Winter 2016

In this edition

BioAg COUNTRY

BioAg's South Australian Area Manager Phil Toy with AgFert's Derryn Stringer.

HUGE BOOST from biostimulants in Balaklava area

As published in the Plains Producer, Wednesday 17 February 2016

Biostimulants that promote a balanced release of nutrients with the added stimulus of soil microbes have demonstrated they have a role in agricultural production in the Balaklava district.

Following demonstrations of economic gains in cereals, Derryn Stringer of Agfert fertilizers this year encouraged a prominent producer to try Balance & Grow on his oaten hay paddocks.

"Any difference, I thought, would be easily seen in the number of bales cut (comparing areas sprayed with Balance & Grow and areas not sprayed.)" Derryn said.

"The results were obvious, with several more bales cut from each run and a big return on the investment made. He is convinced of the value and considering expanding the practice to his meadow hay."

Using Balance & Grow on a 20-hectare section of oaten hay resulted in an extra 280 small bales and taking in the cost of single application there was a six-fold return on the investment.

While counting the number of bales is a convincing measurement of the difference made by this biostimulant, visual observations included more robust plants and longer lasting active growth, with greenness taking longer to fade at the end of the season.

Balance & Grow was applied at 2 litres/hectare at early tillering on the property, which has an even soil type (sandy loam) and good weed control.

While the fertiliser background on the property in question is based mainly on DAP with 1 percent added Zinc, another consideration for the future will be use of BioAgPhos, with high quality reactive rock phosphate that releases phosphorus more slowly.

BioAg's Phil Toy says this example builds on a four-year background of independent local research and commercial adoption of BioAg biostimulants. Soil & Seed, for example, applied at sowing for cereal crops and at the establishment stage for pastures can provide much needed nutrients with added stimulus from soil microbes" he said.

"Balance & Grow and Fruit & Balance, similarly based on liquid cultures, are applied during the growing season to promote vegetative growth as well as grain development."

An independent evaluation of BioAg products alongside other options, carried out by Agrisearch Services stated: "The mild tillering application of Balance & Grow (in trials of wheat) provided the greatest improvement in crop yield."

In this trial 3L/ha of Soil & Seed was applied at pre-sowing and the mid tillering application of Balance & Grow was at 2L/ha.

All treatments being compared were against a background of district practice of 60kg/ha of urea and 50kg/ha of DAP for wheat.

Apart from increasing yields, Hart trials 2013 have shown a lift in protein in wheat from 10.5 to 12.8.

When early adopters demonstrated that research results could be replicated on a commercial basis, other cereal producers followed.

Now the success is being transferred to another important sector of the district's cropping economy, namely hay production.

Oaten and meadow hay are produced for local and export markets.

Growing winter feed with Balance & Grow

Building a winter feed wedge provides feed for winter consumption, and avoids soil damage from over-grazing, and potentially reducing supplemental feeding

Winter temperatures can cause pasture growth rates to drop to vey low levels (0-15 kg DM/ha/day)

Long-term phosphate trials have shown its positive effect on winter production[3]

1 kg P/ha grew 1.7 t DM/ha

15 kg P/ha grew 2.8 t DM/ha

Balance & Grow with nitrogen and gibberellic acid are "get out of jail" cards when short of winter feed

The winter feed-gap

Generally, temperature has the greatest negative impact on winter growth. Growth rates can drop to very low levels (0–15 kg DM/ha/day), and may be insufficient to meet stock demand. This is known as the winter-feed gap.

Winter pasture management strategy

- keep pastures in the Phase II growth phase (capturing more sunlight/assists photosynthesis and regrowth
- increase winter active species
- consider reducing feed demand (stocking rates)
- develop a feed wedge for winter feed

Developing the winter feed wedge

Building a feed-wedge refers to growing excess pasture during late summer/autumn, delivering a bank of feed for winter consumption. This preserves feed on paddocks that may otherwise be grazed out, minimising soil damage and supplementary feed requirements.

Phosphorus

Winter pasture growth can be significantly improved through improving soil fertility. Phosphorus is a critical component of fertilie soils and adequate amounts can also improve applied nitrogen responses[1].

Fertilisers such as BioAgPhos provide sustained release[2], enabling either annual or biennial (every second year) application.

