

# Net Nitrogen Mineralisation in Maize-Cover Crop Rotations in Mediterranean Central Chile

Por: [Salazar, O](#) (Salazar, Osvaldo)<sup>[1]</sup>; [Casanova, M](#) (Casanova, Manuel)<sup>[1]</sup>; [Najera, F](#) (Najera, Francisco)<sup>[1]</sup>; [Contreras, A](#) (Contreras, Americo)<sup>[2]</sup>; [Tapia, Y](#) (Tapia, Yasna)<sup>[1]</sup>  
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## Abstract

The main aim of this study was to evaluate the effects of the maize-cover crop rotation (Zm-cc) in the soil net nitrogen mineralisation (NNM) by measuring in situ NNM incubation in the upper soil (0-25 cm) during spring-summer (October-March) and autumn-winter (April-September) seasons and compared with other rotation in Mediterranean Central Chile. The study was carried out at 5 experimental fields (only irrigated in spring-summer period), where four common soil use or maize-based rotations were evaluated: permanent fallow (F-F); maize-fallow (Zm-F); maize-cover crop (Zm-cc); and permanent cover crops (cc-cc). In these fields were carried out NNM in situ determinations in F-F (n = 18), Zm-F (n = 31), Zm-cc (n = 43), and cc-cc (n = 51) combinations (totalise n = 143), which were collected during spring-summer and autumn-winter in different periods between 2011 and 2018. During the spring-summer period, it was found that the NNM was highest in the Zm-cc rotations with a mean value of 36 kg N ha<sup>-1</sup>, whereas the lowest NNM values were in F-F soil use with a mean of 6 kg N ha<sup>-1</sup>. In contrast, during autumn-winter season, the NNM was highest in the F-F soil use with a mean of 34 kg N ha<sup>-1</sup>, while the lowest NNM values were found in Zm-cc rotation with a mean of - 38 kg N ha<sup>-1</sup>. During the spring-summer period, the Zm-cc rotation had the highest NNM values because cc increased the soil organic matter (SOM) content for microbial activity, whereas in autumn-winter, the Zm-cc rotation had the lowest NNM values because the cc added fresh SOM that increased N immobilisation process.

## Palabras clave

**Palabras clave de autor:** [Climate change](#); [Nitrogen dynamics](#); [N immobilisation](#); [Soil temperature](#)

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## Información del autor

**Dirección para petición de copias:** Salazar, O (autor para petición de copias)

+ Univ Chile, Fac Ciencias Agron, Dept Ingn & Suelos, Santiago 1004, Chile.

#### Direcciones:

+ [ 1 ] Univ Chile, Fac Ciencias Agron, Dept Ingn & Suelos, Santiago 1004, Chile

+ [ 2 ] Univ Chile, Fac Ciencias Agron, Escuela Pregrad, Santiago 1004, Chile

**Direcciones de correo electrónico:** [osalazar@uchile.cl](mailto:osalazar@uchile.cl)

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