



Reducing exposure: Comparison of two application techniques of a granular pesticide in potato fields

INTRODUCTION

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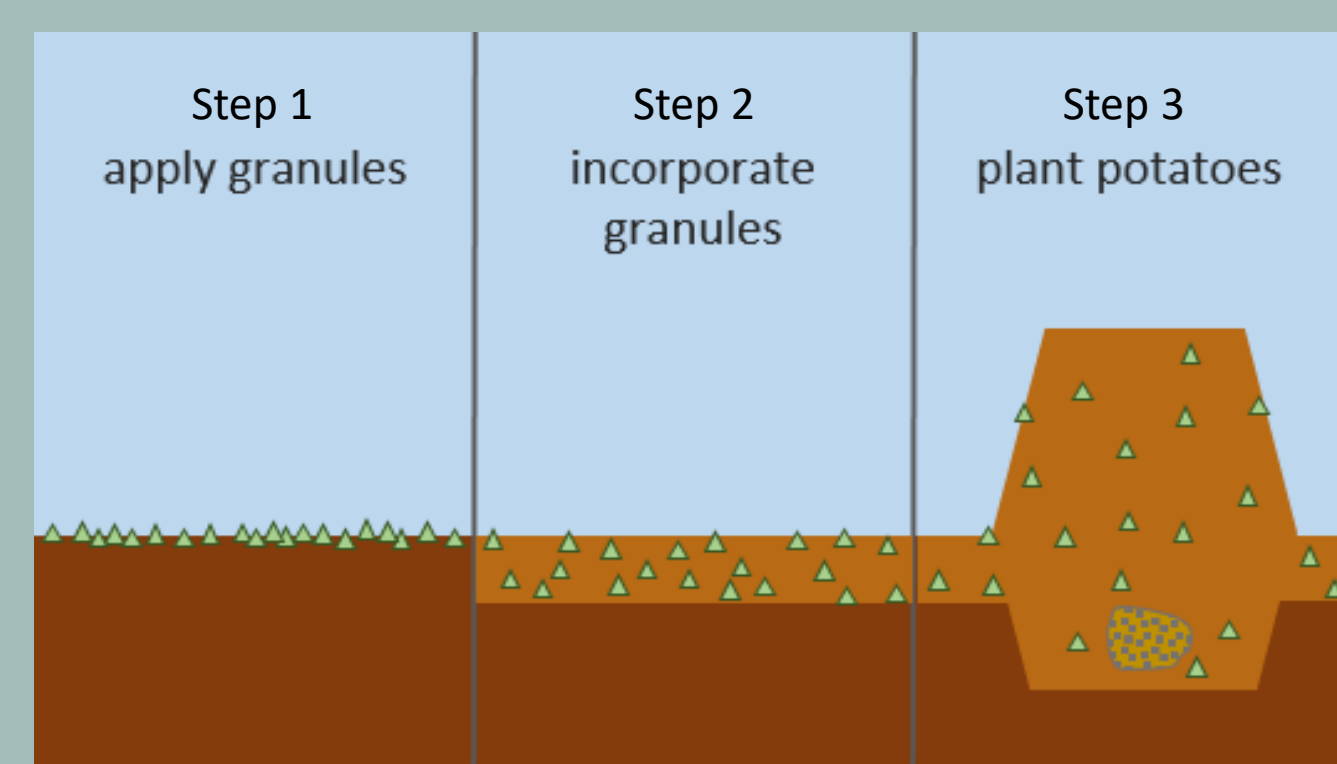
Granular plant protection products (PPP) are widely used and have potential to cause adverse effects to birds and mammals if ingested in sufficient quantities by individual animals. By minimising the availability of granules on the soil surface, the risk of exposure can be reduced to levels that pose a low risk to birds and mammals foraging within treated fields.

This study was performed to compare two common application methods - in-furrow and broadcast application - for a granular PPP used in potato cultivation, to assess the number of granules remaining on the soil surface following application.

Application techniques of granular pesticides

Broadcast application

Granules are applied over the whole soil surface (Step 1) and incorporated when the soil is being prepared (Step 2). With modern equipment Step 1 and Step 2 are performed with the same machine. The planting of potatoes is performed afterwards with a different machine (Step 3).



