

Oilseed Rape Establishment Systems



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Chafer Machinery Ltd was established in 2000 to design and build a range of high performance trailed sprayers, demountable spray packs and liquid applicators for professional farmers and contractors. Building on over 100 years of experience in spraying and liquid application, Chafer Machinery offer custom built liquid application solutions for each individual customer.

In 2002 Chafer Machinery Ltd acquired Horstine Farmery. Horstine Farmery is a world leader in the design and manufacture of highly accurate equipment for the application of granular pesticides, fertiliser and seeds. In the 60 years since the company was established, markets have been developed in every continent and its products have gained a well deserved reputation for accuracy and durability.

The Chafer Machinery Group is in the unique position to offer both tailored liquid and granular application solutions for the agricultural industry.

Contents

- Page 2 – 3 Oilseed rape establishment product range
- Page 4 – 5 Oilseed rape and slug pellet applicators
- Page 6 – 7 Horstine Twin Air user experience
- Page 8 – 9 Band fertiliser applicators
- Page 10 – 11 Chafer Quickstart user experience
- Page 12 Contact details

Introduction to Oilseed Rape Establishment Systems

The key question of how an oilseed rape crop can be established for the lowest cost without compromising yield is something the Chafer Machinery Group have been working on since 2002. This work in conjunction with cultivator manufacturers and growers has resulted in the development of a full range of oilseed rape establishment systems designed to reduce input costs, establishment costs and labour. These systems accurately and precisely apply seed; fertiliser and slug pellets to give the oilseed rape crop the best possible chance of healthy and vigorous establishment.



Seed Application
Horstine Multiseed



Liquid Fertiliser Application in bands
Chafer Quickstart



Seed & Slug Pellet Application
Horstine Twin Air



Solid Fertiliser Application in bands
Horstine Airstream



Horstine Twin Air fitted to Simba SL 400 cultivator (Lincolnshire)

The benefits of cultivations based OSR seeding techniques

Oilseed Rape is a crop whose average yields in the UK have not increased in line with the potential of improved variety development over the past decade.

In part, this has been due to establishment techniques which have countered these varietal improvements resulting in fairly static yields. One example of this is broadcasting onto the previous crop stubbles with no structuring, leading to poor root growth where compaction is present. Where OSR is established using appropriate cultivations based techniques, trials results show significantly higher yields are possible. Combining establishment and cultivations serves to create the right environment for the crop to flourish establishing the crop at the correct time with the minimum of passes and, as such, maximum profit potential.

The choice of specific technique depends on the soil: its texture, structure, and conditions prevailing at the time. There are many common aspects of these techniques which include:

- Producing a fine, firm seedbed with good seed to soil contact;
- Minimising moisture loss and concentrations of straw and chaff residues;
- Ensuring soil structure below the seed is not compact, allowing free drainage & root passage;
- Minimising pest effects by optimum soil structure, establishment and appropriate controls.

The Horstine Twin Air system can be fitted to the most appropriate cultivations machinery capable of achieving these benefits. This can range from a simple subsoiler to more complex machine combinations.

By providing an efficient metering system with the capability to include slug pellet application, the crop can be established in the most effective manner. The potential to combine this with band placement of seed and fertiliser (liquid or solid) further extends the capabilities of the grower to improve establishment, especially in adverse seasons, whilst optimising this targeted fertiliser use.

Philip Wright
Wright Resolutions

Horstine Twin Air

One pass cultivation, seeding and slug pellet application

Horstine Twin Air applies oilseed rape and slug pellets simultaneously without the need for premixing. The system can be fitted to most subsoilers or cultivators. Twin Air features a 300L stainless steel hopper with variable position partition. The unique metering system allows the operator to precisely control oilseed rape and slug pellet application tailored to individual soil conditions, crop variety and slug populations. With increasing focus on the accuracy of slug pellet application to minimise the occurrence of metaldehyde in watercourses, Twin Air offers a guaranteed method of precise application.

