



Dear reader,

We are pleased to present you the fourth edition of the PNA Newsletter!

In this newsletter we report on the success of our PNA website, and the results of two research projects – in almonds and wheat - funded by PNA. The outcomes of these projects are now available on-line, and in this newsletter you'll find them summarized.

If you want to keep on receiving our PNA Newsletter, [please register here](#) (free of charge).

#### Main topics in this edition

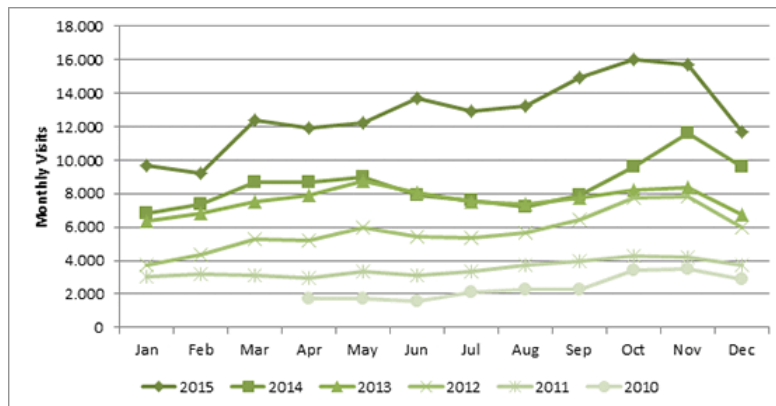
- [PNA library newsletter and increased website visits in 2015](#)
- [Benefits of potassium nitrate in fertigated almonds](#)
- [Potassium nitrate foliar applications increase grain yield of wheat](#)

#### PNA library newsletter and increased website visits in 2015.

In our previous newsletter we informed you of a new tool on the PNA website: The scientific potassium nitrate library. We expected the library to be a major step forward in the realisation of the PNA's ambition to become and to remain the leading information source about all the agronomic and economic aspects of potassium nitrate. Where we started with 50 summaries of scientific agronomic publications in 2014, currently the library counts 155 entries, with each article available in three languages: English, Chinese and Spanish.

In 2015, we started to advertise the existence of this indexed database of excellent agronomic information by sending out PNA Library Newsletters to our list of subscribers. Each newsletter highlights two articles from this valuable collection, and a new issue is sent to subscribers twice each month. The same articles are also advertised in the sidebar on the website, and the sidebar is refreshed with each new issue of the PNA Library Newsletter.

As the figure shows, the website traffic has now increased from 2000-4000 monthly visitors in 2010 to a total of 153,669 visitors in the year 2015, with nearly 16,000 visitors in each of the months October and November. To further facilitate the website visitors, we have made the subscription easier by requiring less information, and in 2016 we will have the website adapted for optimal viewing on mobile devices.



To start with, the website features a basic set of about 50 literature references but in the upcoming months more studies will be uploaded. By continuously uploading new articles, the PNA website will gain more visibility and traffic from search engines. The tool is available in English, and in the next months will be translated into Spanish and Chinese.

To access this library in English surf to: <http://www.kno3.org/en/literature-library>

#### Benefits of potassium nitrate in fertigated almonds.

Almonds are a highly valuable and profitable crop for Californian farmers. However, it is not easy to maintain high yielding crops that bring in premium, high quality harvests and steady pricing. One of the farmers' major challenges is proper nutrition, especially the critical element of Potassium (K). In addition, growers are faced with shortages of water, government imposed restrictions to prevent nitrogen waste, and increasing salinity levels in both water and soil. Choosing the proper K fertiliser source that maximises water and nutrient use efficiency, minimizes salinity build-up, and yet continues to enhance both yield and quality is vital. In a recent trial, the use of potassium nitrate in the fertigation clearly demonstrated to have a benefit for the grower, combined with fan jet irrigation.

This trial in California - coordinated by UC Davis - took place over a period of 4 years, 2011-2014. The project was sponsored by PNA, aiming to find a solution for the challenges faced by almond growers, by considering the 4 R's of fertilisation practice. Yield response to four K-sources was compared: Potassium sulphate (SOP), potassium thiosulphate (PTS), potassium chloride (KCl), and potassium nitrate (KNO<sub>3</sub>). Additionally the relative amounts of two nitrogen sources were varied:

UAN (32%N solution of 1:1 Urea and Ammonium-Nitrate) and potassium nitrate as a source of nitrate as well as potassium. In this trial maximal benefits for both yield and nitrogen recovery were seen at 224 kg/ha total potassium with 60% K as banded SOP and 40% K as KNO<sub>3</sub>, and 336 kg/ha total N, 306 kg N of these as UAN and 30 kg N as KNO<sub>3</sub>.

