



AquaBoost **AG**
SOIL MOISTURE SOLUTIONS

Nut Growers Guide

Benefits

Saves water, fertiliser, irrigation costs. Improves quality and yield. Reduces sodium levels and sodium uptake.

- Promotes the lateral spread of moisture through the soil
- Slows the movement of moisture through the soil profile
- Significantly improves fertiliser efficacy
- Enhances germination, plant health and yield
- Reduces irrigation frequency and improves water use efficiency
- Limits leaching losses of water and nutrients
- Reduces the impact of wet and dry extremes during the irrigation cycle
- Reduces evaporation from the soil
- Decreases mortality and transplant shock for young plants



How does it work?

AquaBoostAG contains specific anionic linear polymers that have been extensively studied for their soil enhancement properties.



Soil Structure Enhancement

The AquaBoostAG Polymers help form water stable aggregates by binding and stabilising soil particles together. Often cultivated soils contain unstable soil particles that disperse from aggregates when water is applied creating an unstable mixture of soil and water. The mobilised fine soil particles can then move into the small pores in the soil structural lattice, leading to soils with high bulk density. High bulk density soils inhibit water infiltration and root penetration. The anionic polymers used in AquaBoostAG have been proven to help form water stable soil aggregates that prevent the increase in bulk density when water is applied. Wallace and Wallace (1986a) reported a strong favourable effect on the physical properties of soils amended with these types of polymers, particularly with respect to infiltration and soil particle size.

Soil Erosion Reduction

The use of anionic polymers to stabilise soil particles in the presence of water improves soil infiltration, which in turn reduces irrigation/rainfall runoff. Surface water runoff carries with it soil particles that result in erosion, hence, by creating water-stable aggregates erosion is minimised. Jhurry (1998) reported that the treatment of soils in Lambang, Indonesia with the same anionic polymers reduced soil losses from rainfall from 17,000 kg/ha down to 4,000 kg/ha.

Soil Water Improvements

AquaBoost polymers improve soil physical properties and reduce surface water runoff. This leads to an increase in water infiltration to the root zone, allowing pores in the water-stabilised soil aggregates to fill and store more water. Additionally, polymer treated soils reduce evaporative soil water losses as

the polymer treated top layer of soil acts in a similar manner to mulch (Wallace and Terry, 1998).

Plant Root Improvements

The improvements in soil structure enable better penetration of plant roots, due to lower bulk densities that result in greater aeration, water percolation and root penetrability. Wallace and Wallace (1986b) reported an increase in seedling emergence and dry weights in soils with anionic polymer amendments.

References

Jhurry, D. Agricultural Polymers (1998). Second Annual Meeting of Agricultural Scientists. Wallace A., Wallace, G. A., (a) Effect of Polymeric Soil Conditioners on Emergence of Tomato Seedlings (1986). Soil Science, 141 (5), 321-323. Wallace A., Wallace, G. A., (b) Effects of Soil Conditioners on Emergence and Growth of Tomato, Cotton, and Lettuce Seedlings (1986). Soil Science, 141 (5), 313-316 Wallace, G. Handbook of Soil Conditioners: Substances that Enhance the Physical Properties of Soil (1998). Eds Wallace, A. and Terry, R., CRC Press, pg 526-527



Boost Production

Yield and Crop Quality Improvement

Improves:

- Fertiliser efficacy
- Nut yields
- Flowering and fruit set

Reduces:

- Irrigation water use
- Crop power use
- Plant sodium and chloride uptake
- Heat and frost stress

Saves water

AquaBoostAG changes the soil hydraulics and slows the infiltration of moisture through the soil. This change of action has been trial proven to benefit the grower with a 25% reduction in the amount of water normally applied to a crop.

Increased moisture availability

The wetting and drying cycle associated with normal irrigation patterns is reduced. The drying phase can cause stress to

developing nuts and increase soil sodium levels. AquaBoost keeps moisture available to the tree by creating a lateral spread thereby ensuring adequate water — especially during periods of extreme heat.

Reduced sodium and chloride uptake

AquaBoost has been repeatedly trial proven to significantly reduce the sodium and chloride intake by plants.

