

## Grass Selection for Drought Affected Sites

### DROUGHT RESISTANCE

Drought resistance is the plant's ability to avoid tissue damage when subjected to water stress. Plant characteristics that affect plant drought resistance are:

- Depth of the root system
- Whether the leaf blades are rolled or not
- Thickness of the leaf cuticle
- Size of the leaf area
- Rate of leaf extension
- Leaf orientation and densities that increase canopy resistance to loss of water.

So, how do the grasses available to the British greenkeepers compare?

EXCELLENT	Common Bermudagrass Kikuyu
VERY GOOD	Fine fescue Tall fescue
GOOD	Hybrid Bermudagrass Kentucky bluegrass
FAIR	Perennial ryegrass
POOR	Annual ryegrass Browntop bentgrass Creeping bentgrass Annual meadowgrass

Table 2: Drought resistance characteristics of some common turfgrass species (adapted from Emmons, 1995).

### DROUGHT SURVIVAL

Drought survival is the ability of plants to endure low tissue water levels caused by drought. Survival is achieved either through dormancy or tolerance of low tissue water levels.

Bentgrasses and fine fescues are able to survive drought through dormancy mechanisms even if they do not always provide an acceptable turf quality for most situations in this state.

### DROUGHT RECOVERY

Drought recovery is the ability of plants to recover from prolonged drought. Tall fescue and fine fescues can recover rapidly following prolonged drought. Bentgrass will be slower to recover, and species such as ryegrass and annual meadowgrass are unlikely to recover at all. The 2006 Open Championship illustrated simply how effective fine fescues can be in a drought situation. The parched fairways that were screened globally recovered within weeks of the conclusion of the tournament after the welcome August rains arrived.



Fine fescue fairway at the 2006 Open Championship

### DECISION TIME

So how do the grasses available to British Greenkeepers compare?

If you are managing a golf course on a drought-affected site it is highly likely that you have already done some research on which grasses to select. For each given situation (greens, tees, fairway, rough etc) select the suitable species with the best drought resistance characteristics. In some regions this will require a move away from traditional species to utilise species with better water use characteristics and drought tolerance, e.g. using fine fescue in place of ryegrass. In other areas, the decision may simply revolve around selecting the most drought tolerant cultivar available within a certain quality grouping or using high-endophyte seed lines.

For assistance in selecting the right grass for you the local starting point is the Turfgrass Seed 2006 Booklet (Published by the British Society of Plant Breeders Limited in conjunction with the STRI).

Be aware of the water use rate, drought resistance and survival characteristics of the turf species managed and irrigate accordingly. Carefully manage the grass to ensure that its drought resistance characteristics are fully utilised. There is no point in planting a low-water use plant, if it is over-irrigated.

There is little doubt that the fine fescues are the superior grass for drought-affected sites in the UK. Most clubs struggle to provide a pure sward of fine fescue in their greens and we tend to see a blend of the fescues with bentgrass or annual meadowgrass. Maximising the fine fescue content in the sward will help to reduce the water requirements of your course without compromising turf quality. The R&A have embarked on a three year study to assess the ideal method of converting annual meadowgrass greens to the finer, more drought-tolerant grasses. Further information can be found at: [www.bestcourseforgolf.org](http://www.bestcourseforgolf.org).

