

Practical test: Grégoire Besson Discordon 4.2m DXRV-HD cultivator

Grégoire's girl stands test of time

They think it's all over. Well, it isn't. Not for now, at least. Despite the previous predictions of certain industry observers, it would seem that the popularity of one-pass soil-loosening cultivators on the UK machinery market remains as high today as it has ever been.

Sales are in the region of 250 units/year, depending on exactly how the term 'one-pass cultivator' is defined – depth of work etc – and UK interest has been roughly at this level for a number of years now. What has changed, however, is the type of UK farmer who is buying and thus the size of kit that's being sold. Whereas five years ago, the likes of Grégoire Besson, Simba and Quivogne pretty much had the sector to themselves, pumping out a relatively modest number of monster 4.5m+ units, today's sales situation has subtly shifted. In 2007, smaller farms tend to have access to more tractor hp than before – often around the 200hp mark – which means

For the fourth of profi's detailed one-pass cultivator tests we profile Grégoire Besson's 4.2m Discordon, which shouldn't have too much left to prove as it has been around, in various guises, for the past 15 years. Andrew Faulkner assesses how this French stubble buster stacks up against today's one-pass competition

that they can now enlist in this one-pass club, albeit with a newer generation of shallower working cultivator designs in the 3-4m width category.

Not surprisingly, one of those previously mentioned one-pass tool players and the company featured here, Grégoire Besson, has recently announced that it is to focus much more attention on this burgeoning 3-4m sector via its SIMA-launched 3m, 3.5m and 4.0m hydraulic-folders, which are due to join the existing 3.2m DXN manual-folding model for the coming '07 autumn tillage campaign. That's looking ahead, though. For this year's one-pass

profi test we deal more with 'here and now', concentrating on what some would consider to be the French firm's crossover model and current best-seller, the 4.2m wide DXRV-HD 667-32 – the entry-level 'traditional' Discordon machine.

Moreover, 'traditional' is a particularly apt description for the Discordon, for this is a design that boasts a substantial heritage. Indeed its history stretches all the way back to the 1980s when plough company Grégoire Besson took over the ailing disc business of SNF, along with all the initial research work on the infant Discordon. The original concept theory was much the same as it is today: Rotating discs excel at



As with most machines of its type, the Discordon has a number of main working zones: Front discs move/loosen the soil, legs remove any pan, and rear discs mix, chop and level. The following press consolidates but it is not meant to be a surface-levelling tool.



Coding of pipework was non-existent on our test machine, although production units should be fitted with coloured cable ties. The requirement is for three double-acting spools, the in-cab control box (inset) diverting the third valve supply out to either the machine's rear linkage (press depth), lifting legs (left wing) or lifting legs (right wing).



A big brute of a machine, the Grégoire Besson Discordon one-pass cultivator was the subject for our autumn 2006 profi practical test. The featured 4.2m wide model remains the most popular member within the Discordon line-up.

TEST COMBINATION DATA

Besson Discordon cultivator (4.2m) weight	8.94t
JCB Fastrac 8250 tractor (ballasted)	12.56t
Total combination weight	21.50t

NB. Cultivator weight was measured on public weighbridge.



To go deeper with the front discs, screw the drawbar adjuster ram down and then lock off. This ram is also used to level the machine up, front to back.

creating a pan so, given the spec addition of soil-loosening legs, this tough pan can be removed immediately while carrying out extra cultivation work as part of the same process. Taking this a stage further, Grégoire Besson's designers arrived at the principles set out below, which were to subsequently form the basis of their work over the next 15 years:

■ Front discs move and loosen the soil using a combination of depth and gang angle. The cultivation aim here is to stir the top 50-100mm, but no more.

■ The legs should be capable of working down to 250mm below the discing depth, cracking up the ground but also leaving it firm enough should conditions turn wet. Because the surface has been loosened by the front discs, these legs should not create or bring up clods.

■ Rear discs are designed to mix, chop and then level the large amount of loose material that has been created by those

front discs and legs. Main task for the rear disc set is to produce a level surface ahead of the consolidating press at the rear.