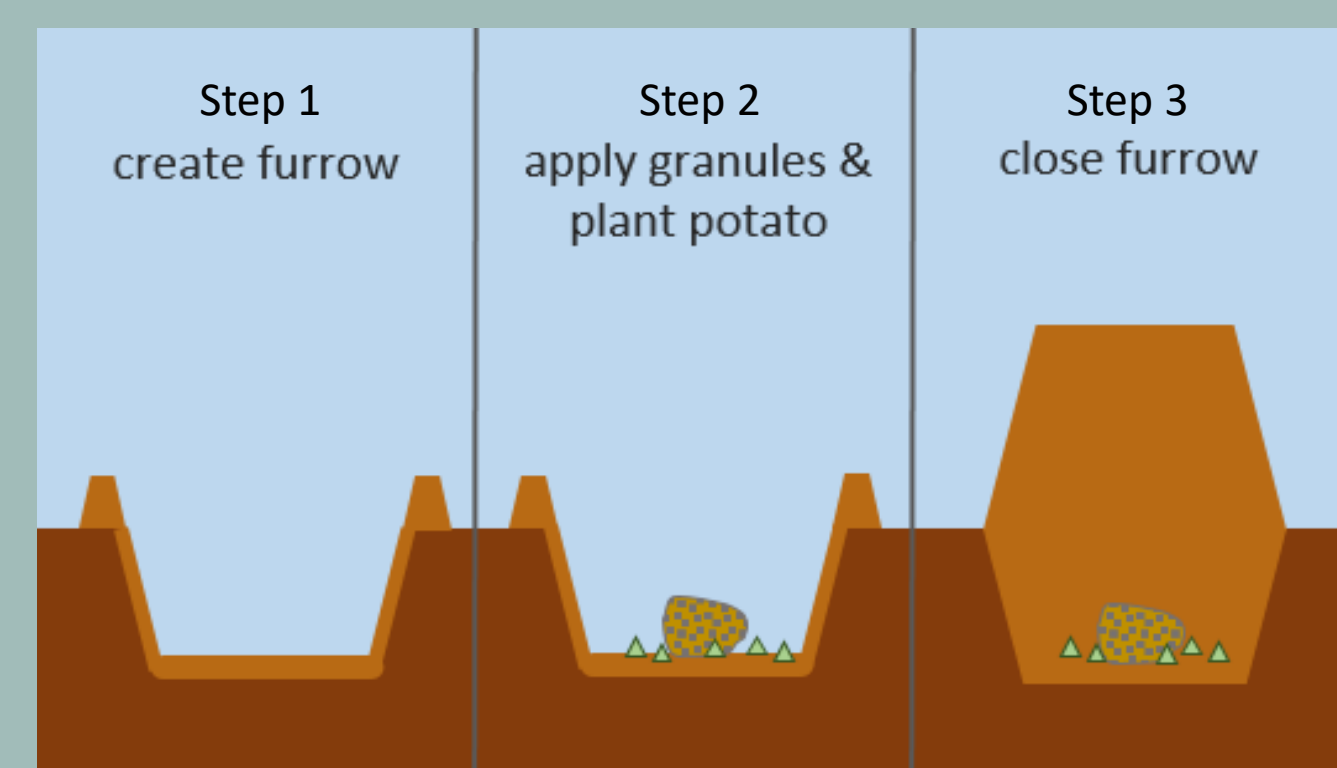
Schematic presentation of broadcast application.



Machinery used for broadcast application.

In-furrow application

Application of granules is performed simultaneously with the planting of potatoes. One machine is used to create a furrow (Step 1), place granules and potatoes (Step 2) and close the furrow (Step 3).



Schematic presentation of in-furrow application.

