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**AVONDALE GOLF
CLUB
PYMBLE NSW
AUSTRALIA**

ecoAGRA
Turf Trial

**PROJECT
REPORT**

2021

eco  *agra*

**EXCLUSIVE
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Avondale Golf Club – ecoAgra Trial

Trial Location

Avondale Golf Club, Pymble, NSW <https://www.avondalegolfclub.com.au/>

1. Introduction

The root system of turf has two main jobs – to provide the turf foliage with all the nutrients it requires & to source water the plant requires to survive.

The stronger the root system is the more resilient the plant is, which in turn will establish a higher threshold against pest attack, and the faster the recovery will be when attack does take place.

There are always areas at a turf facility that come under heavy usage and when there is a good root system present to anchor the turf the sustainability of the turf is always far better with greater ability to recover.

In Australia we often face water shortage issues whereby turf surfaces can dry out excessively, a good root system present will assist in stabilising the soil until the next application of irrigation or rainfall, in this situation if there is a shallow root system present, large divoting would occur and the integrity of the surface would not be maintained.

In any turf situation the root system is the key in supporting the growth of healthy turf, and for providing the turf with the ability to deal with all the stresses that it encounters on a day to day basis. Based on this, a simple conclusion can be made.

“Any turf surface that has a deep and vigorous root system will have very little problems”¹

¹ Ref <https://turfmate.com.au/developing-and-maintaining-a-turf-root-system/>

2. Aim of the Experiment

The aim of the experiment is to investigate if the application of ecoAgra eA300, a plant bio-stimulant, improves the root growth, and the general health of turf in Australian conditions. More expansive roots require less water, adding conservation to the many benefits this technology can provide. ecoAgra™ is 100% formulated from plants and can be mixed with fertiliser or used alone.

ecoAgra eA300 is being used in countries around the world for various applications, and Avondale Golf Club agreed to be the first location in Australia to trial the product on Australian turf.

This series of trials aim to verify the effectiveness of eA300 treatments on Australian turf for golf courses, parks, and stadiums.

The targeted outcome is as followed:

- **Improved quality of grass**
- **Improved Root Mass & Growth**

3. Description of Trial Site

Site Type:	Golf course
Varieties:	Bent Grass
Soil Types:	Sand
Climate:	Temperate
Aspect:	Northwest
Irrigation Method:	Central Sprinklers
Application Method:	Hand held spray
Season:	Summer



4. Trial Protocol Outline: Bent Grass

Design & Layout

Trial Type	Strip Field - Randomisation
Experimental Unit & Size of each	1 metre wide x 20 metres long
Number of replicates	3 Replicates, 1 control.

Visual of Location



5. Study Design

The treatment comprised 3 x Experimental treatment groups and 1 x Control group

Dilution rate for ecoAgra eA300 for experimental groups:

1-part ecoAgra to 300 parts water

Trial Design - Turf

Randomised Strip Trial: 5 Meters x 20 Meters

Number of strips : 3 Trial Strips + 1 Control



The turf in the experimental groups was sprayed with 1, 2 or 4 applications of ecoAgra eA300 as per the table below. The control group was watered as per usual practice.

	Number of treatments	Application	Frequency	Group
Strip 1	1	eA300	Fortnightly	Treatment 1
Strip 2	2	eA300	Fortnightly	Treatment 2
Strip 3	4	eA300	Fortnightly	Treatment 3
Strip 4	1	Water	Fortnightly	Control

6. Assessment Criteria

A log of activity was maintained to record details during the trials. Initial core samples were taken from each of the 4 strips, to form a baseline calculation to assess the effectiveness of ecoAgra over the trial period of 8 weeks. The principal measurement was root mass as this is the major predictor for turf health.

The accumulation of the pre and post application results provides sufficient evidence to demonstrate the benefits of ecoAgra eA300 in turf applications.

7. Trial Process

Avondale Golf Course allocated 4 strips of turf on their practice green for the experiment.

Each strip measured 1 metre wide and 20 metres long. Each fortnight during the trial, a core/plug was taken from the (4) control strips. The purpose of the taking the core/plugs was to measure the dry root mass growth during the experiment. Core/plug samples were laboratory tested at the beginning and end of the trial period only.

After the core samples were taken, ecoAgra was applied to the strips in accordance with the trial protocols.

NATA accredited laboratory SESL Australia environment and soil sciences were engaged to measure the root mass (dry weight) for each collection sample.

8. The Results

The table below shows the root mass results from the control strip and 3 experimental strips at the beginning and end of the trial period.

Avondale Golf Club - ecoAgra trial Root Mass comparison

Treatment	Weight (g) 30/11/20	Weight (g) 25/01/2021	Growth (g) 30/11 to 25/1	Growth (%) 30/11 to 25/1	Growth (%) 30/11 to 25/1 minus control
Control	0.44	0.57	0.13	22.8	
1 x Application	0.56	0.84	0.28	33.3	10.5
2 x Applications	0.42	0.52	0.10	19.2	-3.6
4 x Applications	0.36	0.83	0.47	56.6	33.8

9. Observations noted by SESL Australia

1. Based on the visual observation and pH the product has surfactant properties and would be classed as a bio stimulant
2. The root mass analysis shows difference in growth from application areas when compared to the control.
3. The 2 applications treatment shows a lower growth % than the control and other treatments, however this may be considered as an error within the test (all tests have limitations)
4. Simply put, two out of the three treatments show significant increase in root mass growth and product efficacy – based on tested one core from area (controls and treatment)

10. Discussion

EcoAgra eA300 has been used successfully around the world, in crops, vegetables, small greens, fruit, horticulture and hemp. It was unknown if ecoAgra would work in a turf environment under Australian conditions.