■ The packer is a firming tool, pressing any puffiness and, as much as possible, delivering a weatherproof surface that's capable of accepting a fair amount of rain without turning into an unmanageable bog.

TEST ASSESSMENTS

How profi rated the 4.2m Discordon DXRV-HD

Ease of attachment	
Tractor to machine	+
Hydraulic coupler labelling	- ¹⁾
Disc gangs	
Angle adjustment	-
Depth of work adjustment	0
Mixing quality	+
Ability to penetrate	+
Level of finish	0
Soil-loosening tines	
Depth adjustment	++
Wearing metal change	0
Overload protection	0 ²⁾
Soil-loosening effect	+
Rear press	
Consolidation	-
Scrapers	0
Road/transport conversion	
Discs	+
Tines	+
Press	+
Transport	
Lights/warning panels	+
Transport width	+
Ground clearance	+
Ride/manoeuvrability	-
General	
Operator's manual	-
Parts list	- ³⁾
Build quality	+
Power requirement	+
Price	0

¹⁾ No colour-coding of pipework on our test machine; production units come with full colour-coding ²⁾ auto-reset is available as an option; ³⁾ no parts book

Grading system:

++ = very good

+ = good

0 = average

- = below average

-- = poor



Only reason for adjusting front disc gang angle is to move more soil. Best advice is to leave this setting at the shallowest angle that still achieves the desired effect.

the various couplings into their relevant homes. There is a tractor requirement for three double-acting spools: One for the hydraulic fold; another for the wheels and drawbar ram, which are linked; and the third service splits into a feed for the rear linkage (press depth), legs (left wing) or

Even though all the major sector players have their own particular variances on the above disc/tine/disc/press theme, base principles remain largely the same. There are subtle differences in approach – we'll assess the Besson nuances later – but it is this theory that has seen the one-pass cultivator, originally brought to the fore in the UK by the likes of Simba and Besson, progress to the extent that it is now also attracting significant interest from other markets – France, Germany, Australia and New Zealand. A number of countries in eastern Europe are also starting to adopt the concept.

Now back to our test machine – the 4.2m DXRV-HD which, as already stated, has been Besson's top-selling Discordon in the UK for some time, largely because it matches reasonable field outputs with an acceptable tractor requirement of about

250hp. Head up one Discordon cultivator size, to a 4.7m, and on the heavier soils the buyer needs to be looking at about 300-350hp, thus ruling it out for anyone other than the biggest arable operators. For our practical test we lugged the 4.2m Discordon model around with a 185kW/248hp JCB Fastrac 8250, this proving up to the task across all of our soils. That said, we wouldn't have wanted to be on board anything less.

Working from front to back, the hitch-up process is straightforward – or it would have been on our test Discordon had it been supplied with colour-coding for the assorted pipework; production units are said to benefit from colour-coding of their spools. After a little head-scratching we managed to sort the spaghetti and plumb



Front discs' main job is to loosen and move the soil ahead of the lifting legs. Deflector device is effective at keeping soil within the machine's overall working width on medium and heavy dirt, less so on lighter land.



Discordon is no subsoiler. The lifting legs are designed to loosen the soil down to 150-250mm below discing depth – to remove any disc/plough pan.

FUEL/OUTPUT MEASUREMENTS

profi test measurements on 4.2m wide Grégoire Besson Discordon cultivator

	Site A	Site B	Site C	Site D
Field size	23.70ha	14.74ha	14.43ha	13.80ha
Soil type	Med/heavy clay	Medium clay	Greensand	Med/heavy clay
Previous crop	Winter wheat	Oilseed rape	Fallow	Spring beans
Field surface	Chopped straw, compacted headland	Chopped haulm, lighter than Site A but 'tight'	Minimal weed, cover on surface, wet at depth	Chopped haulm, minimal weed cover
Press setting	2.5	2.2	2.2	2.2
Front disc gang angle	Against 2nd hole stop	Against 2nd hole stop	Against 2nd hole stop	Against 2nd hole stop
Rear disc gang angle	Against 3rd hole stop	Against 3rd hole stop	Against 3rd hole stop	Against 3rd hole stop
Disc depth	75mm	75mm	75mm	75mm
Leg depth	210mm	230mm	200mm	190mm
Average speed	9.0km/hr	9.7km/hr	9.0km/hr	9.2km/hr
Spot output ¹⁾	3.78ha/hr	4.07ha/hr	3.78ha/hr	3.86ha/hr
Fuel used	434 litres	277 litres	240 litres	258 litres
Fuel used/ha	18.31 litres/ha	18.79 litres/ha	16.63 litres/ha	18.70 litres/ha

