

Events

October 2017



1st IPI Symposium on Polyhalite
第一屆國際鉀肥研究所硫酸鉀鈣鎂研討會
 A New Potassium Fertilizer with Complete Secondary Nutrients
 全中量元素解決方案
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Report on the 1st IPI Symposium on “Polyhalite - A New Potassium Fertilizer with Complete Secondary Nutrients”, 2017, China

The 1st IPI Symposium on “Polyhalite - A New Potassium Fertilizer with Complete Secondary Nutrients” was held in Sanya, Hainan Province, China on 31 October 2017, with a focus on sharing and discussing academic research on polyhalite relevant to the Chinese market.

The context

Due to the negative impacts caused by historical excessive application of high concentration macronutrient NPK fertilizers, and the limited application of organic fertilizer, China is now paying greater attention to more balanced fertilization. This new focus is providing an ideal opportunity for development of the secondary nutrients fertilizer industry, which includes sulfur (S), magnesium (Mg) and calcium (Ca). There is a growing body of

evidence of the positive performance of polyhalite, within China and from other parts of the world, which needed to be brought together to facilitate a greater and deeper understanding.

Around 150 people from universities, research institutes and other professionals from China and overseas, as well as the main fertilizer dealers and some large farmers, attended the event along with the media. The performance of polyhalite, marketed in China as elsewhere in the world as Polysulphate, was illustrated in a wide range of target crops including grapes, tomato, potato, rice, banana, apple, pomelo, tea, rapeseed, strawberry, soybean, ginger, maize, tobacco, watermelon, hami melon, cherry, leaf vegetables, coffee, mango, citrus, sugarcane, and jackfruit. This evidence was supplemented with the latest results from polyhalite

trials in crops elsewhere in Asia, Europe and North and South America.

Symposium content

Eleven key speakers gave presentations about polyhalite research in China and other parts of the world illustrating the positive results in a wide range of crops and growing systems.

Typical Crop Responses to Polyhalite in Various Agro-Climatic Regions: A Global View

Hillel Magen, Director IPI, Switzerland

Since the discovery of the mineral polyhalite in Austria in 1818, the understanding of and respect for the commercial and practical uses of this natural fertilizer has widened and deepened. Hillel Magen explained the recent knowledge gained, including: Polyhalite's solubility and extended availability in the soil; the positive effect discovered with young rice seedlings in Brazil; and the positive residual effects on subsequent crops known as the "Poly effect" (where an incremental yield boost in soybeans of up to almost 20% has been reported from two years use of polyhalite). Polyhalite research is now underway in over 21 countries around the world and 38 crops.

Strengthening the Study of Secondary Nutrients and Promoting Scientific-Based Fertilization

Prof. Xinping Chen, China Agricultural University, China

The rising proportion of Chinese croplands with secondary or micro element deficiencies is having a serious impact on yield. With each decade the recommendation to farmers of what fertilizer to apply has evolved: 1980's-1990's the product recommendation was urea and DAP; 1990's-2000's the product recommendation was amended to include compound and formula fertilizer. Now new recommendations are needed to redress the shortage of micro nutrients and address the problems (soil acidification, water pollution and greenhouse gas emissions) from overuse of nitrogen (N) fertilizer in order to achieve sustainable intensification. New approaches are needed to improve N and P efficiency and achieve controlled-release nutrient supply of major and micro plant nutrients. Latest secondary/micro elements research is improving fertilizer targeting and use. From 2004-2013 China's fertilizer use increased by 27.5% meanwhile grain production increased by 28.2%, vegetable production increased by 33.5% and fruit production increased by 63.6%.

Sulfur Consumption in Chinese Agriculture: Situation and Outlook

Dr. Gao Xiangzhao Gao, National Agriculture Technology Extension Service Center, China

More than ten provinces in China report sulfur (S) deficiency in soils, and that S fertilizer can increase crop yields significantly. Sulfur dioxide (SO₂) emissions peaked in 2007, since when they have started to decline. However sulfur fertilizer use has not been based on crop requirement and soil S levels resulting

in over application, particularly in grain crops (rice and wheat). The recommendation from this research is to start nationwide research on soil S fertility and testing. Better forecasting of S demand would be possible as well as efforts to continue use of traditional S fertilizers in production regions and introduce new S fertilizer products for the regions with greatest deficiency and crop demand.

Effect of Calcium and Magnesium on Potato Tuber Yield, Quality and Disease Incidence in Inner Mongolia of China

Associate Prof. Liguojia, Inner Mongolia Agricultural University, China

Increase in potato productivity in the last twenty years is mainly attributed to NPK fertilizer application. However the importance of calcium and magnesium fertilizer for this crop had not been realized. Through trials of the effectiveness of polyhalite four-in-one fertilizer on potato crops, this study showed significant improvements in yield, starch content, plus elimination of common scab.