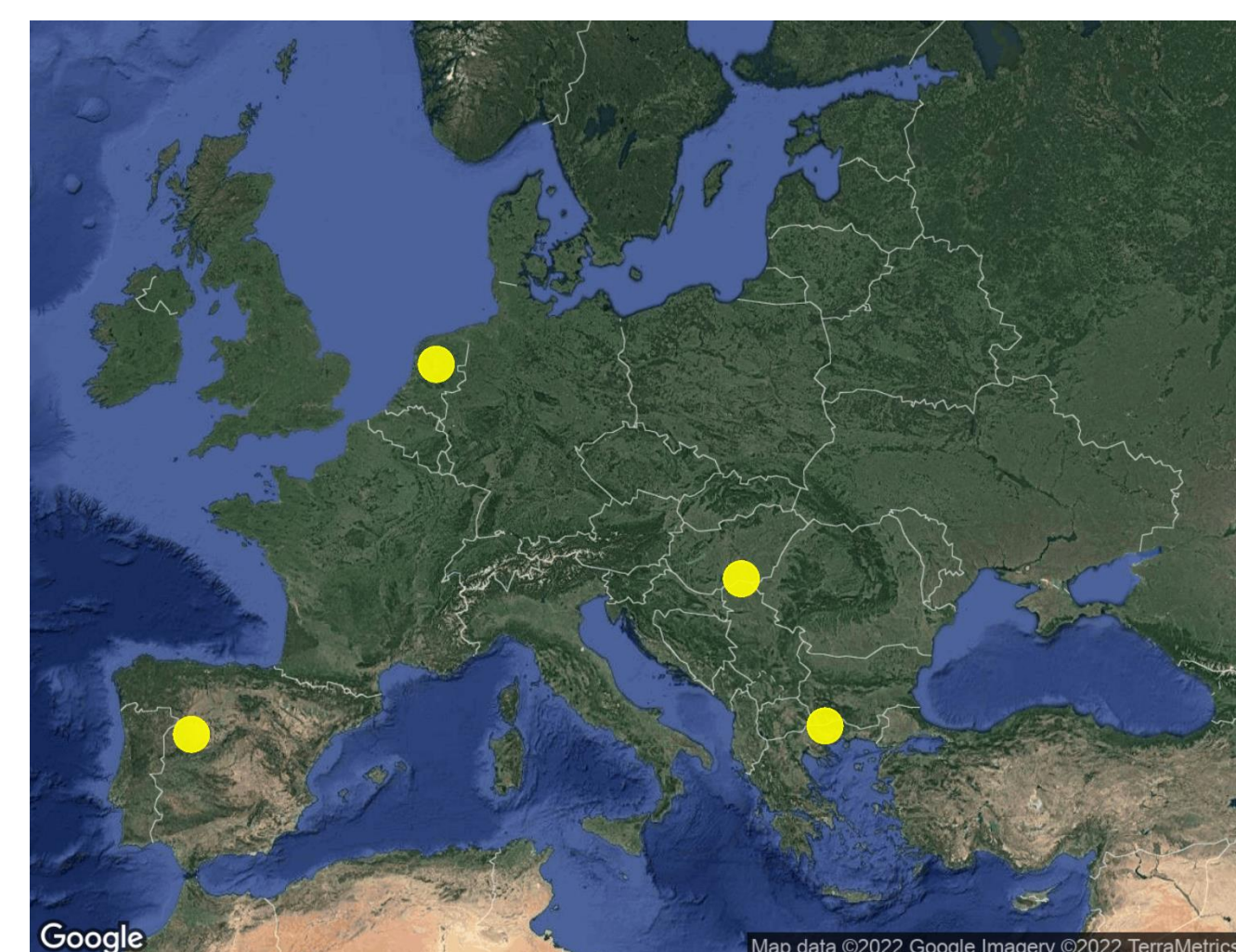


Machinery used for in-furrow application.

Due to the targeted placement of the granules during the in-furrow application a PPP a lower application rate (10-25 kg/ha) can be considered as sufficient compared to the broadcast applications (37-50 kg/ha).

Study sites and study fields

- Exposure assessments were carried out on potato fields in four European countries
- All selected areas were important sites for potato cultivation



Number of study fields		
	in-furrow application	broadcast application
Spain	20	-
Greece	-	20
Hungary	-	15
The Netherlands	10	5
Total	30	40

