



EMPIRE™ ZOYSIA

Zoysia japonica 'SS500' [®]

SUMMARISED RESEARCH, INSTALLATION AND CARE GUIDE

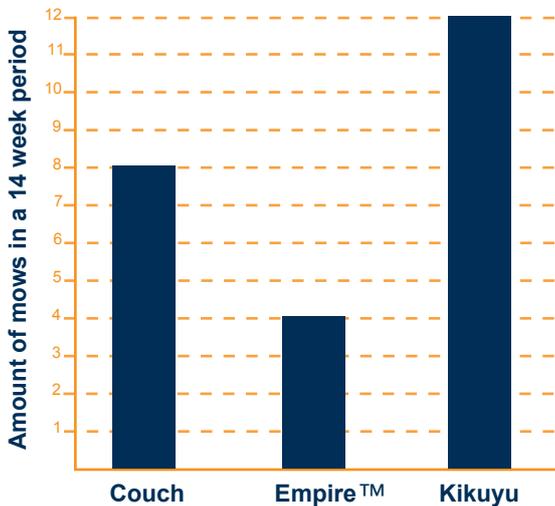
LESS MOWING

Pigs flying seems impossible, so does Empire™ turf needing half the mowing of Kikuyu and half the mowing of Couch. The pigs may not be able to fly, but Empire™ Zoysia has been proven in research to need one third to half the mowing. Research by Ian Paananen (Australia).

For more info: www.empireturf.com.au/empire-turf-research2.html



Average Mowing Frequency for Spring/Summer 2005



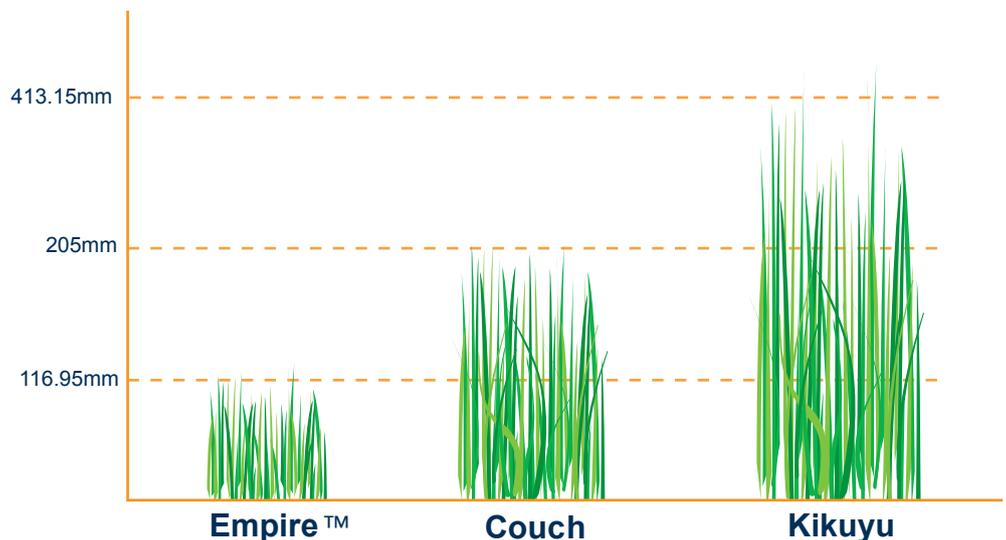
MOWING COSTS

Australian research shows that Empire™ Zoysia needs a lot less mowing than other turf types. This cuts costs dramatically if you are hiring a mowing contractor, paying staff or doing it yourself. It also reduces carbon emissions from mowers. Even for a house, research has shown that you can save \$1,055.60 using Empire™ turf instead of Kikuyu and \$609.60 using Empire™ Zoysia instead of Couch. For commercial lawns, imagine the saving!

NOTE: Empire™ turf also needs significantly less mowing than Buffalo types.
For more info go to www.empireturf.com.au/empire-turf-research2.html

EMPIRE™ ZOYSIA REMAINS SHORT WHEN UNMOWN

After being left for 20 weeks without mowing, Empire™ turf only grew to 116.95mm compared to Kikuyu which grew to 413.15mm and Couch 205mm. Empire™ Zoysia looked far better as it does not get too untidy. Shademaster Buffalo grew on average to 160.9mm.



For more info go to www.ozbreed.com.au/research-papers/3yr-no-mowing-results.html

LESS EDGING DROUGHT TOLERANCE

Empire™ turf requires less edging than Couch, Kikuyu and Buffalo. It is the safer choice around gardens. In fact, Kikuyu and Couch need 10 times more edging.

