

# How, why and when to mole drain



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Soggy fields, ruts deeper than your wellies and bubbling water from broken drains are all telltale signs your field drainage could do with a boost.

It's only in a wet year the importance of drainage and water management really becomes apparent and starts some quiet contemplation among farm managers about how to fund the next groundworks project.

**See also:** [How to improve soils and yields with effective field drainage](#)

Having clear ditches and working land drains is a staple requirement, but forget to regularly mole drain and the link between the rain falling and water being neatly ferried into the land drains is missing.

In wet years, mole draining can often be seen as a quick-fix solution to mask years of neglect.

However, it will only solve half of the problem and won't return yields to anywhere near the potential that can be delivered in well-drained soils.



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This steady job should be a staple in the summer workload, especially given that, on average, employing a contractor to lay a new field drain scheme costs up to £500/ha.

If you've got working drains, regular mole ploughing should keep the system ticking over nicely.

To help us channel out the basics of this crucial task, we spoke to Andrew Wright, contracts manager for Miles Drainage based near Bury St Edmunds in Suffolk.

The company built its first mole plough in the 1950s and has been offering a contracting service ever since.

## Why should I mole plough?

Mole ploughing is imperative if a field-drainage system is to work at peak performance. Land drains are typically spaced at 40m intervals across the field, so there is little hope for the water that has landed 20m away trickling its way into a working drain at any sort of speed.

To catch all this rainwater from in between the drains, mole channels are opened up at widths of around 2.75m across the field, allowing water to trickle into the gravel layer above the drains.

You can have the newest and neatest field drainage system in the world, but incorrect or no mole ploughing will leave water sitting in the soil.

## When should I mole plough?

For arable farmers, there is only one time of year to mole plough and that's after harvest but before drilling, which gives about a two-month window.

That said, it is possible to run the mole in spring on heavy clay soils. If the top is dry enough to travel, the clay underneath will usually be a perfect consistency to create a strong channel and shouldn't cause excessive crop damage. Tackling the job at this time isn't favoured much, though.

## Does it depend on my soil?

Different types of soil will react differently to having a mole dragged through them. Clay subsoils need the most help due to their dense make-up not allowing water to easily trickle through.

However, carrying out the job when the soil is too wet or dry will ultimately be a waste of time and diesel, not to mention a contractor's fee if you hired one.

Clay soils need to be wet enough to hold the shape that the mole has created. The hole is formed out of a solid clay lump to a 100mm channel in a matter of seconds, so wet soil acts like pottery on a wheel and folds in on itself. If it's too dry the hole will tend to crumble.

Peat and loam soils have a better natural water movement than clay and therefore don't benefit so much from mole draining. There is also a wider window to install full-scale piped drainage schemes.

## How does a mole work?

On the bottom of the long subsoiler leg is a mole bullet, which has a flat pointed nose that will pierce a hole in the soil. The bullet then widens to around 75mm as it pulls through.

Attached via couple of chain links on the end of the bullet is an expander made from either steel or ceramic, which will take the hole up to 100mm wide and compact the sides to keep it open.

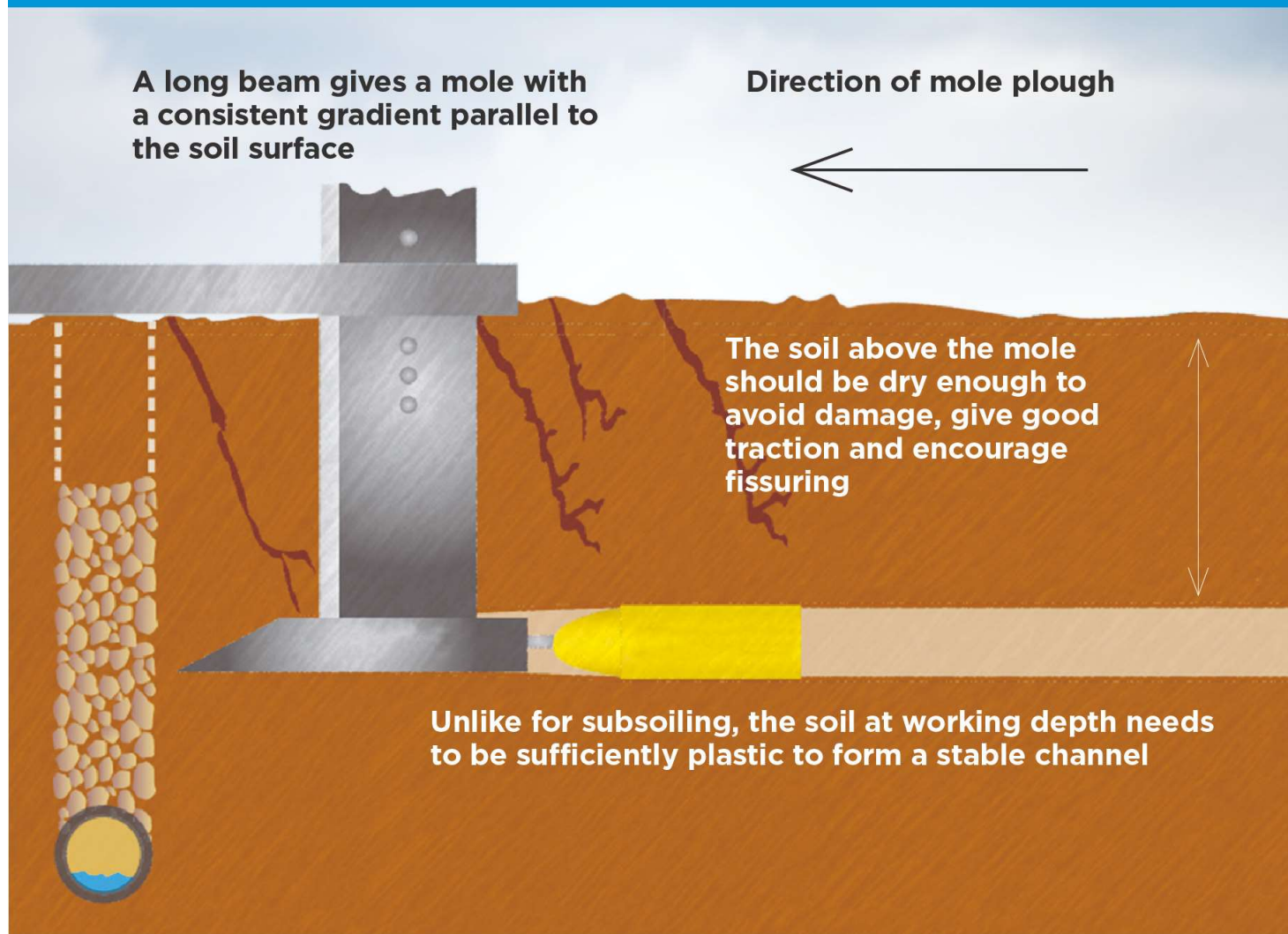
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Once the direction of moling has been worked out, bouts are around 2.75m apart on arable land and 1.8m on grassland and amenity fields, as these areas need to shed the water quicker.