The full report can be downloaded from the PNA website [here](#) (Nr. 4)

Almond kernel yield was mainly influenced by the source of N and K fertilisation. In a fan jet irrigation system, all treatments comprising potassium nitrate always numerically outperformed farmer's practice with banded SOP and fertigated PTS, with the best potassium nitrate treatment effecting a 22% higher yield. The primary effect of potassium nitrate was to increase the total number of nuts, rather than increasing average nut size.

The two most important irrigation strategies in Californian almond are fan jet and drip irrigation, and a majority of growers are providing N and K fertilisers by injecting water soluble fertiliser in the irrigation water. To provide growers with guidance on optimal application, two irrigation methods and two nutrient application schedules were also included in the trial. Fan jet irrigated trees outperformed drip irrigated trees under almost all treatments and fertiliser sources.

Additionally, it was demonstrated that continuous fertigation is a viable fertilisation strategy compared to periodic fertigation. When managed correctly, continuous fertigation will reduce the risk of deep nitrate leaching and provides greater flexibility to adjust fertiliser rates in-season. This offers greater control of nitrate loss and improves nitrogen management, a benefit given the increasingly stringent requirements to minimise nitrate leaching in Californian agriculture.

#### Potassium nitrate foliar applications increase grain yield of wheat.

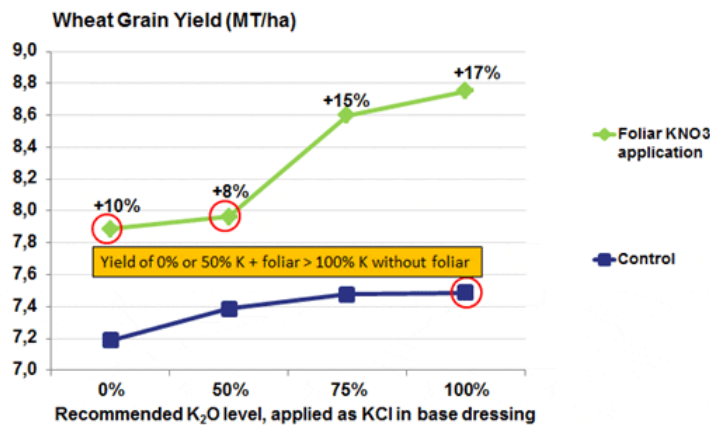
On behalf of the Potassium Nitrate Association (PNA), Landlab research station in Quinto Vicentino (Italy), conducted a trial to test the effect on winter wheat yield of two foliar applications with potassium nitrate (KNO<sub>3</sub>) in spring, on top of KCl base dressing at four levels of K<sub>2</sub>O/ha. Potassium nitrate was sprayed at the growth stages of active tillering and panicle initiation at 10 kg KNO<sub>3</sub>/400 L spray/ha.

The full report can be downloaded from the PNA website [here](#) (Nr. 5)

Due to favourable climate conditions (a very mild winter and frequent rainfall) the average yield of the trial was 7,58 MT/ha, about 1 MT/ha above the expected yield, but in line with the potential of the area. Differences in wheat grain yield levels in response to the potassium treatments were clear and statistically strongly supported. The foliar applications of potassium nitrate were promoting a higher grain yield compared to the untreated controls, which resulted in additional grain yields ranging from 600 kg/ha to 1300 kg/ha (+8% to 17%). Foliar applications with KNO<sub>3</sub> were beneficial at all levels of basal dressed K (Figure 1).

The increase in yield could not be attributed to a higher 1000 grain weight or dry matter content. Neither did the protein content of the grain differ. The results show that the foliar application of KNO<sub>3</sub> is promoting a higher yield compared to the untreated entries mainly due to more ears/m<sup>2</sup>. The yield results are clear and statistically strongly supported at a very high level of confidence.

The study confirms the benefit of potassium nitrate for wheat yield, applied twice as foliar spray, in the key moment of the crop cycle, even if KCl is provided in the base-dressing at sowing.



**Figure 1.** Effect of different base dressing applications and two foliar potassium nitrate sprays (10 kg/400L spray/ha) at the growth stages of active tillering and panicle initiation on wheat grain yield.

#### PNA Contact Details

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See for more contact details the PNA website: [www.kno3.org](http://www.kno3.org).