¹⁾ It is important to note that these are spot rates.

legs (right wing), the particular direction of supply selected by the operator via the cab control box. On this latter point, instant reaction is to question why it's necessary to have the separate controls for both left and right leg wings, effectively doubling up the operator task whenever he wants to alter leg depth. The Besson response is to say that this solution is preferable to a balancing valve, which is prone to eventually working its way out of synch.

With the valves now connected, coupling to the tractor is simply a matter of tweaking the spools to bring the Discordon's heavy-duty hitch to the right height,

The packer depth effectively alters the depth of the rear discs – hence the levelling effect. To achieve the most uniform finish, it is better to tweak the packer setting rather than mess about with the angle of the rear discs.



Depth of the legs can be controlled from the tractor cab on the move. Operator must check that the left and right wing sections are set at the same level.

and then reverse up. Interestingly, the Besson option of a Scharmuller ball hitch is becoming increasingly popular. Backbone to the machine, and the item that provides its inherent strength, is the Discordon's main frame. This comprises



two main chassis rails – 250mm x 150mm x 8mm – with two outer wing sections of 150mm x 100mm x 8mm; the individual soil-engaging elements hang from these wing sections.

Controlling the above, there are two rams back at the rear of the Discordon and one up at the front on the drawbar, the main chassis effectively forming a bridge link between front and back. The two rams on the rear linkage control the depth of the Emopak press unit – a two-section item

on our 4.2m model, this stretching out to a three-section unit on 4.7m Discordons and wider.

It is this 'bridge link' configuration that sets the discing depth – on the drawbar ram and the rear linkage/press. To dig deeper with those front discs, spin the adjuster ram down, and lock using the catch/linch pin.

Then level the machine by pushing the press down or pulling it up, the aim here being to have the drawbar angled from the Discordon up to the tractor drawbar and the cultivator running either level or slightly nose down. Inherent advantage is that the gang angle of front and rear discs can be altered without affecting the actual discing depth, although, in most cases, gang angle is best left untouched anyway. If anything the main temptation is to tinker with the gang angle too much; in our test, for example, we just slightly



Rear linkage and rams provide the point of attachment for the packer. The 4.2m machine uses a two-part Emopak, whereas 4.7m+ units gain an extra section.

steepened the rear gang angle on the one occasion for a more aggressive mix. Returning to those front discs, their main task is to cut/move the soil surface ahead of the deeper loosening legs. On our 4.2m model there are two overlapping gangs with eight discs on each. Disc diameter measures 660mm, spacing 270mm, thickness 7mm, and they alternate in profile

between plain and cutaway. Cutaways are more aggressive and throw the soil out further than the longer-wearing plains, but this all helps with the mixing process and it also means that the discs should keep on spinning in the more difficult UK soil conditions.

In terms of disc spacing, Besson is said to be toying with narrowing the gap down



from 270mm to the 230mm set-up currently used on the smaller DXN model. Whether this would be a wise move remains a moot point. The current 270mm spacing seems to act as a reasonable compromise between offering a fairly shallow work capability – 50mm-100mm – and not being susceptible to bunting up in a wetter season, while a slimmer spacing might increase that risk of blocking. We were happy with the quality of work from the profi test discs so, on balance, we'd probably be more comfortable with the spacing staying where it is now, at 270mm. After all, it would be a shame if the Discordon were to lose its current name for being one of the one-pass tool designs that copes better with a claggy year.

The profi tester consensus was that 'packing' is the one key Discordon area where there's room for improvement. Besson is well aware of this, and is looking at various alternatives.