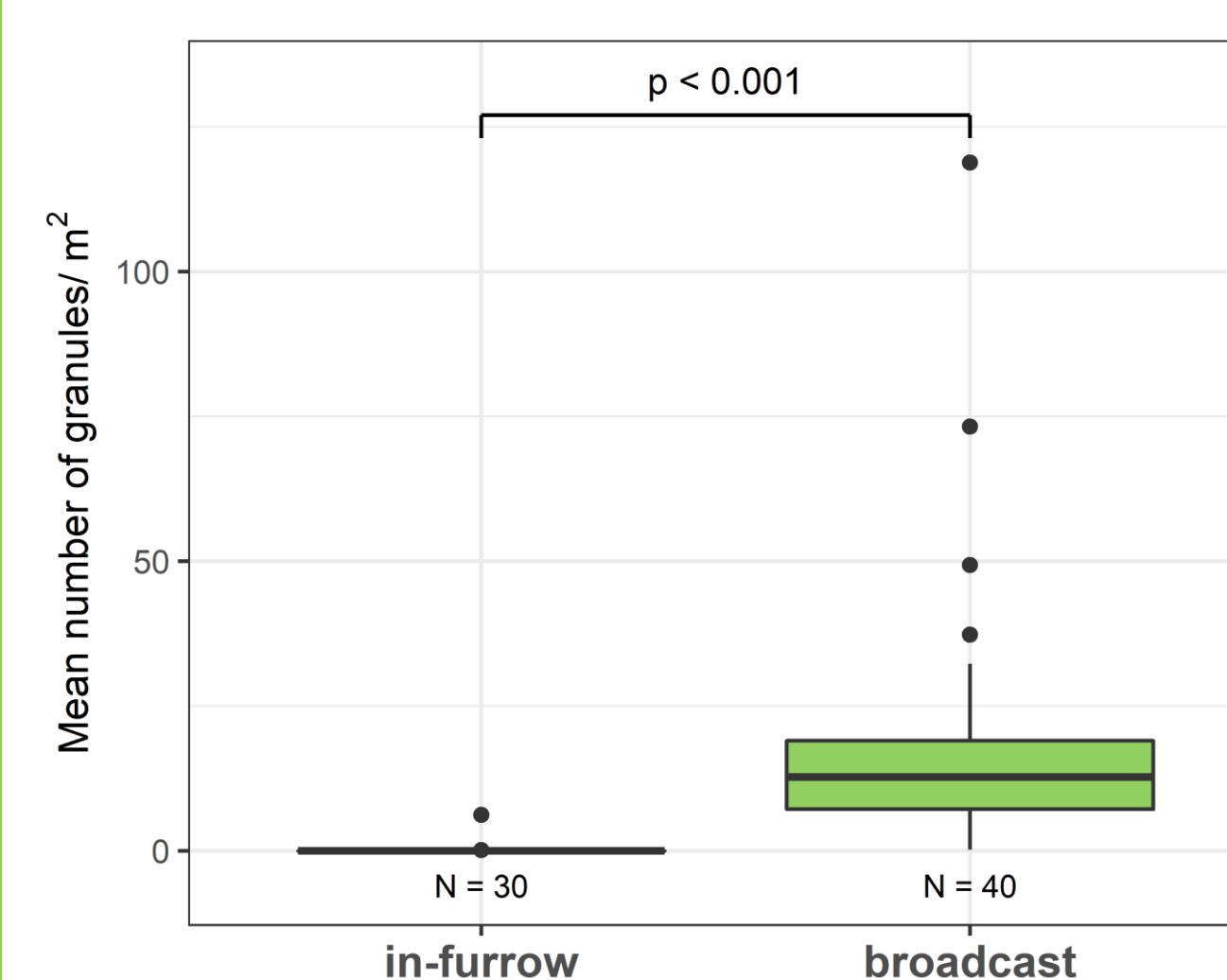
Method

- the number of granules on the soil surface was counted at 40 plots per study fields at the day of application
- A metal frame was used to examine an area of 0.25 m² per plot