Twin Air Benefits

- Combines three operations in one pass saving fuel and labour
- Increases the accuracy of slug pellet application
- Saves separate pass to apply slug pellets

Twin Air Standard Specification

- 300L stainless steel hopper with hinged lid
- 8 outlet metering unit for oilseed rape
- 8 outlet metering unit for slug pellets
- Choice of 33/67 or 50/50 product ratio partition
- Hydraulically driven metering unit
- Hydraulically driven fan with air filter
- Horstine Wizard application controller
- GPS speed sensor

Optional Equipment

- Low hopper sensors
- Automatic implement lift switch
- Self cleaning air filter
- Broadcast application outlets
- Band application outlets
- Choice of cultivator fitting kits



Stainless Steel Hopper

Twin Air features a unique split hopper design enabling oilseed rape and slug pellets to be applied simultaneously without the need for premixing. A variable position partition allows the 300L hopper to be split to carry a 50/50 or 33/67 product ratio. Low level sensors are available as an option to warn the operator when the hopper is below 15% full. For further versatility the hopper can also be used to apply micro granular fertiliser in place of slug pellets while cultivating or to apply granular nematicides during bed tilling operations.

- Large capacity hopper for less filling downtime
- No pre mixing of products required preventing hopper separation
- Can be used for oilseed rape plus slug pellets or micro granular fertiliser

Hydraulic metering

The Twin Air's positive displacement metering units are driven by hydraulic motors. Two metering variations are available. For growers wishing to apply a fixed ratio of seed to slug pellets, a single hydraulic motor drives the metering unit for both oilseed rape and slug pellets. In this situation, if the oilseed rape rate is increased the slug pellet rate increases proportionally by the same amount. Where seed rates and slug pellets need to be fine tuned for individual fields; crop varieties or slug populations then independent hydraulic drives are used to meter seed and pellets individually.

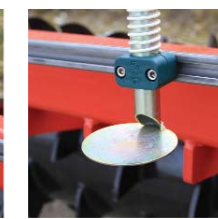
- Fixed ratio product application offers simplicity
- Optional independent application control of seed and slug pellet rates gives flexibility
- Precision metering to individual outlets ensures application accuracy



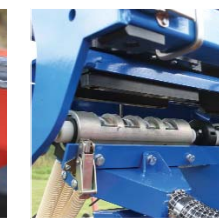
Split hopper



Banding outlet



Broadcast outlet



Metering cassette



Horstine Wizard application controller (Independent product control)

Horstine Wizard Application Control

The Horstine Wizard application controller is used to precisely adjust metering rotation speed to compensate for alterations in implement speed. A fixed application ratio Twin Air uses a single Horstine Wizard but for independent product control two Horstine Wizards are used, one for oilseed rape and one for slug pellets. Twin product control also allows slug pellets to be switched off around sensitive areas close to watercourses and in areas of low slug populations.

- Rate adjustable from the cab
- Eliminates need for land wheel drive
- Simple to calibrate

Seed and Slug Pellet Application

Twin Air is fitted as standard with two eight outlet metering units. Each outlet can be blanked off where necessary to work in conjunction with a wide variety of cultivators. A hydraulically driven fan applies seed and slug pellets uniformly and evenly on cultivators up to 6m in width. The fan motor is driven by a priority flow spool fitted to the Twin Air hydraulic system. This maintains a constant flow of oil to the fan regardless of other hydraulic operations on the tractor. A range of application outlets are available to apply seed or pellets in bands or broadcast across the width of the cultivator. An optional implement lift switch automatically controls oilseed rape and slug pellet application as the cultivator is lifted in and out of work.

- High flow fan transports seed up to 6m
- Band application outlets precisely place seed in a tight band
- Broadcast application outlets spread seed or pellets uniformly across the width of the cultivator

Horstine Multiseed

Growers looking for a simple oilseed rape or grass seed applicator can use Horstine Multiseed as a versatile system which can apply seed in bands or broadcast across the full cultivator width. Multiseed kits are suitable for use with cultivators of up to 6m and can be used to apply both oilseed rape and grass seed. A choice of 100L or 200L hoppers are available. The proven and reliable Horstine metering system guarantees spread accuracy across the cultivator and can be upgraded to include a Horstine Wizard electric drive system eliminating the need for a land wheel drive.