TECHNICAL DATA IN COMPARISON

One-pass soil looseners with integrated press and working widths of approx 4.0m

Manufacturer Model	Grégoire Besson Discordon DXRV-HD 667-32	Quivogne Tinemaster 4.0m	Simba Solo 380 STR	Väderstad TopDown 400
Working width	4.2m	4.0m	3.8m	4m
Transport width/length ¹⁾	3m/9.9m	3m/9.5m	3m/9.05m	3m/8.8m
Front tools				
Tool design	Serrated/plain discs	Serrated discs	Serrated discs	Serrated discs
No. of main discs/diameter/spacing	16/660mm/270mm	18/660mm/230mm	16/700mm/250mm	30/430mm/125mm
No./diameter of outer discs	-	-	2/610mm	-
Soil-loosening legs				
No. of legs	7 ²⁾	7	9	14
Max working depth	300mm	325mm	250mm	270-300mm
Rear discs				
Disc design	Serrated/plain	Smooth	Serrated	-
No. of main discs/diameter/spacing	14/660mm/270mm	14/660mm/230mm	16/700mm/250mm	-
No./diameter of outer discs	2/610mm discs & 2/510mm covers	2/610mm discs & 2/510mm covers	-	-
Levelling discs				
Design	N/A	N/A	N/A	10 star wheels
Integrated press				
Design	32 Emopak rings	24 razor rings	16 DD rings	32 steel rings
Press diameter	600mm	660mm	700mm	600mm
Running gear				
Position	Rear	Middle	Middle	Middle
Tyres	500/45-22.5	295/45-22.5 ³⁾	500/50-17.0	570/50-17
Weights				
Total weight	9,000kg	9,000kg	6,900kg	6,000kg
Max weight per disc	265kg	250kg	203kg	200kg
Price				
List price excl VAT	£46,525 ⁴⁾	£37,440	£35,500	£39,415

Manufacturer information: ¹⁾ Overall machine length is measured from drawbar eye to rear of integrated press; ²⁾ soil-loosening legs are hydraulically adjustable from cab; ³⁾ Tinemaster has four main wheels rather than two, optional tyres 445/45R19.5; ⁴⁾ Discordon is also available in heavy-duty specification, priced at £52,040 for L-HD 4.2m; auto-reset leg option adds £2,590 for seven-leg model.

Also worth noting is that the outer front disc comes with a deflector disc on its outside, which slows the soil speed off the disc and then works in tandem with the Besson trademark side rake/deflector to retain the flung soil within the width of the cultivator. Over our test the combination was more successful at its dirt-retaining role on the heavy ground than on the more free-flowing greensands. To be fair, however, most machines struggle to leave a totally ridge-free finish when on this very fine dirt. More a problem is to avoid overworking the land. Back one step, we arrive at the Discordon's seven soil-loosening legs/tines that,

On stickier ground we had problems with dirt building up (left) under the shoulder scraper plates. Eventually we decided to remove these plates, which seemed to sort the issue. On greensand, the 32 rings developed quite a shine.



depending on the leg type specified, are designed to operate at 150-250mm below the discing depth. At the base of the leg is a tungsten-tipped point, secured by two roll pins, and behind the point is a steel wing, on this occasion held in place by a nut and bolt. One point should last the life of two or three wings, and the wings need changing when they are more than 50% worn – to move sufficient soil.

Across our 60ha of relatively non-abrasive test ground, we didn't really do enough to obtain an accurate feel for wear rates – other than a little 'necking' of the wings. To give a guide, though, we reckon that it would take around 15mins to change all of the wing plates, depending on how badly the nuts have been rounded off. Leg protection is via a shear bolt, although there is the Besson option to spec auto-reset (£2,590 for a seven-leg model) for those that warrant it.

What's the Besson leg effect? Well, this is perhaps best characterised as somewhere between the result from a Simba ProLift/Kverneland Stubble F and the lighter built Väderstad TopDown. Besson stresses that its machine is no subsoiler for correcting seriously entrenched compaction issues; its leg is more for taking out its own disc pan and lifting/conditioning soil that has slumped together over the course of the past season or two. And this is a task that the Discordon performs with distinction: Digging in and down with a spade, we were happy with the lift effect produced across our test ground.