Long-term phosphate trials have shown its positive effects on winter dry matter production[3]:

- *1 kg P/ha grew 1.6 t DM/ha in winter (Olsen P 5 mg/kg)*
- *15 kg P/year grew 2.8 t DM/ha in winter (Olsen P 13 mg/kg)*

Winter pasture trials

BioAg will be running a series of trials this winter incorporating Balance & Grow, nitrogen & gibberellic acid combinations. We will be investigating effects on forage production, and how to improve pasture quality (energy & protein). We will publish the results upon the trials completion.

Balance & Grow

Balance & Grow with nitrogen and gibberellic acid are get out of jail cards when caught short of winter feed.

This combination supplies the nitrogen required by pastures during winter, and supplies the plant's requirements to convert nitrogen into true plant proteins (vitamins, minerals, proteins, amino acids, carbohydrates and plant hormones).

Balance & Grow is best applied to green leaf just after a grazing has finished and can be mixed with gibberellic acid and foliar nitrogen fertilisers in a single application.

Whilst BioAg programs are tailored to suit each grower, the basis of the program is Balance & Grow and UAN (UAN is interchangeable with calcium nitrate if calcium levels are low).

Balance & Grow Organic is certified for use by organic growers.

Nitrogen (urea, sulphate of ammonia, Easy N (UAN), calcium nitrate)

Balance & Grow is compatible with foliar nitrogen fertilisers, so can be applied as a single application.

Nitrogen is best applied immediately after stock have been removed from the paddock.

Soil temperature, soil moisture, soil fertility and species composition all impact on the pasture responses to applied nitrogen.

In winter, a north facing slope can be 2°C warmer than a south facing slope. Applying nitrogen to north facing slopes in July and south facing slopes in August (as temperatures begin to warm) can give a greater growth response than applying nitrogen to both areas at the same time.

If pasture is moisture stressed (too dry or too wet), the response to nitrogen will be restricted. The greatest response to nitrogen fertiliser is seen in annual grasses, followed by short rotation grasses, then perennial grasses.

If other nutrients (e.g. phosphorus[1], potassium) are limiting growth, the response to nitrogen could also be reduced.

Contact a BioAg Area Sales Agronomist for application details.

Gibberellic Acid (Pro Gibb, Gala, Ryz-Up)

Gibberellic acid is a naturally occurring plant hormone that stimulates growth through cell expansion. In grasses, this results in stem and leaf elongation. Its production naturally slows during colder months.

Applying gibberellic acid mixed with Balance & Grow in colder winter months stimulates the plant and can improve the quantity of feed on offer. The rapid growth is often lighter (yellow) in colour for the first couple of weeks after application, which does not affect the quality of the feed on offer.

Growth stimulation is usually seen within seven days of application.

A BioAg Area Sales Agronomist can provide further details on its application, use with a rotational grazing program, frequency of use, expected responses from various pasture types, and optimal period of use.

