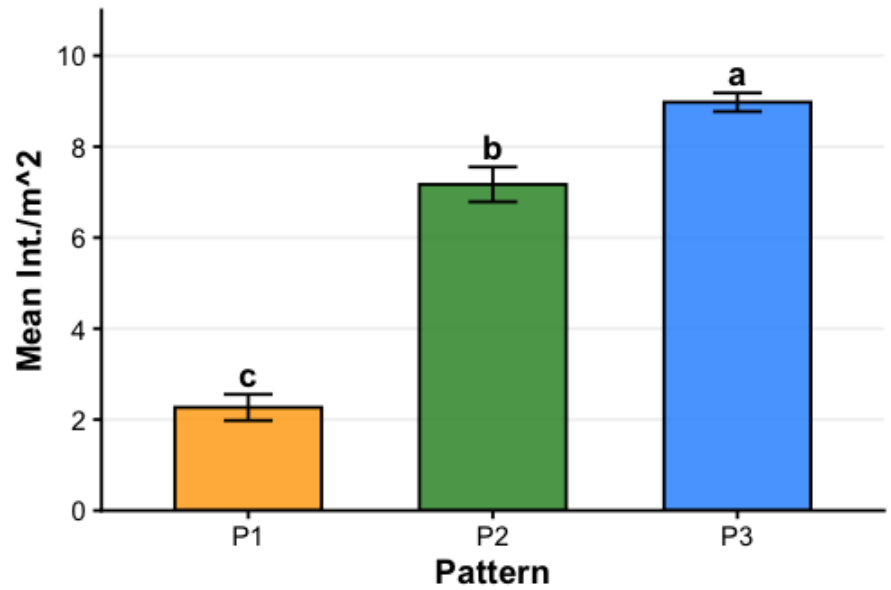


Results and Discussion

Turf: Fa | Variable: Int./m²

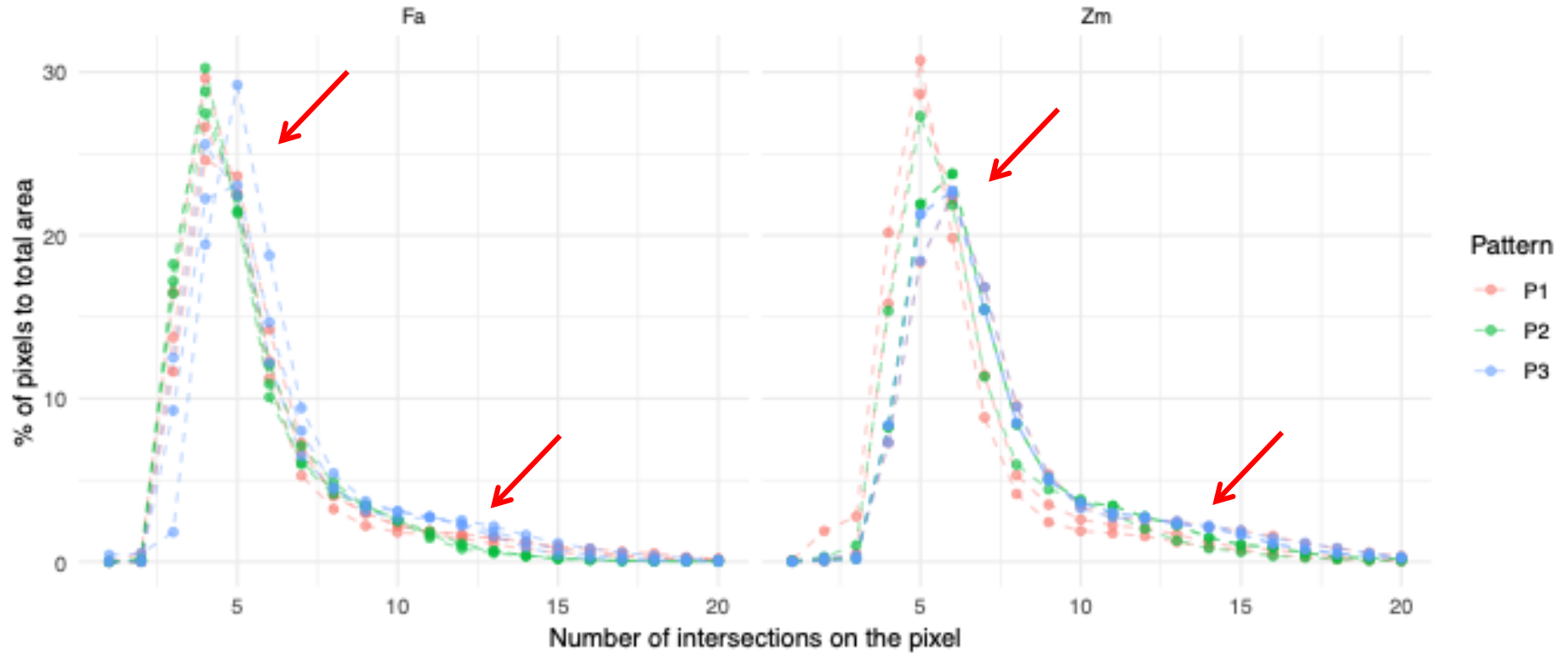


Turf: Zm | Variable: Int./m²



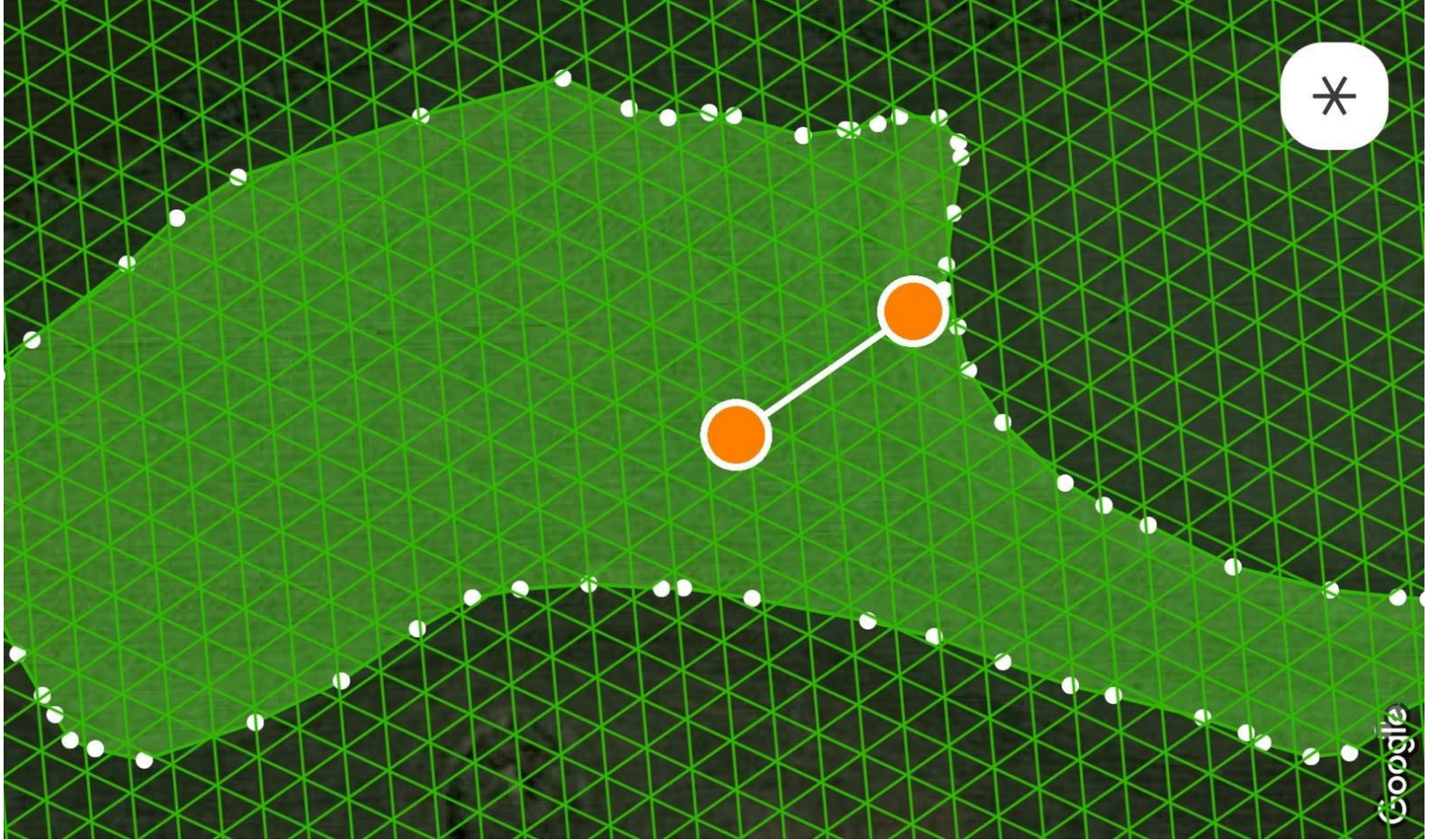
Results and Discussion

Distribution of % of Pixels by Number of Intersections









Conclusions

In both cases:

- Pattern 3 increased turf quality and color
- Coverage% and Mowing Efficiency were not mainly affected by patterns
- Pattern 3 led to more intersections/m²

We can conclude that changing **mowing trajectories** between mowing cycles **does not statistically affect** the robot's operative parameters; however, it **increases turf quality and color** through a wider distribution of the passes.



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Thanks for your attention

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