Back again, we come to the rear discs. As at the front, there are two gangs of eight, the difference being that the rear blades have a 510mm covering disc at either end. Main job for the rear discs is to return the soil that has previously been churned by the front discs and legs to a level surface ahead of the press. Indeed, once initially set up, this is probably the main tweak that the operator has to make in work, to the extent that it constantly amazes just how much difference a fractional adjustment induces. Which, of course, tends to

be the temptation for novice operators. Our tip: Don't over-adjust. Where there is a bit of a central hollow in the work in front of the press, lift the press so that the rear discs drop in and gather more dirt. Conversely, where there's a central ridge, lower the press to raise the discs up so that they're shovelling less soil into the

middle. Simple. In fact, simplicity of set-up and operation rate as two of the big Discordon's major trumps. It really is a matter of 'point and shoot':

- Pull into the field
- Remove packer locking pins. Small point: Why can't this operation be done from the cab?
- Unfold wings
- Pressurise the cultivator wings down for 3secs to fill up the accumulator in the hydraulic circuit
- Set legs and packer to a number on their marker guides – say '2.5'
- Pull into work, do 50m at 7-10km/hr, and stop
- Check the machine is level front to back, and that the front discs are at the correct depth



The daily maintenance on a 4.2m Discordon takes about 45-60mins - to grease all the disc bearings, wheels, chassis and pivot points. Auto-lube lists as a £2,100 option.



Packer locking pins should be inserted before heading out on to the road. We suspect that some operators simply will not bother.

In work, the wheels are largely redundant because the machine is supported by the tractor up at the front and the packer at the rear. However, it is worth setting the provided depth stop so that the wheels just kiss the ground rather than having them hoisted up clear. The big boots then act as a safety measure, preventing the cultivator from terminally burying itself should the outfit inadvertently end up in a boggy patch.

Next, there's the press which, on our 4.2m wide model, was the 4.6m EMP 460 SRV2 complete with its 32 x 600mm diameter, tapered-profile rings. Consolidation tends to be the one area that comes in for most

■ Study the side-to-side level of finish. Do the rear disc gangs need to bring more or less soil into the centre? Adjust this by re-setting gang angle or lifting/lowering the press.

Reality, of course, is that following initial set-up, most operators will only alter the rear press setting in between fields, and perhaps the depth of the legs. But that's it. As we've already said, it could hardly be simpler.

It's not all good news, though, there still being scope for further Discordon design



Discordon folds up to 3m for transport. One of the downsides of positioning the wheels right at the back of the machine is that manoeuvrability is compromised. Turning into tight field gateways can be a struggle.

criticism on many of the one-pass designs, and Discordon is no exception. On our test it did a reasonable job on the heavier ground, though could perhaps have done with more weight. The teeth were

also prone to flicking soil back up to leave a rather rougher surface than expected. Overall assessment: Satisfactory.

GRÉGOIRE BESSON DISCORDON DXRV-HD LINE-UP

Model	667-32	667-36	667-44	667-48	667-52
Working width	4.20m	4.70m	5.70m	6.20m	6.70m
Transport width	3m	3m	3m	3m	3m
No. of discs	32	36	44	48	52
No. of loosening tines	7	9	11	13	13
Weight (kg)	8,520	10,040	10,720	11,900	12,250
Min hp requirement	250	280	340	370	400
Transport wheels	500/ 45 x 22.5	500/ 45 x 22.5	500/ 45 x 22.5	500/ 45 x 22.5	500/ 45 x 22.5
Price	£46,525	£50,710	£57,075	£61,250	£62,995

NB: All of the above Besson Discordon models are also available as more robust 'L' heavy-duty versions with larger diameter discs (710mm, not 660mm) and bigger shafts and bearings (50mm, not 40mm).²⁾ All of the above Discordon models are supplied with an Emopak packer.³⁾ Besson also sells a smaller 3.2m DXN with manual folding discs, plus the all-new hydraulic-folding models (3m, 3.5m, 4.0m) for sub-210hp tractors

refinement. Which brings us to the final elements yet to be discussed - transport wheels and consolidating press.