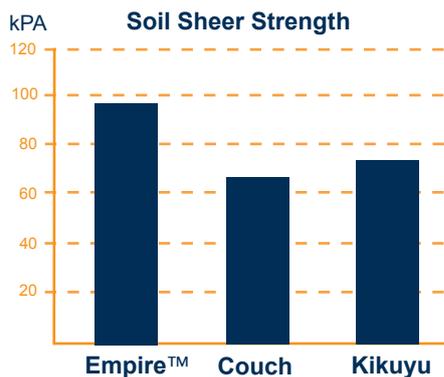
NOTE: Based on actual edging practices.

In the largest drought study on turf in the world, of all the varieties available in Australia only a few Couch varieties and Empire™ Zoysia were approved as drought tolerant enough. No Buffalo types in Australia made it.

The study was conducted in a desert type area of the USA (see www.ozbreed.com.au/download/Saws.pdf).

Another study by the University of Florida also shows Empire™ turf has good recovery from drought (see www.ozbreed.com.au/download/UniFloridaEmpire.pdf).

GREAT FOR SLOPES



Empire™ Zoysia is the best turf for strengthening soil which means it's a safer choice for steep slopes and retaining wall areas. Empire™ Zoysia strengthens the soil significantly, at a rate of 97.9 kPA, considerably more than Couch at 68.1 kPA and Kikuyu at 72.4 kPA. Kilopascals (kPA) measure the strength of soil by shear strength.

From Australian study. For more info:

www.ozbreed.com.au/research-papers/erosion-research.html



PEST & DISEASE RESISTANCE lawn grub resistant - less pesticides

University research proves Zoysia is resistant to Army Worm and Web Worm. It is also less damaged by Black Beetle. Mealy bug, as with some other turf types, has caused some problems, but it is easily fixed and mainly causes problems in the more humid areas of Australia. Empire™ turf has had no major disease problems.

For more info and new info: www.empireturf.com.au/pdf/EmpireTurf24pg.pdf

HERBICIDE TOLERANCE LESS FERTILISER

Most weeds can be easily removed from Empire™ turf by use of selective herbicide (see label). A recent study showed remarkable resistance to some herbicides. Kikuyu can even be selectively sprayed out by professionals.

More info: www.ozbreed.com.au/download/ElevatedRatesofHerbicidesEMPIRE.pdf

Empire needs less fertiliser to maintain acceptable quality. Research from the University of Florida.

More info: www.ozbreed.com.au/download/UniFloridaEmpire.pdf

CARE AND INSTALLATION GUIDE

SOIL PREPARATION Why is Good Soil Important

The benefits of proper and complete soil preparation are:

- Improved uniformity
- Increased density
- Faster recovery from wear
- Reduced use of water, fertiliser and chemicals
- Reduced maintenance

For optimum growth, turf needs just four things (in the proper balance) to grow...sunlight, air, water and nutrients. Reduce any of these, or provide too much of any one, and the grass may die or simply suffer. In the right proportions, the grass will flourish, providing not only beauty to the landscape, but also a clean and safe place to play and many benefits to the environment.

Grass obtains three of these four essential factors (air, water and nutrients) from the soil, but many soils are less than ideal for growing grass. Some soils contain too much clay

and may be very compacted... great for roads, bad for grass, because air and water aren't available to the roots and the roots can't grow. Other soils may have too much sand... beautiful on a beach, but difficult to grow grass because water and nutrients won't stay in the root zone long enough for the plant to use. Another frequently observed problem with many soils is that its pH (the degree of acidity or alkalinity) is too high or too low for optimum grass growth.

What is the Best Soil for Empire™ Turf?

Loams, sandy loams and loamy sands, with a pH of 6.0 to 7.0 are the very best soils for producing a beautiful, high-use, low-maintenance Empire™ lawn.

How Deep Should the Soil Be?

The absolute minimum soil depth for a care-free lawn is 10 cm; however, for deeper root penetration and the benefits that brings, the accepted standard is 15 cm.

Can Soils Be Improved?

Not only can most soils be improved, they usually need to be improved to obtain the maximum results with only a minimum of other on-going effort.

The knowledge of what is necessary, the amount and availability of materials and the costs of time and money are the factors that typically deter people from taking necessary steps to improving soil. While some do not fully understand the importance of good soils, many also believe they can save time and money by ignoring the need to improve soil.

The fact is that failing to improve soil before planting is only inviting a much greater and continual investment of both time and money that will never return its value as fully as preparing the soil properly before planting any grass.