Multiseed Standard Specification

- 100L or 200L translucent plastic hoppers
- Positive displacement metering units
- Up to 12 outlets
- Maximum spread width 6m
- Electric fan with in cab on/off switch
- Hopper mounting frame
- Heavy duty land wheel drive
- Full set of change sprockets
- Delivery hose and spreader plates
- Spreader plate mounting brackets

Optional Equipment

- Horstine Wizard application controller
- GPS speed sensor
- Low hopper sensors
- Automatic implement lift switch





Horstine Twin Air fitted to Spalding's Flatlift subsoiler (Lincolnshire)

Twin approach to oilseed rape drilling leads to efficiency and establishment benefits

A succession of late and wet harvests and concerns over black-grass control prompted a Lincolnshire based farming business to re-evaluate its approach to establishing oilseed rape to ensure that, as an important break crop, it was a viable option on the farm.

This autumn, having adopted a one-pass cultivator seeding system, combined with simultaneous slug pellet application, costs of establishment have been dramatically reduced while at the same time accuracy of seeding and chemical application have been improved.

Up until 2005, Neil Wilson, manager of 3,500ac R and R Farms, Reasby Hall near Lincoln says that 1,250ac of oilseed rape were established with a traditional system of a heavy disc/tined cultivator (a 6m Simba Solo), two passes with a press (8m Vaderstad Rexius Twin), followed by a 12m (Horsch Co12) drill.

However, he believes that the cost in both fuel and time made the system prohibitive, especially at a time when oilseed rape was at £125-£135/t. "It got to the stage where oilseed rape was being grown as a break crop but it was offering us no profit," says Mr Wilson.

"Trying to get all the oilseed rape in the ground following first wheat during seasons that featured late and wet harvests was also difficult and meant a lot of juggling between key operations on the farm in late August and early September. It was a case of really having to justify the crop's inclusion in the rotation."

In 2005, the decision was made to change to another one pass cultivator, a 4.5m Kverneland CTS Stubble Finisher, which included 7 subsoiler legs and a following packer pulled by the farm's Case Quadtrac STX 535 tractor. A Vaderstad BioDrill seeder was mounted to the unit and, according to Mr Wilson, this reduced the number of passes in the field from 4 to 1, and costs by as much as 60% (approximately £20/ac).

"We thought we'd cracked it this time but the problem was that we suffer from severe resistant black-grass on the farm and, with the cultivator tines working to a 4-5in depth, we were burying black-grass seeds as we were drilling the rape. This then led to problems with our herbicide strategy which is based on Kerb (propyzamide), which wasn't able to control the black-grass so effectively at depth," explains Mr Wilson.

After experimenting with direct drilling using an 8m Horsch Sprinter in 2008, which although reduced costs still further it created terrible problems with slugs on account of chopped straw and trash levels, Mr Wilson turned to machinery manufacturer Chafer, to find the solution to his rape establishment conundrum.

"We chatted to Chafer who said that their Horstine division were producing a more sophisticated one pass seeding unit with infinite calibration, in combination with a slug pellet applicator," comments Mr Wilson.

"We had looked at different seeders ourselves but they seemed to have a 10-12% difference between each seed rate increment. I wanted precisely 50 seeds/m² for the hybrid varieties and needed the right amount of control.

"The Horstine system sounded good, as the one issue I had with one pass systems was getting on the land within 24-48 hours following seeding to get the slug pellets on. It's not always possible to get on the field immediately after drilling because of rain, and slugs can literally take out the crop. But to be able to apply the pellets at the same time was great," Mr Wilson says.

Horstine's Twin Air one pass seeder and slug pelleter is designed to fit most subsoilers or cultivators and comes with a 300L split stainless steel tank allowing both seed and pellets to be applied simultaneously at different rates without the need for pre-mixing. Each product is metered individually to each outlet across the width of the cultivator so application accuracy is guaranteed.

"It's designed specifically to sow seed behind each cultivator leg in a band, and a feed roller for each outlet means you can fine tune seed rate to a greater degree, ultimately saving seed costs," he says.

