

JULY 2023

DIRECT DRILLER

MAGAZINE

SPRAYING SUPPLEMENT

Spraying Application and Technology



Supporting Knowledge transfer in Direct Driller



Farmer Focus: Steve May

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Low Drift : No Drift

8



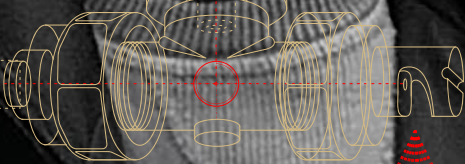
Latest Rogator Sprayers

10



LIQUID

0 - 6 bar



9mm

AIR

0 - 1.8 bar



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FIGHTING WIND WITH WIND

LARGER SPRAY WINDOW THANKS TO WIND

FARMER FOCUS STEVE MAY



With my year as 2022 FSOOTY winner coming to an end here are a few thoughts on the spring workload and how the new sprayer has performed.

First off, I'm Steve May and I work for Fromant and Sanders at Kislingbury near Northampton, a family arable farm with extra contracting work in the form of whole farm contracts and one off jobs covering the local area.

My focus is on spraying, drilling and primary cultivation both in planning and execution working closely with our agronomist and management team.

Cropping consists of winter wheat, winter barley, oilseed rape, winter beans, winter oats and spring barley. Wheat is mainly milling Zyatt and Skyfall (hard group one's) and Astronomer and Firefly (soft group threes). With Septoria and yellow rust pressures very high this season I'm pleased we've managed to keep them all relatively clean so far with a robust fungicide program based around Folpet and Tebuconazole at T0, Prothioconazole and Folpet at T1 and Pyraclostrobin and Folpet at T2 with a few other actives thrown into the mix as well so far.

Hybrid winter barley is grown here. We like the vigorous nature of the plant, its ability to tiller in early spring gives it the power to push on and deliver us some good yields. We have four varieties this year Bazooka, Belfry, Kingsbarn and Armadillo. They do need a strong PGR as they can get very big and we want everything standing at harvest.

Our main break crop is still oilseed rape and I have to say we have been very lucky with it this year; it was drilled with our 6 metre Horsch Avatar after a light cultivation to work in a dressing of sludge in late August following 40mm of rain. CSFB pressure wasn't too high and it got away well, knee high by the end of October! However, the hard frost in December and some patches of winter stem weevil, a pest we've never really seen before, hammered it back hard. With the aid of the pigeons by February it was mainly skeletal but a bit of early nitrogen and good weather it has picked up well and now looks fantastic. It had a long flowering period this year which my honeybees really appreciated, they've done a great job of pollenating it. Here's hopeful for a reasonable yield.

The winter beans are looking strong, drilled with our 4 metre Claydon hybrid drill, some after the plough on some dirty BG ground and some after a light cultivation 50mm deep with a Horsch Joker on the cleaner ground. Germination and vigour seem higher after the plough which may lead us to ploughing a bit more next year. I know I've just used the P swear word in this publication, but you've got to go with what you see on the ground, harvest will tell us what's right or wrong I hope. The forward crop and wet weather have lead us to applying the first fungicide for chocolate spot a couple of weeks early. It'll be interesting to see if it ends up getting

an extra spray because of this, here's hoping not, to try and keep costs down.

We have a small amount of Southwalk winter oats drilled the third week of November with our Kverneland Evo drill as the damp conditions were not suitable for the Avatar. They looked pretty grim all winter, so we went with a bit of early N in February and this has seen them pick up very well to a point where they have needed a robust PGR to mitigate against potential lodging.



JD 6R215 and R975i powerspray

32 hectares of spring barley was direct drilled in mid-April after a grazed cover crop but this doesn't look so good. The decision was taken not to roll it after drilling due to the very damp seed bed conditions. It seems this and the cover crop have led to a boom in the slug population, which in turn have had quite a feast on the young seedlings. This is something we need to look at a bit harder and try to choose our cover crop mix a little better, trying not to incorporate species that encourage slugs. I think Phacelia should be the base and add in a few others.