INSTALLATION

Empire prefers to be installed when the weather is not too cold. It is best to avoid laying Empire™ turf in the following months in certain regions:

- Avoid laying 15th March - 15th September: ACT (Including similar climates such as Bathurst, Armidale and Ballarat)
- Avoid laying 25th April - 25th August: Victoria, SA, WA
- Avoid laying 15th May - 15th August: Sydney
- Empire can be laid anytime of the year in Brisbane and north QLD.

This is the same for all Zoysia types. It can actually be laid in the cooler months in Sydney provided the turf is kept moist until it roots out, but as it takes up to 7 weeks to root out in winter, we feel it is best to wait for warmer weather. In warmer weather it will establish relatively quickly. In early spring or autumn it may take a week longer than other turf types to establish, but what's a week compared to a life-time of low maintenance?

How to Install

1. Remove all building waste & weeds
2. Spread a free draining soil to a depth of 7-15cm (roots can penetrate much deeper) or loosen ground and mix in appropriate soil conditioners. Phone your supplier for more advice on this option. For sandy soils, simply mix in organic material and rotary hoe.
3. Level the surface using a screeding board, lawn leveller or similar device.

4. In hot months, moisten the soil but do not make the soil too wet. Do not lay turf on hot, dry soil.

5. Lay turf as soon as possible after delivery.

6. On hot days, lay a section of turf and lightly water. Repeat until all turf is laid. On cool days, turf can be laid all at once. Roll and water thoroughly within one hour of laying turf.

7. Water thoroughly for 7-10 days or until turf is established. Take care that the water is saturating the soil beneath the turf. In colder months, the turf will take longer to establish. The turf should not dry out until roots are established.

8. When the soil has firmed and the Empire™ Zoysia has rooted down, usually 2-3 weeks after laying (longer during winter), mow lightly to tidy up the lawn.

9. It's important to use of a slow release fertiliser one month after laying (applying fertiliser before this time has shown not to make a difference to lawn establishment).

Installing Empire™ turf in Winter in Sydney, Melbourne, Adelaide and Perth

After installing the turf as described above, top dress with an organic sand or soil mix. Rub the top dressing in so that at least a quarter of the leaves are showing above the top dressing. Water the turf every day for the first week, soaking it so the water penetrates and soaks into the soil beneath. Water every second day for the next two weeks. Continue this until October, however after the first 3 weeks, watering Monday, Wednesday and Friday will suffice. If you have a watering system, program it for watering on these days.

FERTILISING

1. For lawns that receive moderate wear, where good winter colour is desired, and low to moderate mowing is desired.

Fertilise at the beginning of April and in mid-June with slow release fertiliser applications, we recommend the use of our Summer/Autumn blend. Empire needs less fertiliser than all other turf types, so all other fertilising applications other than autumn and winter are optional and not necessary to keep a healthy lawn under these circumstances. Fertilised well in autumn and winter and shortly mown, results in Empire having much better winter colour. Longer Empire™ turf tends to brown off more on the tips, so the best option is to mow short from around the 10th of March. Keep it like that till mid-September then you can let it grow a little longer. If you have shade, or prefer the lawn a little longer, the other option is to fertilise as advised, and if in the middle of winter the tips brown off, simply mow very lightly removing the burnt tips. In regions that get only a small number of light frosts, the tips will not brown. For example, Sydney's east and inner west, or most parts of Brisbane will not tip burn.

2. For lawns that get high wear, or if you want a super dark green lawn all year round and don't mind mowing more.

Fertilise in autumn and winter as per option 1, then also fertilise in September to October with a moderate rate of slow release fertiliser, for this time of year we recommend our Spring blend. Empire does not need fertiliser in summer; however it may be worth considering further optional applications under extreme circumstances. If your lawn receives very heavy wear from dogs or kids, you can optionally fertilise again in mid-November, and at the end

of February with moderate rates of slow release fertiliser. THE MOST IMPORTANT TIME TO FERTILISE IS AUTUMN AND WINTER.

3. For lawns that you want reasonable winter colour, but do not care if your lawn browns off near the middle of winter, or if you live in QLD where it will generally stay green in winter with one fertilise, and the aim is to mow much less.

Fertilise at the beginning of April only with slow release fertiliser applications at a heavy rate, we recommend our Summer/Autumn blend. Empire will still have quick spring green up. Empire needs less fertiliser than any other lawn type. Option 3 will mean less than a half to a third the mowing of Buffalo turf, and a quarter to a fifth the mowing of Couch and Kikuyu.

4. No fertiliser at all for roadsides or low to moderate wear areas for people who hate mowing, resulting in a lawn that requires only 2 to 4 mows per year.