University and field trials have conducted in different climactic conditions around the world where the efficacy of ecoAgra has been tested on crops, vegetables, fruit and hemp. The conclusion from some of these trials is shared in this discussion.

a. Potato Test eA300, Les Pommes De Terre Du Temis, Temiskaming, Quebec, Canada, 2016

- Seed potatoes were sprayed with ecoAgra eA300 at the same rate 1-part ecoAgra to 300 parts water as the Avondale turf trial. Second treatment was applied at the 3-5 leaf foliar stage.
- Fertiliser use was decreased by 20%
- 10 tests, potato average weight gain was 25.16%

b. Rice Test eA300, Tumbon TungKok, Ampur Songpeenong, Supanburi Province, Thailand, conducted by Project Field Co, Ltd, 2014

Harvest yield Results – measured against control - (55 days after 1st treatment)

- 17.1% increase in number of grains per panicle
- 29.3% increase in weight of grain

c. Zucchini Test eA300, Gaxbar, S.A. DE C.V. Prepared by Professor Ing. Oscar Fernandez, Universidad Autonoma Chapingo , 2015

Evaluation of the treatments of ecoAgra eA300 on Zucchini from seed to production during the 10-week crop cycle. Applied at the rate of 1 part eA300 to 300 parts water.

- ecoAgra produced a reduction in days to flowering and days to fructification
- ecoAgra produced increase in root length, fruit by plant, and fruit yield

The trial found:

- The application of ecoAgra was significant in determining the quality of the fruit, with respect to weight of fruit, and the diameter and length of fruit.
- Based on the results achieved a dose of 1part ecoAgra to 300parts of water is recommended.
- The dose of 1part ecoAgra to 300parts of water did not cause phytotoxicity effect in the Zucchini (i.e delay of seed germination, inhibition of plant growth or any adverse effect on plants or growing conditions)

d. Strawberry Test eA300 Horticulture Innovation Lab, Sher-e- Bangla Agricultural University, Dhaka, Bangladesh, 2020.

Experiment: Influence of ecoAgra on growth, yield and quality of strawberry production.

Examination of the following variables:

- Growth: Plant height, Number of leaves, SPAD value
- Yield: Number of fruit, yield per plant and yield increase percentages (calculation)
- Fruit condition: Fruit length, Fruit breadth, single fruit weight, Brix percentages

The experiment was conducted using randomised block design with 3 replications to evaluate the efficacy of ecoAgra diluted with 300 parts water, diluted with 600 parts water and no ecoAgra (water only). A total of 60 strawberry plants were used (20 plants for each treatment). During per application, 3 litres of water was used per 20 plants.

Result: 60 days after treatment ecoAgra had increased fruit size and weight and increased sugar percentages. Best results were achieved with ecoAgra diluted to 300 parts water with yield 26% higher than control.

Recommendation: Application of ecoAgra diluted to 300 parts water applied more than 4 times is the best application to increase strawberry production. To increase the fruit size and brix value, 2 applications should be administered during the fruiting stage.

e. Efficacy of ecoAgra on Golden Purna variety Cherry Tomatoes Test eA300 Horticulture Innovation Lab, Sher-e- Bangla Agricultural University, Dhaka, Bangladesh, 2020.

Examination of the following Variables:

- Growth: Plant height, Number of leaves, SPAD value (chlorophyll content)
- Yield: Flower count, Fruit count, Fruit length, fruit diameter, fruit weight, yield/plant and yield/hectare
- Quality: Brix percentages, % of increase fruit weight over control

The experiment was conducted using randomised block design with 3 replications to evaluate the efficacy of ecoAgra diluted with 300 parts water, diluted with 600 parts water and no ecoAgra (water only). A total of 60 cherry tomato seedlings were used (20 plants per treatment group). Fertilisers were applied following as Bangladesh agricultural research council (BARI).

Result: Both experimental groups, ecoAgra diluted with 300 parts water and diluted with 600 parts water observed increased size, fruit length, diameter, weight and brix value than the control group (water only).

Yields in the 600 part dilution group were 45% higher than control, and an increase of 90% was recorded in the group with ecoAgra diluted by 300 parts. It was concluded that ecoAgra boosts plant growth (height), promotes fruit quality (weight, increases yield and acts as stimulator to increase sugar).

Conclusion

1. ecoAgra eA300 diluted one part to 300 parts water on various fruits and vegetables in different climactic regions and conditions, all resulted in increased plant growth, root mass and yields.
2. In turf in Australian conditions, 4 x application of ecoAgra eA300 produced a 33.8% increase in root mass growth over the control group.
3. Increased root mass growth results in less fertiliser use which was demonstrated in the potato trial in Canada which decreased fertiliser use by 25%.
4. Based on visual observation we can conclude application of ecoAgra eA300 to turf resulted in an overall improvement in overall turf health, a deeper green turf colour and density without an incidence of disease.
5. Results from the Australian turf trial concur with results in international locations and demonstrates that ecoAgra eA300 diluted to 300 parts water increases plant health, root mass and yield.
6. Plants with stronger roots use less water and require less fertiliser.
7. Results from international trials and the Australian turf trial were consistent. It is concluded that ecoAgra is suitable for improving overall turf health in Australian conditions.
8. ecoAgra application has potential to significantly decrease water usage and fertiliser application.