Depth will depend on the type of system that you're moling too, but the key is to be in contact with the gravel layer above the pipework, which is either 450mm or 375mm from the ground surface.

## APPROPRIATE CONDITIONS FOR FORMING A MOLE DRAIN



However, it is essential to know the system below the soil – if there is no gravel layer, moling will allow water to sit and make matters worse.

### How do I know if my drains are in good order?

This can be tricky but the best time to look at a drainage system is after a heavy downpour. Outlets should be running freely and will tend to dry up within 72 hours of the last rainfall if the water is getting off the field as intended.

If there is a constant trickle of water three days after heavy rain then it suggests the water is still making its way into the drains and not leaving the field as quickly as it should.

If there's a complete blockage then the field drains might not run at all after heavy rain. Check they are part of the most recent system and not an old redundant installation, and seek expert advice if you're unsure. Don't just stick the mole in the ground and hope for the best.

### Do I have to be a drainage map expert?

No, but there needs to be a basic understanding of what the arrows on the maps denote. If you don't have maps then it's probably not a good idea to mole drain at all.

When drainage systems are installed they are worked out carefully with all the field undulations taken into account, so deciding to pull a mole from the nearest ditch is rarely the best course of action – the chances are you'll be moling in the same direction as the drains and not solving the issue of water getting into them.

On all drainage maps, there will be a gravel depth measurement and this dictates your mole depth. If the drainage system is more than 20 years old it's worth getting the spade out to check this is still accurate, as it may have sunk over time and you may need to mole a bit deeper to tap into it.

If you're lucky, the maps will have direction of moling on them. If they don't, it's best to mole across the main field drains, tapping into the gravel layer on each one. This way the water caught by the mole can easily get away into any one of the outlets.

Usually there will be a headland main roughly 15m from the field edge – all of the drains will run into this.

## What are the common mistakes?

Along with going when the soil conditions don't suit, not moling deep enough is a common error.

Pulling a mole too shallow will prevent the water getting down to the drains as there will be no outlet, so water will sit in the mole channels and cause a soggy mess than was there to start with.

A slow speed is also essential. Large farmers will often put 500hp tractors on a single leg mole where 200hp is ample, so there's always a tendency to speed up. Aim for a forward speed of about 3mph.

## What does it cost?

A contractor will charge anywhere from £110 to £120/ha, plus travel. This may seem steep but, as the job is no quicker than a fast walking pace, output of a single-leg moler will top out at about 8ha/day.

Ideally, moling will need to be carried out every five to 10 years, but this depends heavily on soil type.

There aren't too many expensive wearing parts, either. Miles Drainage supplies reversible boron steel legs for £160, while a 75mm mole bullet costs £58.50 and a new mole drainer is about £6,500.

## Things to be wary of

Hard lumps of soil, stones or prolonged use will alter the pitch of the mole, so it needs to be adjusted regularly to keep it running level. On newer machines, this will be a thread adjustment that is wound either way to raise or lower it.

Older molers may have steel wedges that are hammered home either side of the leg to maintain the angle of the bullet to prevent it from nose-diving or riding up.

It's also important to let the mole cool down for a few minutes after it's been in the soil for an extended period as the friction causes it to become red hot.

## Miles Drainage



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Based in Suffolk, Miles Drainage has been running in its current guise for 30 years and built its first mole plough in the 1950s.

The company now works across the south of England, installing land drains on arable and construction sites, golf courses and amenity drainage schemes, along with installing utilities and fibre internet cables for BT.



Mole drainage work amounts to about 600ha/year and is carried out using a single-leg mole plough towed by a huge 1958 225hp Caterpillar D8H on steel tracks.

It's transported around the jobs via a low loader and, although headland turns aren't the best with steel shoes, it does a good job of spreading the weight and provides a steady, low down tug for the mole.

There is also a selection of Mastenbrook trenchers in the Miles Drainage fleet capable of installing full-scale field drains to replace old broken pipe works.