Improved fertiliser efficacy

The increased moisture being held in the root zone provides the crop extended access to water soluble nutrients. AquaBoost ensures nutrients are present during critical growth stages resulting in increased flowering and fruit set.

Reduces plant stress

By maintaining available moisture to the crop prior to expected periods of weather that could cause plant

stress (high temperatures, hot winds or frosts) such stress is significantly reduced. Applications before harvest will prevent stress from altered irrigation cycles.

AquaBoostAG is suitable for all irrigation systems including:

- Drip irrigation
- Centre pivot irrigation
- Boom spray
- Overhead / low throw sprinklers
- Flood furrow irrigation
- Sub-surface drip and tape
- For optimum results, BioCentral recommends that AquaBoostAG be used in conjunction with moisture monitoring equipment.

Energy savings

The reductions in water applied provide carry-over benefits in a reduction of energy required to irrigate. In hydrophobic sands the addition of AquaBoostAG to the initial “wet up” will reduce the number and frequency of irrigation cycles. This results in significant energy and

water savings to growers.

- AquaBoostAG products biodegrade naturally in the soil
- AquaBoostAG products demonstrate no systemic toxicity
- AquaBoostAG products are proven to promote microbial activity in the soil

Moisture monitoring

The use of moisture monitoring systems provides an indication of the movement of moisture through the soil profile and shows clearly that the use of AquaBoost in an irrigation regime will significantly slow the movement of moisture and reduce the leaching of nutrients.





Testimonial. Mr. Ian Mau. Mallee Orchards Pistachios. Conservation road, Peebinga S.A.

We are located in the South Australian Mallee, some 45 kms north of Pinnaroo and have typical soil-hydraulic issues such as Non-Wetting and highly free-draining sands.

We purchased the Orchard in 2006 in a run down state, the trees had been neglected and all the equipment was old and mostly unusable. We decided early on that our priority would be irrigation, including an efficient fertiliser injection system. After getting this equipment to a satisfactory standard we started looking for products that would condition our sand to enhance our watering profile.

After extensive trialling over 3 years ago, we now utilise a full-farm program of AquaBoostAG Liquid Soil Moisture Solutions with great success. Upon post-winter or pre-season irrigation applications of AG30NWS- Non-Wetting-Soils blend @ 5L/Ha the greatest impact visually is the vastly improved lateral spread of moisture, allowing all the dripper wetting patterns to join up giving us a full undercanopy moisture coverage. Our increased wetted-

area and vastly improved moisture retention has brought greatly improved irrigation scheduling efficiency and meant a full soil moisture profile is maintained through the Summer months allowing us leeway in case of irrigation failures or extreme weather events etc. AquaBoostAG30FB-Fulvic Blend is also fertigated @ 5L/Ha with liquid fertiliser throughout the growing season, which has demonstrated a greatly improved nutrient availability to the whole root system and greatly reduced leaching of valuable nutrients from our soil profile. Notable is the increase in uniformity and health of our Pistachio trees.

For the past three years we have enjoyed record yields and quality in our Pistachio crops and vastly improved tree health. At Mallee Orchard Pistachios we firmly believe that utilising both AquaBoostAG products has brought improvements to the efficiency of our irrigation and fertiliser inputs such that we can readily trust that our Irrigation and Fertiliser inputs to our trees are available and being used to the best effect.

Testimonial. Mr. Jim Pierson, A.J.S Pierson & Son Pty Ltd Almond Growers, Virginia.

We have successfully used AquaBoostAG for over 10 years and it is an important part of our Irrigation program. Year in and year out we apply AquaBoostAG in Multiple Doses @ 5L/Ha, principally in Mid-November and Mid-January.