In most regions for roadsides by not fertilising, Empire™ turf only needs two mows per year; three to four in Queensland. The lawn is usually left to grow a little longer before mowing, for example 75mm to 90mm. Then it is mown to about 40mm to 50mm high. Empire will brown off in winter with no fertiliser, but it will green up quickly in spring. Treating the lawn like this will not result in a fully manicured looking lawn, but it will generally look acceptable. University research in the USA shows Empire can live on very low nutrients compared to other turf types.

MOWING

Empire™ turf can be mown short or long depending on the desired finish. If you want a green manicured bowling green, regular short mowing will achieve that. As a general lawn, fortnightly spring and summer mowing should be enough, unless it is highly fertilised, then mowing each 10 days may be needed for a bowling green appearance. With no spring and summer fertilising, Empire™ turf can usually be mown every 3 to 4 weeks or so. Mow to a height that does not cause scalping. E.g. 35 to 45 mm.

Mowing can also help keep it greener in winter. Leave at a moderate length for most of the year. If after all the recommended fertilising the lawn browns off in winter, lightly mow the Empire. Under moderate frosts and even the odd heavy frost, mainly the tips of the leaf burns, thus a light mow removes most of the burn making the lawn greener. The best method to keep Empire™ turf greener in winter is to mow it short from early autumn and keep it like that.

A combination of autumn and winter fertilising, and a shortly mown Empire will provide good winter colour, particularly for NSW and QLD. To improve winter colour and general health, it is recommended to dethatch the lawn every second or third spring; around the end of August in QLD or Sydney, or early September in cooler areas like Melbourne. The easiest method is to simply mow the lawn very short and collect the clippings. Another method is to hire a dethatching machine, or simply lightly top dress the lawn.

Watering your lawn in a dry winter can improve its winter colour. If the ground or lawn is very dry, frosts have a habit of burning the lawn more. Watering after fertilising helps activate the slow release fertiliser. In the warmer months water when the leaf starts to dry out. It is better to apply heavy deep watering. If you get water on soon after the leaf starts to shrivel, it will quickly green up. If water restrictions prevent you from watering, do not panic if the lawn is at least one year old. Due to its deep rhizomes, a mature Empire™ lawn can withstand long periods of drought without dying. It will brown off and go dormant but when it rains again or it is irrigated it will generally reshoot well and green up. If you live in desert regions or places like Perth with little summer rain, some top up watering is required to keep Empire™ turf alive. In research in the USA by a water authority, Empire™ Zoysia withstood drought far better than Buffalo turf.

WEED CONTROL

Controlling weeds in Empire™ turf is much easier than in Kikuyu, Buffalo and even Couch. A healthy, dense Empire™ lawn will resist many weed types. If a few weeds do invade you can simply hand weed them. If it is a greater weed problem, Empire™ turf is more tolerant to chemicals than most lawns. The following are some types of chemicals that can be used. Check label rates and details before use. For most broadleaf weeds (flat weeds) use Bromoxynil + MCPA (Domestic and Professional), Dicamba + MCPA (Kamba M) (Domestic and Professional), or Spearhead (CLOPYRALID + DIFLUFENICAN) (Professional).

For many grass weeds, including annual grasses such as Kikuyu, Paspalum, Mullumbimby Couch and Sedges, use DSMA. (Domestic and Professional) To kill Nut grass and other sedges use Sempra. (Professional) For a combination of some grass weeds and some broadleaf weeds try Monument. (Professional) As a Pre-emergent to stop weed seeds germinating, for established grass only, not for use when turf is establishing, use Barricade (Proflam) (Professional) or Ronstar (OXADIAZON) (Professional).

PESTS AND DISEASES

Empire™ turf is far less susceptible to lawn grub attack than Buffalo, Couch, and Kikuyu, however damage can occasionally occur. Generally Lawn Grubs prefer Buffalo, Couch and Kikuyu to Zoysia, as Zoysia has a biology that makes it far less attractive. Army worm is rare in Empire, but can happen, and if you see masses of caterpillars walking across your lawn, wait 20 to 30 minutes or so and see if they are just travelling to your neighbour's lawn, and leaving your Empire mainly alone. Usually this will be the case, but if they do start eating it down, use Baythroid Lawn Grub & Garden Insecticide. In Queensland, it can occasionally get Mealy Bug. Brown patches occur with a milky residue. Although this is rare to occur, it's still possible, so if you see this use Confidor Lawn and Garden Insecticide from Yates. This will also control black beetle, which also are less likely to prefer Empire to other lawns, and actually rarely cause damage in Empire. We have after many years yet to see any fungus or diseases on Empire on the East Coast of Australia that affect other lawns. If you do see any please let us know, as we always strive to help customers who use Empire have the knowledge to look after their lawn in the best way possible.