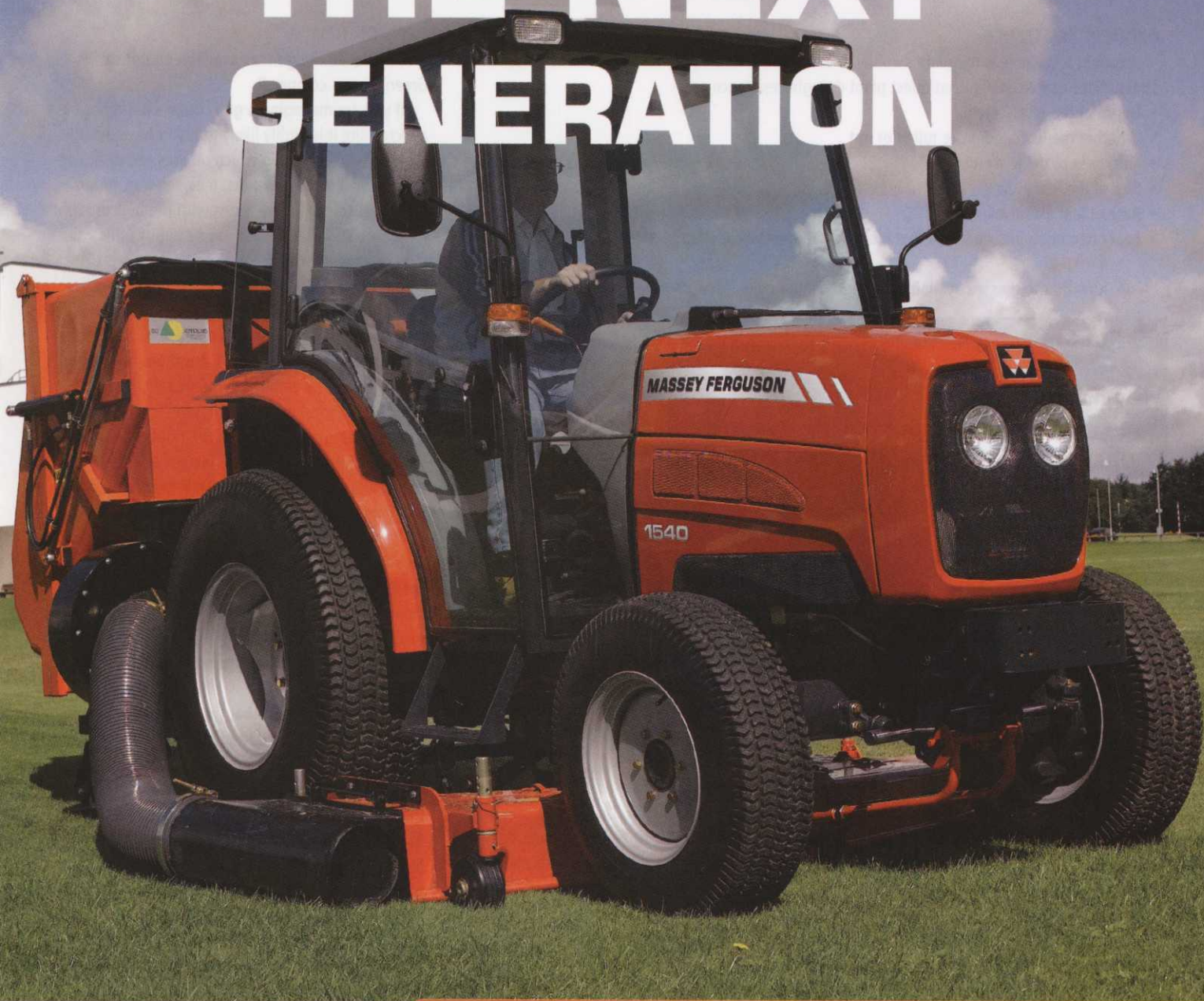
### LOOKING AHEAD

There is a high probability that some golf courses will be using recycled effluent water or non-potable water for irrigation purposes within the next decade. General water availability is likely to reduce. If you are located in a drought-prone area and are managing a grass that has a high water requirement, chances are that it is going to become more difficult to access water in the future. Grass selection has long-lasting consequences on all golf courses and it is important to plan ahead, so start thinking about tomorrow, today.

*Megan Hood is Turfgrass Agronomist for STRI Ltd.*



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# Think Ergonomically

Manufacturers have really started to take operator comfort seriously. Improved seats, reduced noise levels, lower vibration and even power steering combine to make long hours on repetitive jobs less tiring. Often overlooked, however, are advances made in ergonomics. The way controls are positioned can make a huge difference to how any item of equipment feels to operate. James de Havilland reports.

Nostalgia has a funny habit of coming with a box of ready to wear rose tinted spectacles. How often have you heard someone describe a given tractor or mower as the best machine a company has ever made? Spend a few hours behind the wheel of one of these almost mythical bits of kit today and the chances are the experience will initially seem somewhat less than expected. Surely the seat was not really that hard and the steering so heavy? Was it really necessary to lift your foot up that high to operate the clutch?

Machinery evolution is certainly a lot faster than in the natural World and it is this relentless pace that has seen each new generation improve upon what went before. Although the differences between each new model generation can sometimes be slight, those upgrading from older tractors to a new one often notice just how much the designs have evolved.

All pretty obvious stuff so far. Less clear is the subtle differences made during a machine's production life. Although manufacturers are often 'guilty' of calling something new when in fact all that is changed are the model's numbers to accommodate a new Tier II engine, some more subtle developments go unnoticed simply because listing the detail changes takes too much effort. A good example is the move from a manual to electronically controlled PTO.

It's a small change such as this that can make all the difference. So when it next comes to looking at a new tractor, do not rule out a given model because it essentially seems pretty much the same as the 10 year old example you are seeking to replace. The chances are the odd ergonomic nip and tuck will make the latest version more pleasant to operate.