Overall, the farm is looking good but due to the wet spring Black Grass can be seen all too easily. Like many other farmers, we've been relatively successful over the last few years at controlling it but, as many are seeing this year, it's come back with a vengeance. I'm sure there will be quite a lot of ploughs working this summer to press the reset button as the boffins call it.



Twin select applying 200 litres per ha via 035 and 025 guardian air nozzles together

For spraying operations, we have recently purchased a new John Deere R975i power spray trailed machine. This has also been accompanied by a new 6R215 John Deere tractor. The two units as one compliment each other very well and I'm very pleased with the set up. So far this spring the sprayer has done around 3000Ha of spraying. No liquid fertiliser is applied through the sprayer only ag chemicals and micro nutrition.

I'm particularly pleased with the upgraded joystick which is significantly easier to use. Reversing trailed sprayers into corners is never easy and this has been made easier with the rear wheels self-straightening when the tractor is put into reverse, no more fiddly buttons to press in every corner.

As far as filling is concerned, I mainly fill from base at Kislingbury. We have 40000 litres of water in two tanks I can draw from filled from a bore hole. This is normally enough to keep the sprayer filled even when I'm doing pre-em's at 200 litres/ha. For back up there are also several satellite tanks around the farm. As we are in a hard water area, we have to watch for pesticide lock up and sometimes have to add water conditioners to some tank mixes to counteract this.

When filling the tank, the active pause option on the R975i allows plenty of time to add all the chemicals as it slows the water flow to around 60 litres/minute. When all the chemical is in I simply push the button on the console and it fills again at 1200litres/minute.

When fully loaded the sprayer weighs around 13 tonnes

so we went for the 710 tyres to spread as much weight as possible when the going is not so good in the winter/early spring. Even these this year were not enough to stop some deep ruts being created in March and April that will need rectifying after harvest. For summer work these are switched for 480's, the tractor also runs the same setup.

The sprayer is fitted with TwinSelect nozzle units running with 3 metre GPS auto shut off which suit us better than individual shutoff. In the future I'd like to look at PWM, but this was not available on this machine at time of purchase.

The wind this spring has been particularly challenging. To help applications in less than favourable conditions I can choose 035 Guardian air nozzles running around 1.8 bar pressure at 12 KPH delivering 100L/Ha. When conditions are better, I can choose 025 Guardian air nozzles running around 4 bar pressure delivering 100L/Ha at 12 KPH. With TwinSelect if I require 200 litres/Ha I can run both together. For pre-em spraying I can choose either 05 3D defy or 05 UDL for low drift. All these nozzles are fitted to the boom constantly as there are five nozzle holders. The fifth is taken up with a 03 3D defy. Keeping the boom half a metre above the crop is vital in windy conditions to avoid drift and this is done automatically by the Norac system which I find runs well.

After four months spraying with the new unit, I'm very pleased. It is a bit of a monster when you are stood next to it, but it doesn't matter what sprayer you have now if you want capacity it's going to be big.



 **HORSCH**

STAY CLOSE TO THE CROP **LEEB CS.**

The Leeb CS mounts to the tractor's 3-point linkage to form a compact and manoeuvrable unit that is ideal for smaller fields. Active boom control system is a unique feature in this class, while continuous cleaning system CCS Pro, the induction tank and the 25cm nozzle layout are available for the new Leeb CS. **HORSCH.COM**



Scan to find out more

TOGETHER FOR A HEALTHY AGRICULTURE

REDUCE DRIFT WITH HORSCH LEEB SPRAYER INNOVATIONS

HORSCH has updated its sprayers in each class to offer the highest performance. Close-nozzle spacing, pneumatic nozzle control and advanced cleaning systems are available across all HORSCH Leeb sprayers but at the heart of its sprayer innovation is its award-winning BoomControl system, an advanced boom design that keeps the boom rock steady and as close to the crop as possible.