The Twin Air was mounted on a 4m, 7 leg (at 23in centres), Flatlift subsoiler for this autumn at R and R Farms, and following calibration teething problems which were immediately put right by Chafer, the unit was put to work on selected "problematic" fields, claims Mr Wilson.

"In order to get the level of black-grass control we were looking for in problem areas, we used the Twin Air and Flatlift for minimal soil disturbance to leave the black-grass seeds on the surface."

With no pre-emergence herbicides applied following the Twin Air, Mr Wilson is quietly confident that the Kerb will now "do the job on the black-grass".

He also says that sowing accuracy has been enhanced to such an extent that the decision was made to reduce seed rates still further. For next season Mr Wilson plans to drop the rate down to 40 seeds/m² pointing out that for every 10 seeds/m² reduced, a saving of £12/ha is made.

With the slug pellets broadcast behind the Flatlift's packer roller at the rear of the implement, and across the full width at the same time as sowing, Mr Wilson says that the urgency to get the next dose of pellets on has gone. "We applied 4kg/ha at drilling with the Twin Air, followed by another two applications of 4kg/ha and 7kg/ha respectively (with a pneumatic fertiliser spreader), and that is all that we have had to do this season. However, being able to get the first dose on with the Twin Air when sowing was the critical factor.

"Because of the importance of slug pellet stewardship, you can't apply more accurately than we have done with the Twin Air, which has a digital controller for both seed and slug pellet rates," he adds.

The majority of land drilled with the Twin Air this season was followed up with a press and roll to firm the surface within 24 hours but, despite this, Mr Wilson believes the system offers him a 50% saving in costs over his original 4-pass system of rape establishment. The Twin Air will also be used on the farm's lighter land next year where a following press won't be needed.

All oilseed rape drilling was completed this year by the end of August with the Twin Air accounting for one third of the acreage planted. "The crop is looking very good and in late September it looked further ahead than last season's crop did in March," exclaims Mr Wilson. "I can't put it all down to the Twin Air but it has made a big difference and plant growth is certainly equal to and arguably better than, that established after the CTS, and certainly 2010 will see a greater area established using the Twin Air.

"Of the 1150ac of oilseed rape to be harvested in 2010, we only had to buy one extra 3ha bag of seed above our original sowing calculations and that demonstrates to me the increased accuracy we are getting with this machine," he concludes.

Oilseed rape margins under scrutiny?

Band application of nitrogen at drilling could be the answer to higher profitability.

Achieving good oilseed rape crop establishment is a matter of getting several factors in place but, above all, the crop's ability to develop a strong root system. From its emergence the oilseed rape plant has a very primary root system until the tap root develops 2-3 weeks later. In this early phase of root development it is essential that there are adequate supplies of easily available nutrients. By applying nitrogen, phosphate and potash in a band where the seed is drilled a concentrated pool of nutrients is easily accessible for the young plant.

With many growers now sowing oilseed rape in bands behind cultivator tines, applying fertiliser, either in liquid or solid form, gives the plants a boost pre winter, and also directs the fertiliser straight into the crop rooting zone. Fertiliser applied at drilling in this way has also been shown to potentially reduce spring fertiliser requirement.

Band applications of nitrogen could also help growers meet ever increasing NVZ legislation. Although you are only allowed to apply 30 kgs/ha of nitrogen in the autumn, by directly applying it in a band, it results in depending on band spacing, a three or four fold increase in fertiliser concentration being applied to the crop.



No nitrogen at drilling



Nitrogen applied at drilling

Band Fertiliser Application – The Benefits

- Reduces fertiliser rates
- Lower spring nitrogen requirement
- Helps development of tap root essential for strong plant development
- Aids compliance with NVZ regulations
- Doesn't feed weed population between rows
- Combines two operations in one pass

Chafer Quickstart

Liquid Fertiliser Band Application

Chafer Quickstart applies a precise band of liquid fertiliser when establishing oilseed rape in bands during field cultivation. Various tank mounting options are available to suit a wide range of cultivators and tractors. Simple plumbing with an accurate application control system ensures accuracy.