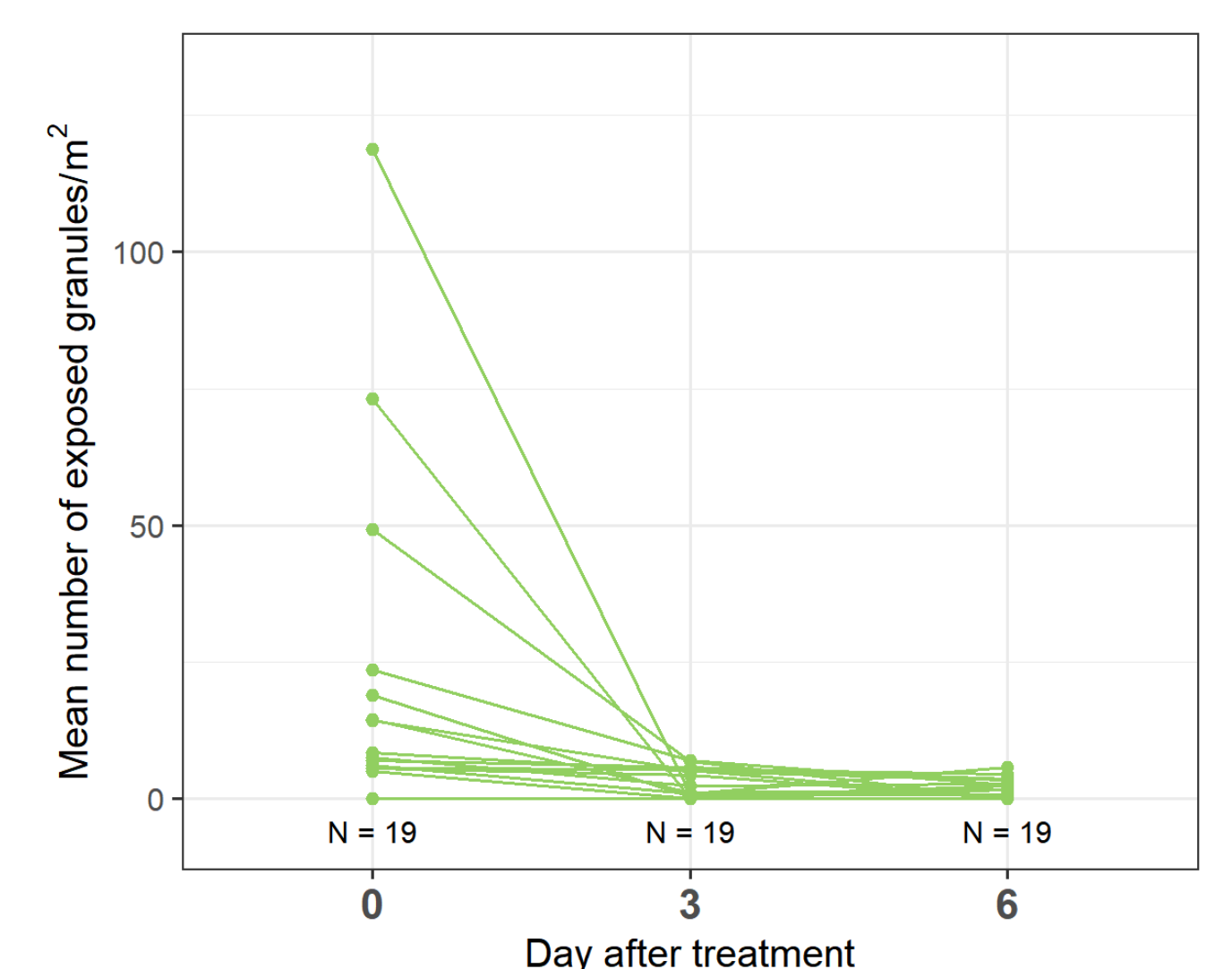


Results

- The mean number of exposed granules/m² per study field was significantly lower in fields with in-furrow application (0.2 granules/m²) than in fields with broadcast application (17.6 granules/m²)
- in 26 out of 30 fields with in-furrow application no granules at all were found
- Repeated measurements at day 3 and day 6 after treatment showed a steeply decreasing number of exposed granules/m² during the later samplings



Boxplots showing mean numbers of exposed granules/m² per study field for both application techniques. P value above the boxplots according to Mann-Whitney U test.



Lines indicating numbers of exposed granules/m² during repeated samplings at day 3 and day 6 after treatment. Each line represents one study field.

CONCLUSION

The number of exposed granules was significantly lower on fields with in-furrow applications than on fields where broadcast application was used. Thus, in-furrow application of granular plant protection products can mitigate the risk of exposure to wildlife potentially ingesting granules left on the soil surface.

Granules which were exposed after the application seemed to break down quickly as shown by the steeply decreasing number of granules found during the repeated exposure assessments.



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