In addition to BoomControl, AutoSelect and PrecisionSpray create an advanced suite of tools that ensure chemical application is very efficient and productivity is high.

Precision boom control up to 54m

The HORSCH Leeb BoomControl system is a renowned sprayer technology. All HORSCH Leeb mounted, trailed and self-propelled sprayers feature the unique system for exact sprayer boom positioning. Booms from 18m to 54m are held steady at less than 40cm above the crop at speeds up to 30kph, even on hilly terrain.

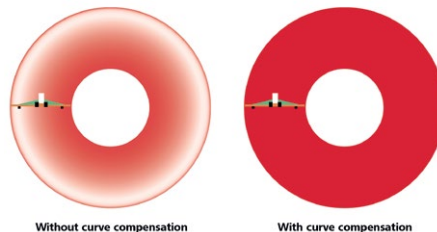
Three versions are available: BoomControl, BoomControl Pro and BoomControl ProPlus. BoomControl automatically maintains an exact, lowest possible working height even at high operational speeds. Boom is completely decoupled from the vehicle and held securely below a target area height of 40cm thanks to active adaption of the boom to the terrain via two boom-tip sensors.

BoomControl Pro expands on this capability by adding active boom adaption via tilt and height control of the middle section. Using four sensors from boom tip to the middle section, greater terrain following is possible by the parallel angling of the boom arms

in combination with the rotation of the middle section.

BoomControl ProPlus goes even further with active adaption of the boom middle section via the tilt and height control and double variable geometry of boom sections. This enables each of the boom section across the boom to lift and lower individually for the closest terrain following.

James Casswell farms at Horbling, Lincolnshire and runs a Leeb 7 GS with BoomControl Pro and remarks, "We expected it to be good, but the low levels of drift are unbelievable. The boom stability is amazing. The guys were spraying on a quite windy day and there was no movement under the boom."



A powerful nozzle control system

AutoSelect is HORSCH's own nozzle control system. In addition to the nozzle and the pressure range, the operator can also adjust the target area spacing. Multiple nozzle carriers and a 25 cm partition on the nozzle bar provide a wide range of possibilities.

Individual or even different nozzle places may be combined into nozzle profiles and up to 16 profiles can be controlled automatically. This allows the operator to ensure the optimum pressure range for the nozzle or the nozzle combination that is used, and that the optimum target area spacing is maintained if the operational speed changes. The boom height can be automatically adapted based on the

nozzle spacings that are defined in the nozzle profiles. More nozzles give the operator a wider range of options.

AutoSelect Pro adds curve compensation for operators not wishing to use pulse width modulation (PWM). By selecting differing nozzle types through the turn, AutoSelect Pro adjusts the spray volume across the boom length to allow for varying boom speed.

PrecisionSpray uses the latest generation pulse width modulation

HORSCH PrecisionSpray pulse nozzle system is available on all Leeb PT self-propelled and Leeb LT and GS trailed sprayers. "Although PWM has been available for some time from various manufacturers, PrecisionSpray is one of the first to integrate the technology completely into our own HORSCH sprayer software without requiring third-party controllers, making it easier to use," explains Stephen Burcham, general manager at HORSCH UK.

PrecisionSpray uses the latest generation pulse width modulation nozzle controls to ensure spray volumes are consistent across the field despite variations in sprayer speed or changes in boom speed when turning. As a sprayer turns the speed of the boom across the ground is dramatically faster on the outside than the inside, and the effect is increased as the boom widths get greater. PrecisionSpray's curve compensation alters the spray volume proportionally across the boom length to ensure the same volume of spray per square metre from the inside to the outside of the turn.

In addition to curve compensation, PrecisionSpray offers stepless adaption of the volume flow at constant pressure and drop size and can adapt the application rate without changing the spray characteristics.