Quickstart Standard Specification

- Choice of fibreglass or stainless steel tanks
- Hydraulically driven self priming centrifugal pump (450L/min free flow)
- Hydraulic hose kit
- Pump filling port
- Fast fill port for direct filling from bowser pump
- Fast discharge port
- Pressure filter
- Electric on/off valve
- Automatic rate control system
- Pressure sensor
- Pressure gauge
- GPS speed sensor
- Delivery hose

Optional Equipment

- Automatic headland shutoff switch
- Stainless steel cultivator spray line
- Cultivator leg mounted nozzle bodies



Band application nozzle is unaffected in windy conditions

Quickstart Mounting Options



Front linkage mounted

1000L Fibreglass tank
1500L and 2000L Stainless Steel tanks
Suitable for mounted cultivators



Front linkage mounted with weight frame mounting points

1000L Fibreglass tank
Suitable for mounted cultivators where tractor requires front weight



Sandwich frame Mounted

1000L Fibreglass tank
Suitable for trailed cultivators

Mounting Options

A big potential issue for many band fertiliser systems is where to mount the tank. Most cultivators are pulled by high horse power tractors often on tracks. This limits tank mounting options. One solution is to mount the tank on the cultivator. However, many cultivators do not have the room to mount a tank and the extra weight can cause problems with weight distribution and lift weight on the three point linkage. Chafer Quickstart is available in a variety of mounting options engineered to provide high tank capacities but also to balance weight distribution.

Tank, Pump and Plumbing

A variety of tank options are available ranging from 1000L Fibreglass up to a 2000L stainless steel. All Quickstart kits are fitted with a high flow centrifugal pump designed for rapid tank filling. This pump also is designed to cope with low flow rates while band spraying. Simple to operate valves allow the operator to fill direct from a bowser, discharge to a bowser and to spray. A direct filling port to fill direct from a pump feed bowser is fitted as standard.

Application Control

All Quickstart kits are supplied with an application controller to adjust spraying pressure as the forward speed of the implement changes. This system ensures that a consistent and even rate of fertiliser is applied across the field. Implement forward speed is measured using a GPS speed sensor which is supplied with the Quickstart system.

Fertiliser Application

Precisely targeted fertiliser application is essential to gain the maximum benefit from the band placement principle. Quickstart kits are supplied with fertiliser streaming nozzles which produce a precise stream of liquid which can be applied directly in front of the packer roller. The action of the roller incorporates the fertiliser before seed is applied behind the packer. This stream of liquid is not effected by wind and spray drift as with conventional spraying nozzles. Various nozzle mounting options for different cultivators are available. Trials of fertiliser placement under the soil surface are being conducted with potential further benefits for accuracy.

Horstine Airstream

Airstream distributes solid fertiliser using a high capacity hydraulically driven fan. The system can be used to apply fertiliser in an accurate band in line with the sub soiling tine during oilseed rape seeding. This can offer the same benefits as liquid fertiliser application at planting and without the need to setup liquid storage facilities for growers not already handling liquid fertiliser. Solid fertiliser grades can also be more cost effective than the equivalent liquid grade reducing establishment costs. Airstream can be used for a wide variety of operations including fertiliser placement in potatoes, bulk transfer to a rear spreader or drill and bed top application to salad crops and potatoes.



Airstream Standard Specification

- 1000L or 2000L stainless steel hopper with hinged lid
- Heavy duty three point linkage mounting frame
- 6 outlet positive displacement metering unit
- Outlet blanking system
- Hydraulically driven metering unit
- Hydraulically driven fan
- Horstine Wizard application controller
- GPS speed sensor

Optional Equipment

- Low hopper level sensors
- Band application outlets
- Transfer pipe work for rear mounted fertiliser spreader
- Placement tines for Grimme & Structural planters
- Hydraulically folding 6m boom for bed top application

Band applied fertiliser giving vital autumn boost to oilseed rape establishment

Applying liquid fertiliser in a band, in conjunction with band-sowing of oilseed rape, could be the solution growers need as new NVZ regulations restrict much-needed autumn nitrogen applications to the crop.