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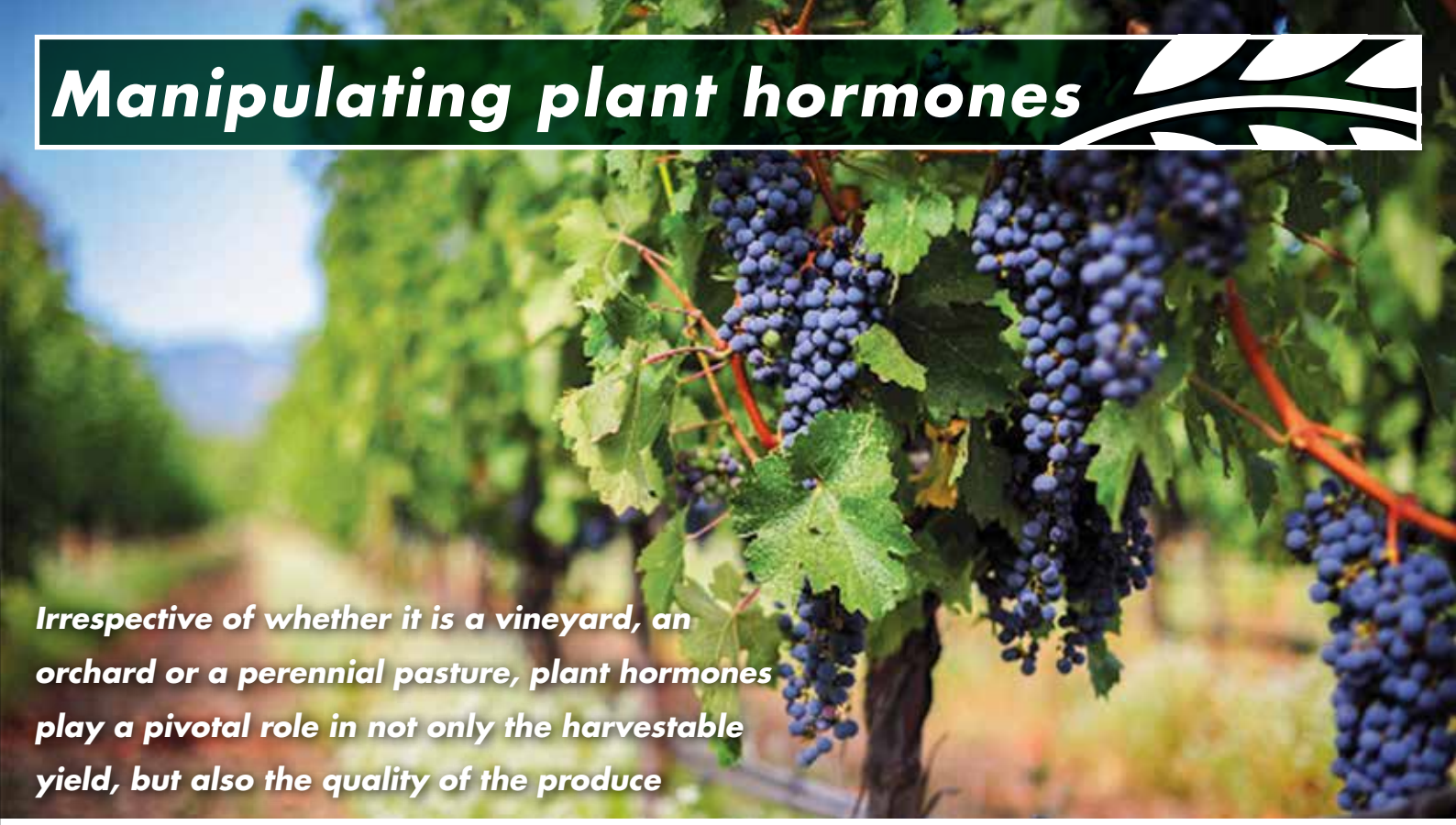
Manipulating plant hormones



Irrespective of whether it is a vineyard, an orchard or a perennial pasture, plant hormones play a pivotal role in not only the harvestable yield, but also the quality of the produce

- Hormones in plants affect the plants functions, such as growth and reproduction
- Manipulating plant hormones through application of synthetic products can provide short terms gains, but there are repercussions
- Vary the biostimulant foliar applied between the vegetative growth stage and physiological maturity stage

A hormone is a chemical compound that affects the ways in which an organism functions. They work by coming in contact with target cells, and causing the organism to respond in various ways to chemical signals.

In plants, hormones are divided into five categories: auxins, cytokinins, gibberellins, abscisic acid and ethylene, and usually work by influencing;

- cell differentiation
- elongation
- division
- reproduction, and
- germination

Understanding the roles of plant hormones, how they can be manipulated, and how our management practices impact the equilibrium between the hormones has become very important for horticultural production.

Auxins

The primary function of the auxin hormone is to elongate plant cells. For instance, auxins are the hormones responsible for phototropism, the growth of a plant toward the light or apical dominance.

Auxins are also responsible for root development, inhibition of lateral branching and fruit development.

Cytokinins

The cytokinin hormone promotes cell division and tissue growth, and is regulated by the presence of auxins to determine the extent of their activity.

When the ratio of cytokinins to auxins is higher, stem and leaf growth is stimulated. When, on the other hand, the ratio of cytokinins to auxins is lower, root growth is stimulated instead.

The balance between these hormones ensures that the plant invests in both root and shoot growth equally.

Gibberellins

Gibberellins stimulate growth, especially elongation of the stem, and can also end the dormancy period of seeds and buds by encouraging germination. Additionally, gibberellins play a role in root growth and differentiation, and produce an enzyme that promotes the conversion of an embryo's starchy food supply into utilisable sugars.

Synthetically produced gibberellins have been used to increase dry matter production in pastures, stretch berries in seedless table grape varieties, and increase fruit size in citrus.

Abscisic Acid

Abscisic acid reduces growth and maintains the period of dormancy in seeds and buds. It causes the guard cells of the stomata to close when the plant is losing too much water, slowing the evapotranspiration of the plant.

Ethylene

Ethylene is best known for controlling the ripening of fruits. It also contributes to the senescence (aging) of plants by promoting leaf loss (termed leaf abscission) and other changes.