Massey Ferguson is a name many will associate with yellow MF135 based highway tractors, a good number of these once ubiquitous tractors being pressed into service with a set of gangs for fairway mowing. The company now offers a broad range of kit targeting the ride-on mowing market, with a comprehensive range of small tractors to suit golf users. Although its ride-on mowers includes models manufactured by US based MTD, Massey is a stickler for good operator comfort, with an eye for ergonomic detailing. Take this hydrostatic control pedal on its MF 22-28GC. A long pedal like this allows heel and toe operation, a design some prefer to side by side pedals. Again, details like this are easily overlooked when buying



Seating remains something of a hot topic among operators; manufacturers sometimes offer a choice of seat but not necessarily with attractive enough pricing to tempt buyers to select the 'deluxe' option. Ransomes began to offer an air suspended seat as an option on its Highway models early this year. The value of this type of springing is not so much in added comfort but in the way the suspension automatically compensates for different operator weights. This is a real bonus on machines that may be operated by several different people. Fairway mowers will not really benefit from advanced suspension systems, but a seat that offers a good range of adjustment and support for the lower back is important. Larger tractors are offered with heated seats, an option that many would appreciate when mowing on a chilly morning



## Think Ergonomically



Golf courses were early adopters of compact tractors, but over the years the size of machine has started to creep up again. From a manufacturer's standpoint, a larger tractor is easier to make operator friendly, there being more space to fit a reasonably roomy cab. The bigger the cab, the easier to place controls ergonomically. The pictured John Deere 4520 is a good example of modern tractor design, the cab having fully glazed doors with good visibility to the sides. Although an older generation tractor will probably do just as much work in the hands of the same operator, the more current design should be quieter and easier to use. This is a definite plus when it comes to getting more done in a day. Of equal importance, good kit helps to attract and, of equal importance, retain quality personnel



What on earth does a telescopic handler have to do with the ergonomics of equipment used on a golf course? Frankly, not a great deal. But the reason why this control layout of the current JCB 531 loader is interesting is that shows how this British built machine combines good ergonomics with some style. Operators feel they are operating something a bit special, the chrome rimmed dials with their white faces lending an air of GTI to machine destined to handle muck and big bales. Although it is all too easy to get sidetracked by added 'glitz', good looks and good ergonomics can go hand in hand. A JCB 531 is an absolute doddle to operate



A modern fairway mower, such as the Toro Reelmaster 540, is a product of evolution. Go back ten years to sit on this model's predecessor, and the Toro family genes will show the mowers have much in common. But if it were possible to work the two machines side by side, the new machine will be quieter, smoother, easier to operate and more comfortable. The arm rest controls are now simpler and easier to operate. An experienced operator would get used to this new machine within a morning. Older machines would take longer to really get to grips with



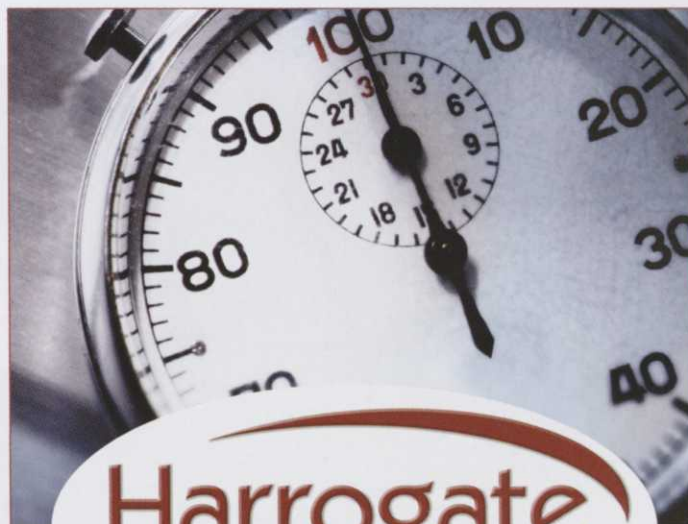
Kubota knows a thing or two about small tractor design. Although some would say certain models seem have 'old fashioned' looking controls, the company is one that gently improves its ergonomics, a fact that many operators of a fleet of machines appreciate. So although the simple levers of this STV40 model may look pretty ordinary they actually operate with 'well oiled' precision. Why change to a flashy design when the existing system is liked by operators? Take a closer look and note the PTO is engaged electronically. It is really important to try a given tractor model before assuming a flashier looking alternative is easier to operate



Good ergonomics encompass all aspects of a tractors control and operating environment. A good test is to see how quickly all the main controls identify themselves. Modern tractors should make it easy for an experienced operator to just jump on the machine and operate it without resorting to the instruction manual. That is not to say the latter can be ignored, but more that operating a forward reverse shuttle or engaging the PTO should be obvious. Notice how the view from this John Deere cab extends down to floor level. Good visibility is a critical point, and important as more kit will come with cabs in the future



Hydrostatic drive has become the default transmission choice on many compact tractors, this allowing the designers to do away with floor mounted gear levers. A small detail, maybe, but a clear floor really does make working a small tractor more comfortable. Of equal importance tractors, such as the New Holland TZ21 pictured, benefit from much improved ergonomics. The levers to the side of the operator are laid out so they fall 'readily to hand'. Even the shape of the levers are hand friendly, the simple round knob on the end of a shaft still having its place but typically on infrequently used controls



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# Petrol Storage and Dispensing - are you complying?