The use of AquaBoostAG Liquids enables us to further tailor our irrigation events against extreme weather events, salinity, moisture retention and nutrient uptake issues. In a normal summer season our trees will take up approximately 8mm of water per day from the profile. Using of AquaBoostAG allows us to replenish and maintain moisture in the rootzone, reducing excess irrigation which introduces more salinity and creates excess drainage and leaching in the profile. With Moisture monitoring we are able quantify where AquaBoost is holding the moisture and we have been able to identify our soils as healthier and reduce irrigation inputs by at least 15-20%. In our situation, the introduction of AquaBoost and subsequent reductions in irrigation of saline water has increased our tree, crop and general soil



health. Reductions in pumping times and costs are an added bonus. In recent years we have changed to the AG30FB- Fulvic Polymer Blend, again dosed out at 5L/Ha, and seen a noticeable increase in nutrient uptake and retention of nutrients for the trees, which has resulted in increased plant health and yield/crop uniformity, all with less water and far better irrigation efficiency.

Simply speaking, multiple fertigation doses of AquaBoostAG @ 5L/Ha has given us a more even moisture level whereby we can irrigate pro-actively rather than reactively.



Provides a Scientific Option

Shaping The Future For Cost Efficient Crop Management Practices.



AquaBoostAG100 is a cross linked copolymer of acrylamide and potassium acrylate. It's performance characteristics include increasing soil and substrates water holding capacity over long periods of time.

AquaBoostAG100 granules are characterised by high absorbency and high gel strength. The granules consist of a set of polymeric chains that are parallel to each other and regularly linked to each other by cross linking agents thus forming a network. When water comes into contact with one of these chains, it is absorbed into the molecule structure by the process of osmosis.

AquaBoostAG100 is specifically formulated as a high performance water absorbing granule that when incorporated into the soil or substrate, absorbs and retains large quantities of water and nutrients. It therefore enhances plant growth by more readily making water and nutrients available to the plant in the root zone.

As a result of providing a more uniform moisture supply to plants, mortality rates are dramatically reduced

and a healthier root system developed.

AquaBoostAG100 has the ability to easily release the absorbed water and nutrients, thereby allowing the plant to have water and nutrients available at will as a function of the absorption release cycles.

AquaBoostAG100 remains in the soil profile awaiting another contact with moisture so that the process can be repeated for up to 3 to 5 years. As such it is ideal for no-till farming.

AquaBoostAG100 not only reduces irrigation frequency but it also has the ability to limit losses of nutrients due to leaching. It improves the soil structure by aeration (a result of the expansion/contraction cycle of the product).

The product is available in Coarse and Medium Granules to suit differing soil types. The medium granule for finer soils.

There is an AquaBoostAG formulation for every crop and soil type:

AG30 LIQUID Suitable for all crops and irrigation systems.

Recommended for all soils apart from Hydrophobic (non-wetting) – see NWS.

AG30 NWS NON WETTING SOILS Suitable for all crops and irrigation systems. Formulated to overcome hydrophobic (non-wetting) soils.

AG30 FB FULVIC BLEND Suitable for all crops and irrigation systems. Fulvic acid improves drought resistance, frees up potassium and provides a stimulus to plant growth.

Product	Rate	Application	Comments
AG30	5L/Ha	New tree planting (see Tree Planting with AquaBoostAG Technical Fact Sheet), first season irrigation, prior to fruit set, post-harvest. Apply again as required or before heat or frost events.	The application programs for AquaBoostAG are indicative of the critical timings for crop water requirements. They can be adjusted to suit individual production system requirements. Use freely at any time you require increased fertiliser efficacy and water holding capacity. AquaBoostAG can be introduced to "harvest" rainfall during dry winters. AquaBoostAG can be introduced prior to periods of extreme heat to minimize plant heat stress. AquaBoostAG has been trial proven to reduce plant sodium uptake. AquaBoostAG slows the leaching of water and nutrients by promoting the lateral movement of moisture through the soil.
AG30NWS			
AG30FB			





Nursery Application

AquaBoostAG can be incorporated into all stages of tree nursery growth.

Water seedlings with AquaBoostAG Fulvic Blend for even moisture spread through the medium and promote root growth.

Moisten soil with AquaBoostAG prior to potting to ensure even moisture and eliminate dry spots.

Once the tree is bagged, maintain even moisture by using AquaBoostAG Fulvic Blend and ensure a healthy tree delivered to the grower.





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