Unlike most other one-pass cultivators, Discordon positions its chunky 500/45-22.5 transport tyres right at the rear of the machine rather than in the middle. This has advantages in that it produces a very balanced outfit, but then there are some corresponding disadvantages, too. Firstly, it is very tricky to make a tidy job of headland corners because there are no

mark-eradicating tools behind the wheels. And, secondly, the right-at-the-rear wheel position has a major impact on manoeuvrability, both on the headland and when turning in and out of tight field gateways. We, as an example, found it necessary to leave at least six or seven times around the headland to allow sufficient room for single-loop turns when knocking off the landwork, although the fact that we were operating the Discordon in tandem with an equally wide-turning Fastrac possibly exaggerated the problem.

In addition, the press was responsible for our only period of test downtime, when the heavier soils built up under the press rings' shoulder scrapers, finally snapping off a couple of the scraper arms. Besson's suggestion was to remove the shoulder plates altogether and rely on the central scrapers themselves to keep the critical inter-ring area clear. This solution proved effective, and matters also improved once we moved on to the lighter soils, which duly produced quite a ring shine. Again, though, on the naturally puffy greensands we could have done with additional rear consolidation.

Comparing the two soil types of our test - medium clay and lighter greensand - our conclusion would be that the Discordon press was at its happiest on the heavier ground once the shoulder scraper plates had been removed. Ultimately, however, we ...think that Simba's DD ring continues to set the consolidating benchmark for most soil types, and that Besson has some catch-up work to do in this department. On this theme, the French company has already started to offer the options of a



Tug for our test was a 185kW/248hp JCB Fastrac 8250. Shod with Pirelli TM800 710/70R38 rears and 540/65R38 fronts, the tractor hit our target 8.5-10.0km/hr travel speed under most conditions.

745mm rubber ring roller or 745mm steel shoulder ring roller as alternatives.

Back on the positive, the Discordon has plenty of pluses in its corner and more than enough to counter that one 'pressing' matter. In addition to those design strengths already alluded to, horsepower requirement is another. Bearing in mind the robustness of build and the amount of work being carried out, we reckon that 60hp per metre of machine width is one

of the more modest requirements in this one-pass sector and, given our test experience with a 185kW/248hp Fastrac, we certainly wouldn't argue with Besson's 60-horse minimum demand claim.

The Fastrac maintained our 8.5-10km/hr target across all of our test fields, and, in any event, there would have been little point in pushing travel progress to 12km/hr+, as this

would have only served to heat up the soil-engaging metal and increase wear rates. As it was, we were able to clock in spot work rates of 3.5-4.0ha/hr and peg tractor wheelslip to 5-8%.

Summary: 'Not perhaps the most refined piece of kit, but a big brute of a machine that will always go in and will always do a job' was the assessment picked up from a current Besson operator. And that just about says it all.

Simple in its build, simple to set up and very simple to operate, the Discordon has established itself as a reliable performer

over the past 15 years, and it could be argued that this French-built cultivator has little left to prove. Yet time moves on, as does the competition, and there is a whole lot more of the latter than when the Discordon first tucked itself into UK soils back in the early 1990s.

So, how does the Discordon measure up in the current market? A solid all-round performer. A safe bet. That's our view. The design has its weaknesses, such as question marks over consolidating effect - to be fair, that's a criticism of many of its rivals, too - and poor manoeuvrability, but the Discordon more than counters with its strength of build, quality of mix and ease of operation.

As in previous tests, advice to any buyer is to arrange demos of all the alternatives on his particular farm. Some one-pass designs will tickle his tillage fancy; others won't. Bottom line, though, is that this kit depreciates at an alarming rate, irrespective of its colour, so that the £30-40,000 investment decision is clearly not one to be taken lightly. Make the wrong choice, and it'll be costly to put right - big time.