Effects of Polyhalite Application on Seed Yield, Nutrient Uptake and Seed Quality of Winter Oilseed Rape

Prof. Jianwei Lu, Huazhong Agricultural University, China

Two field experiments were designed. The first investigated the effects of polyhalite application compared with conventional (NPKB) fertilizer treatment on seed yield, nutrient uptake and seed quality of oilseed rape in Hubei province, central China. The second trial compared six polyhalite fertilizer application rates to determine the optimal rate. Polyhalite increased seed protein concentration and seed yield, but at the highest rate of application it depressed seed yield, demonstrating the need for understanding the correct application rate for the crop.

Improving the Growth and Yield of Crops in Europe and South America with Polyhalite

Eldad Sokolowski, IPI Coordinator for China

The importance of tailoring fertilizer combinations to suit crops was reported from trials in Brazil with onions (peak yield reached with 60% KCl and 40% Polysulphate); bananas (peak yield reached with 40% KCl and 60% Polysulphate); and cabbage (peak yield reached with 20% KCl and 80% Polysulphate). The effect of fertilizer placement in soybean showed MAP + MOP + Polysulphate applied in furrows is more effective compared to broadcast. Also in soybean, the relationship between root system, depth, Ca and Mg in soil, and yield were also correlated. From Argentina, strong response to sulfur was reported in wheat and maize. From France, the positive response of alfalfa to Polysulphate at 200 kg ha⁻¹ was illustrated. Finally, from Israel, the way that Polyhalite prevents Ca and Mg deficiencies in greenhouse tomatoes irrigated with desalinated water was reported.

The Nutrient Release Kinetics of Polyhalite and its Biological Effect on Tea Growth and Quality in China

Dr. Kang Ni, Tea Research Institute, Chinese Academy of Agricultural Sciences, China

As the largest tea producing country in the world, Chinese tea farmers are particularly interested in the 5% yield increase that results from magnesium (Mg) fertilization. That combined with the convenience, lower application costs and reduced harmful environmental effects are just some of the reasons for the increasing interest in application of Polysulphate for tea. An experiment was designed to investigate the advantage of using polyhalite compared with normal NPK compound fertilizer, and also whether the additional Ca in polyhalite might have an adverse effect on tea yield and quality. Laboratory leaching was compared with pot and field trials. The prolonged, slow release of nutrients was confirmed, nutrient leaching was reduced, young shoot biomass increased slightly, certain tea characteristics were improved and no adverse effect of higher Ca was shown on autumn tea quality.

Effects of Polyhalite Application on Honey Pomelo Yield and Quality in Fujian Province of China

Associate Prof. Liangquan Wu, Fujian Agriculture and Forestry University, China

Research in honey pomelo orchards, selected from the 80,000 hectares in Fujian province, showed significant problems such as severe soil acidification and symptoms of magnesium, calcium and sulfur deficiency. Polyhalite application was compared with existing fertilizer practice. Honey pomelo spring growth, yield, and fruit quality, as well as farmer income all improved with the use of polyhalite.

The Efficiency of Granular Polyhalite to Improve the Growth and Yield of Crops in Malaysia

Cheng Siang Seh, ICL Agronomist, Malaysia

Trials in watermelon comparing the use of compound fertilizer with the use of the same fertilizer plus polyhalite showed that the latter improved watermelon yield by 33%. Trials in chrysanthemum production showed adding polyhalite with compound fertilizer improved root development, leaf size, flower stem length and bloom. Trials in pineapple showed polyhalite led to a reduction in potassium deficiency symptoms, higher sugar content, better shelf life and 11% higher proportion of fruit classified as Grade A. In addition, a trial with paddy rice was reported which showed that using polyhalite with a conventional fertilizer resulted in bigger grains and a yield increase of 25%.

Effects of Polyhalite Application on Yield and Quality of Apple, Tomato and Maize in China

Ning Ma, WZF Agronomist, China
(Presentation available in Chinese.)



Symposium's field visit to a polyhalite hami-melon greenhouse trial.

Photo by IPI.

Summary of Effects of Polyhalite Application on Different Crops in China

Dr. Guohua Li, ICL Agronomist, China

The multi-nutrient, prolonged release, natural and effective nature of polyhalite, marketed as Polysulphate, was outlined, explaining the rising popularity of Polysulphate around the world. The relevance of Polysulphate to meet Chinese fertilizer requirements in different regions was explained, whether sandy soil with high rainfall, acid soil, saline soils or S deficient soils. Also the positive performance of Polysulphate in a wide range of sensitive agronomic situations was highlighted, including in Ca and Mg demanding crops (potato, citrus, grapes, roots and strawberries), chloride sensitive crops (tea, tobacco and greenhouse crops), oil crops, pasture and forage, N-fixing legumes and for organic crops. The full extent of the latest agronomic research on Polysulphate in China was demonstrated as well as examples of some of the dramatic improvements in yield and quality of a wide range of crops including bananas, grapes, tomatoes, cherries, strawberries, pak choi, melons, peppers, cabbage, chili and maize.

Extending the understanding of delegates on the current use and future potential of polyhalite in China

As part of the 1st IPI Symposium on Polyhalite in China, the attendees had the opportunity to see the results of using Polysulphate by visiting a hami melon farm. A field visit gave the opportunity to see polyhalite use in practice to share observations and comments with each other.

Further insight into the content of all the main presentations from the symposium is available on the IPI website at:

[Papers and Presentations](#)