ANGLESEY CONTRACTOR EXPANDS WITH **KUHN SPRAYER**

An Anglesey contractor has invested in a KUHN mounted sprayer to replace his Knight K1840 self-propelled machine. Fuel and time saving has since seen him cover the whole of the island and take on work in North Wales.

At 18 years old, Rhys Jones took on his father's local contracting business in 2015. With only a handful of spraying contractors on the island, he immediately saw an opportunity to grow the business by increasing the radius he operated.



PRECISION SPRAYING
Technology options offer

"The work was there, and I had the Knight, but I soon realised it was uneconomical to cover the whole island using a self-propelled. I looked at trailed alternatives, but the costs were too high, so I settled on the KUHN Altis 2002. It operates at 12km/h in the field, which is similar to the self-propelled, but on the road I can travel at 50-60km/h which makes covering the island much easier," he explained.

The Altis offered the chance to add another tractor to the business which now runs a Valtra T234, and a N174 which is the principal tractor for the sprayer. With auto shut-off, 24 metre gullwing booms, a 2200 litre rear tank and 1500 litre front tank, the Altis was similar to the self-propelled but has provided a significant fuel and time saving to Mr Jones.

"The steel booms on the old machine were heavy and it was slower on the road. Having two tanks means I can use the front to carry water which saves trips when I am on farm. If I cover three or four farms in a day, the time saving can be up to two hours. Also, on the road I have halved my fuel bill, saving 8-9 litres an hour which, with the rise in fuel prices, is a significant cost saving," he said.



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Operating from the family beef farm on the northern most point of Anglesey, Mr Jones has chosen to expand the business to cover the whole island and beyond to make best use of his machinery purchases. Working predominantly on small farms with small fields, he has found the Altis to be the perfect choice.

"The A-frame means I can hitch in five minutes. The booms are quick to open and close and the gullwing design means less wear and tear over time. The best feature is the DILUSET cleaning function which enables me to start the cleaning of both tanks from the cab using the 170 litre front clean water tank and the 300 litre rear tank. It's particularly good if I am changing from a weed killer to a foliar fertiliser, which is often the case on grassland," he said.

Auto shut-off on the Altis makes spraying small fields significantly easier for Mr Jones. He has also installed a nozzle on the end of each boom to spray hedges at headlands. The accuracy, manoeuvrability and added benefit of headland spraying has been



well received by his customers because he can also control weeds in the hedges.

"With the auto shut-off I realised that I could fit wider nozzles to the ends of the booms and shut down everything else. This means that when I turn at the headland, the end nozzle will spray into the hedgerows which means my customers don't have to use knapsacks or ATV sprayers," he said.

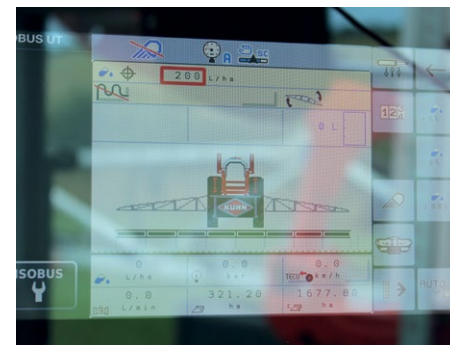


To reduce drift, he added 04 nozzles. The stability of the boom is good, not quite that of the steel booms on the self-propelled machine but it is a small compromise for the weight saving he has achieved.

"I would never go back to steel because of the weight. Each boom on the Altis is in two sections, as opposed to three or even four on some 24 metre machines. Every joint is a potential problem area in my opinion, so this configuration is preferable when you are looking for long-term reliability," he said.

The Altis, like many of Kuhn's sprayers, has aluminium booms, which offer an effective combination of

strength without excessive weight. The machine is notable for its suspended mounting, which reduces the stresses on the machine when in transport. More damage is done to sprayers in transport than when in use in the field, so this is another important advantage for Mr Jones, who travels long distances and has limited time for repairs.