In addition, the technique could boost crop establishment and potentially reduce the overall reliance on autumn slug pellet and herbicide applications, says a Lincolnshire grower.

Terry Metson, farm manager for 1,414ha Leverton Farms, Lincoln believes the new NVZ regulations have diluted autumn applications of nitrogen to oilseed rape to a questionable level.

"The new rate of 30kg N/ha is hardly worth doing when applied with a traditional broadcaster," he says. "It's so important to get fertiliser to the plant if we want a stronger and bigger crop growth in the autumn."

Chafer's Quickstart band fertiliser applicator that applies liquid nutrients onto the soil in front of the legs of a one-pass cultivator/seedler could be the answer says Mr Metson. He installed Quickstart in time for last autumn's plantings.

Leverton Farms has two oilseed rape establishment systems: a one pass, 4m Vaderstad TopDown with a band-modified Biodrill seeder for lighter land, and a home-made, 7-leg subsoiler/drill for the heavier parts of the farm.

Both machines have the Quickstart 1000l liquid fertiliser tank mounted on the unit's loading platform behind the cab, feeding spray lines down to the implement itself. The TopDown features 2m spray bars, each with four nozzles, situated between the discs and legs. The subsoiler has individual nozzles attached to the front of each leg.

"Last autumn we applied fertiliser with the Quickstart system and we now only apply 25kg N/ha in a band (5kg N/ha below the legal limit) directly in line with the seed. Quickstart is very targeted and effectively it equates to a far higher fertiliser application to the crop," says Mr Metson.

With no fertiliser going in any hedges or ditches the environmental profile will also improve. Bigger and stronger plants could see less slug and pigeon damage too.

Targeted approach is key for oilseed rape fertiliser application

Growing 618 acres of oilseed rape both on the family farm and on a contract farming basis, Robert Naylor of J R Naylor & Sons, Wood Farm, Uffington in Lincolnshire understands the importance of getting nutrients to the crop in the autumn.

He says that 2008's wet harvest and autumn was a reminder of just how difficult it can be to establish oilseed rape when the conditions are against you, emphasising the need to get sufficient nitrogen and phosphate on the crop to boost autumn establishment.

"In 2008 things were so late because of the delayed harvest and so many jobs began to pile up," he says.

The difficulties in 2008 prompted Mr Naylor to adopt a different approach to his oilseed rape establishment programme in time for the 2009 season. He turned to Chafer's Quickstart band fertiliser applicator for an improvement in overall crop establishment.

The Quickstart applies a band of liquid fertiliser, fed by a tractor, or cultivator-mounted tank, in front or behind the leg or tine when establishing the crop in bands behind a cultivator. According to Chafer, applying fertiliser to the soil in this way places nutrients in the area where they are most needed, and encourages strong tap root development.

"We used a traditional broadcaster before, but you are more reliant on the weather to do the rest of the job for the fertiliser and it's an extra pass through the crop as well," Mr Naylor continues. "It's very important to get a little nitrogen and phosphate to the plant's root to get it established well, and the Quickstart system is a more targeted way to do it."

The 1,000 litre liquid fertiliser tank came with a linkage attachment allowing it to be fitted to the front, or rear, of the farm's 300hp Challenger tractor, feeding nozzles on the 9 leg (with 0.5m spacing) Cousins subsoiler.

"This has only been our first season using the system and we are monitoring how it goes, and we'll be comparing establishment with untreated crops," says Mr Naylor. "Fertiliser prices have been so volatile recently that anything we can do to be more targeted with it has got to be good for economic and environmental reasons.

"We also hope that weed coverage in the crop is affected because of a lack of nitrogen between the rows, and better crop establishment should smother any weeds quicker.

"Applying fertiliser at the same time as drilling does mean the operator has to concentrate on another job, but getting nutrients where they're most needed and cutting out a pass in oilseed rape is key at this time of year, particularly when the weather turns against you," he concludes.

Quickstart fitted to Claas Xerion



Front linkage mounted Quickstart with weight block



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