Why is hormone management important?

The hormonal balance within all plants changes throughout its growth cycle.

Auxins, cytokinins and gibberellins are dominant during the vegetative growth cycle, whereas abscisic acid and ethylene levels tend to increase only during the ripening phase.

This is based on the assumption of adequate plant health and nutrient balance, which unfortunately is not always the case.

For example if a water stress event occurs prior to the ripening phase of production, a spike in ethylene production can occur causing a fruit drop through the formation of a abscission layer.

Conversely, the stimulation of both auxins and gibberellins through nitrogen applications during the ripening phase can reduce the plant levels of ethylene and thus slow the ripening process.

The initial understanding of most biostimulants was that they contained natural plant hormones like auxins and cytokinins, as there was a visual plant response (of cell division and elongation/increase in dry matter) following application.

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New Agronomy and Sales Manager for *SOUTHWEST NSW*

To those of you in the southwest of NSW, including the Riverina/MIA we would like to introduce Robert Gill who started with BioAg in late May.

Robert comes to BioAg with two decades worth of experience in both commercial agronomy and territory sales management of coarse broadacre seed and nutritional products.

Robert is a Wagga Ag College 'old boy' who majored in entomology and agronomy in his Honours undergraduate degree.

A decade of commercial agronomy in western NSW on dryland and the lower reaches of the Murrumbidgee and Edward Rivers (between Balranald, Kyalite and Moulamein) gave Rob broad experience in crop and pasture production.

In the late 90's and early 2000's, Rob's role included extensive experience with horticultural blocks with vines, nuts, and fruit and vegetable crops, which were booming around Swan Hill, Tooleybuc and Barham.

Whilst managing rural merchandise locations in Hay & Balranald, Rob met Carrathool-lass Jayne, and a family began. After re-location to Darlington Point (and via several small schools in the Riverina), Jayne is now Principal of Leeton Public School, while their son Thomas is doing his secondary studies at Hurlstone Ag selective High School in western Sydney.

Cotton, maize and rice crop agronomy in the fields of the MIA and CIA developed Rob's agronomic acumen in summer irrigated cropping, keeping him busy year-round improving water use efficiencies with a greater understanding of soil and plant nutrition relationships.

Rob can often be found after work in summer on the Leeton Golf Course with their Twilight Golf team, or toiling with volunteers in Apex 40's. He's a passionate Geelong Football Club member and enjoys days at home with family and friends.

Agronomy and Sales Manager (southwest NSW)

Robert Gill

BAppSc (Agriculture) Hons. Charles Sturt University.

Riverina Graduate Certificate in Cotton Production Systems (ongoing), University of New England.

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It is now understood that the response observed in the crop is an elicited natural response from the plant by a stimulation or up-regulation of normal metabolic processes.

The plant is always better than us agricultural advisors and primary producers at knowing and maintaining its own hormonal balance.

How do we manage hormones?

Understanding the plants desire to maintain hormonal balance helps us recognise why production issues are observed following the application of synthetic plant hormones e.g. a decrease in bud fruitfulness following excessive gibberellin applications, or fruit softening post an ethylene application.

Irrespective of whether it is a vineyard, an orchard or a perennial pasture, plant hormones play a pivotal role in not only the harvestable yield, but also the quality of the produce.

Manipulating plant hormones through application of synthetic products may provide short terms gains, but there will always be repercussions or consequences.

Allowing plants to maintain their own hormone equilibrium, through balanced nutrition and foliar application of biostimulants, is always going to minimise issues like bi-annual bearing and poor bud fruitfulness, when compared to the alternative.

During the vegetative growth period, when auxin, cytokinin and gibberellin production is regulating the vegetative growth of the plant, Balance & Grow® is incorporated into BioAg programs to stimulate the natural production of these hormones, as well as provide the necessary carbohydrates that the plant will require to maintain the balance between the hormones.

Conversely, the inclusion of Fruit & Balance® during the ripening period enhances the natural production of ethylene, boosting the plant's capacity to reach physiological maturity.

By varying the raw ingredients (e.g. seaweed extract) and developing a unique amino acid profile for each of these products, we are able to achieve these different outcomes.

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References

[1]Data from a cutting trial at Ellinbank indicated that responses to nitrogen are limited at soil phosphorus levels below 14 mg/kg Olsen P.

[2]The Role of RPR Fertiliser in Aust. (Tas.) CSIRO Publishing, 1997.

[3]Hamilton Long-Term Phosphate Experiment.

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