Mr Jones now sprays 2000 hectares across the island. Most is grassland, but he covers 200 hectares of maize and a small area of arable crops too. His aim is to bring on a full-time employee. However, finding labour on Anglesey is no easy task.

"Construction and office work pays better than agriculture so many young people have left Anglesey. Those still here, work on their own farms, so finding someone who can work full time is going to be tricky when the time comes," he said.



LOW DRIFT : NO DRIFT THE BFS OPTIONS

The key aim of Regen Agriculture is to farm more sustainably, both in terms of soil biology in the ground, and profitability of the farm.

Key to this is:

- Minimising mechanical soil disturbance and seeding directly into untilled soil
- Enhancing and maintaining carbon rich organic matter on the soil surface using crops, cover crops or crop residues
- Reducing inputs where appropriate, and using them more effectively
- Product choice – be it varieties with greater disease resistance, fertilisers with less impact on soil flora and fauna, and with greater nitrogen use efficiency, down to nozzle choice when applying pesticides and foliar nutrients

It may seem an anathema for a regen magazine to be talking about spray nozzles, but you have to remember that regen agriculture currently still depends upon the continued use of glyphosate at least. And regen farming is not necessarily “organic” farming – we still expect high crop yields, which depend on the use of herbicides and fungicides. Yes the aim is to minimize their use, and if appropriate omit the application (especially of insecticides) all together.

So, if we have to apply pesticides, there is no point at all in allowing these to stray over the crop edge, where they can adversely affect the adjacent habitats and waterways. Quite apart from the financial cost of lost active ingredient, there can be significant damage to wild plants, insects and mammals.

BFS have been at the forefront in the development of low drift nozzle technology, having introduced the first air inclusion nozzle range in the mid nineteen nineties, namely the BFS Air Bubble Jet. These revolutionized low drift spraying on farm by making “Air Tech” technology affordable to any farmer, simply by utilizing the principle of induction. This is where the pressurized flow of spray liquid draws in air through specific air inlets molded into the nozzle body. These nozzles could easily replace existing nozzles, so any sprayer could become LERAP compliant relatively easily and cheaply.

When introduced, Air Bubble Jets reduced the level of drift relative to a flat fan nozzle, by 75%. The effect of this was a massive reduction in non-target contamination by spray drift. Since then we have brought in a 90% less drift air inclusion nozzle, the BFS



ExRay XC, making drift an unnecessary occurrence. The days of using the original, drift prone flat fan nozzles are severely limited, and really should only be used in perfect spraying conditions where drift will not occur.

Even when applying nutrients and foliar nitrogen to crops, coverage of the target plants is of paramount importance. Low Drift nozzles should always be used. We should never be spreading these products into the grass margins and upsetting the fine balance of nature that lies there. We do not want to encourage very competitive, aggressive weeds that could smother small, native flowering plants.

Nozzle choice is only one aspect of drift reduction programs. Our advice to reduce drift to the bare minimum:

- Select a 4 Star rated LERAP nozzle like the BFS ExRay XC, or at minimum a 3 Star rated BFS Air Bubble Jet
- Do not spray in windy weather. A light breeze is preferable. Never spray if spray droplets are heading towards sensitive margins
- Use a higher volume of water through a nozzle with a larger orifice. This produces larger, less drift prone droplets. BFS have a wide range of larger output



nozzles

- Slow down – there is less air movement to affect the smaller droplets
- Lower the boom, but consistent with the double overlap from adjacent nozzles required, reduces the time it takes a droplet to travel from the nozzle to the target, which is critical – the shorter the time, the less risk of drift
- Alternate adjacent nozzles to face forward 30 degrees forward (BFS produce a 30 degree angled cap) and straight down. There will be less impact between the fan pattern from adjacent nozzles, which causes small droplet formation and thus, potentially higher drift
- Lower the operating pressure, but within the nozzle parameters, to create larger droplets less prone to drift
- Eighty degree nozzles naturally produce fewer smaller, driftable

droplets, so use these if your sprayer is suitable (25cm or 33cm nozzle body spacing)

On a similar environmentally friendly note, BFS also manufacture liquid fertiliser application caps and bars. Again these are so much better for the environment where they can place nitrogen and sulphur accurately and precisely right up to the crop edge, and no further. Again not encouraging aggressive weeds from the boundary.