Training is the key to ensure greenkeepers do not unwittingly break the law.

By David Mears.

Petrol is a highly flammable liquid and, because it can emit flammable vapour even at low temperatures, should be treated with the utmost respect! There is always the risk of fire or explosion if it is close to a source of ignition.

The storage and carriage of petrol is a concern for us all and the risks involved should be assessed. Many greenkeepers and groundsmen are often, unwittingly, breaking the law and risking prosecution by storing and collecting petrol from local garages in unauthorised containers and/or in too great a quantity. Apart from this being a dangerous practice, flouting Health and Safety rules, insurance cover would probably be negated too.

It is very difficult to obtain clear advice on the storage and carriage of petrol as it applies to greenkeeping and grounds maintenance, as there are a number of different pieces of relevant legislation. On storage alone there is:

- The Petrol (Consolidation) Act 1928 (PCA)
- The Petroleum-Spirit (Motor Vehicles etc.) Regulations 1929
- The Petroleum-Spirit (Plastic Containers) Regulations 1982

To make matters more difficult, local fire authorities and other official agencies often interpret regulations in different ways and insist on special arrangements for your particular conditions. An example is that, although The Petroleum-Spirit (Motor Vehicles etc.) Regulations 1929, allows up to 275 litres of petrol to be kept in any one storage place without a licence, this can be considerably reduced, particularly if there are perceived hazards (and this is often the case!). The amount of fuel stored in the fuel tanks of all vehicles is included in the total allowed to be stored. An acceptable amount of petrol, in purpose-designed storage, at greenkeeping/turf maintenance premises in "normal" circumstances, would probably be below 100 litres (not including that in vehicle tanks), unless a dedicated and approved tank was installed.



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## Petrol Storage and Dispensing - are you complying?

Plastic containers can be used as well as metal (The Petroleum-Spirit (Plastic Containers) Regulations 1982). For storage in plastic containers without a licence, the containers must:

- Be constructed of suitable materials
- Have a maximum capacity of five litres
- Be designed and constructed properly
- Have appropriate markings or labels

And the quantities that can be stored are:

- Two x five litre containers on any motor vehicle
- Plus two further containers in a safe place
- Plus two more containers in another safe place at least six metres from the first

These quantities are in addition to any petrol kept in metal containers.

The HSE however, in their Carriage of Dangerous Goods manual, under Small Load Exemptions, states that: a typical case would be the carriage of two or three jerrycans in a van. Providing those cans are UN approved, marked UN 1203 and labelled with the flammable diamond, then the only requirements are: Driver awareness training, to carry a 2kg fire extinguisher and stow jerrycans correctly to avoid damage or loss from the vehicle.

All this can lead to confusion to say the least, so what should a responsible club/organisation do?

The following advice is offered:

- Do not allow staff to collect petrol from local garages in anything other than two x five litre purpose designed containers, unless they are taking a special Transit Box, which can hold four x 20 litre jerrycans and should be carried in the back of an open back pick-up or on a trailer.
- Check that your insurance cover allows such collections.
- Ensure that you store petrol responsibly on site. Local authority officers require a Petroleum Licence, which is easily obtained if the Petrol Station is specified. Filled jerrycans should be stored in an appropriate safe container too, e.g. transit box or a Site Safe. Should you need to store and dispense vast quantities of petrol then you should consider installing a special above ground tank such as the Supervault MH.
- Implement driver awareness training and fire drills.
- Place a suitable fire extinguisher adjacent to every petrol storage and refuelling area.
- Place an appropriate spill kit in the same areas. The best spill kits are those produced from sphagnum moss, such as Cansorb, that will reduce the level of harmful vapours from 100% to 10% immediately and are "oil only".
- Place conspicuous notices - "Petroleum Spirit", "Highly Inflammable", "No Smoking" and "Switch Off Engine" - in the above areas.
- Always use a funnel or a proper dispensing spout for refuelling and in a well-ventilated area.
- Staff should be protected from splashes and spills. Gloves should be worn and, ideally, goggles.
- Clean up any spillage immediately, using a spill kit and dispose of all petrol soaked product safely and as hazardous waste.
- Keep ignition sources such as: cigarettes, mobile phones, hand lamps, heaters, welding apparatus etc, away from petrol.

For details of The Petrol Station, transit boxes, petrol storage, spill kits, fire extinguishers, protective clothing, jerrycans and waste services contact your local supplier.

David Mears is Joint Managing Director of Course Care. Course Care operates nationally and supplies all these items/services as well as offering free advice, visit: [www.course-care.co.uk](http://www.course-care.co.uk) for more information.





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