The BFS AutoStreamer bars are variable rate compatible so accurate targeting is possible, resulting in less fertiliser usage. This, coupled with accurate foliar nitrogen placement by Air Bubble Jets, makes the whole BFS system more environmentally acceptable.

The BFS 5 Star and Nova ranges can be utilised for delivering fertiliser in a band, where it is easily found and absorbed by plant roots as they are germinating and becoming established. These will fit those cultivator type drills with liquid delivery systems,

placing the fertiliser behind a couler in a narrow band. This allows you to reduce the overall application rate of product per hectare, but also you are not encouraging weed growth between the rows. Definitely part of the regen ethos.

BFS products are all designed, manufactured and quality tested here in the UK. So fewer air miles and less impact on the environment. Quality British products.



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APPLICATION TECHNOLOGY

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LATEST ROGATOR SPRAYERS OFFER PRACTICAL OPERATOR IMPROVEMENTS

The latest versions of Fendt's self-propelled Rogator sprayer are now available with new features to improve boom stability, reduce cleaning times and maintenance, while increasing component longevity.

Central to the upgrades is a redesigned plumbing system featuring a separate clean water pump allowing a new ContiRinse system to cut overall tank cleaning times after spraying. The system works on two adjustable liquid volume thresholds, with the first initiating cleaning of plumbing lines that contain chemical residues whilst the operator continues spraying, without affecting the spraying process. The second threshold is closer to the end of the tank load and activates the remaining part of the cleaning cycle as the tank empties, reducing the need to transfer water and flush the system after spraying.

Sam Treadgold is sales engineer for sprayers at Fendt and explains the benefits of the new feature: "ContiRinse is designed to reduce the downtime spent cleaning and rinsing the plumbing system after spraying, making it quicker to change between products and crops. The additional clean water pump allows the pre-rinse cycle to begin whilst spraying and there is now an auto pump shutoff, which switches off the main 785l/min pump after cleaning to prevent it running dry."



New nozzles and valves

All Rogator models are now fitted with new Altek electro-pneumatic nozzle bodies as standard, which replace the



fully electric Arag versions. These are compatible with Fendt's OptiNozzle automatic nozzle selection system which uses different nozzles to maintain pressure and reduce drift, while allowing increased forward speed. Also using the new bodies are a single line Hypro five-way rotary, an Altek twin-line, and an Altek quad-line setup. The valves on the Rogator are now supplied by Banjo.

Mr Treadgold continues: "The changes to our spray systems will increase longevity and reliability of the machines. The new nozzle bodies don't have diaphragms and feature no dead volume areas, so liquid or chemical residues can't sit inside the bodies after use. The electro-pneumatic design also provides increased reliability compared with our old units."



FENDT

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The self-propelled machine for professionals.

The Fendt Rogator 600 meets all the requirements that customers expect from a cutting-edge plant protection implement. With precise boom control, easy handling and optimal, reliable application, the Rogator 600 is the perfect all-round solution.

It's Fendt. Because we understand Agriculture.



Boom stability has been improved with six OptiSonic height sensors – previously four – to keep the booms automatically adjusted in uneven crops, increasing application accuracy. The central sensor has been repositioned away from the rear axle to keep it free from debris.

In the VisioCab, the Rogator now gets the option of a dedicated fridge, keeping contents chilled down to 0°C. The cab comes with category 4 filtration as standard, so the operator is well protected. There is an improved handsfree system with a centrally located gooseneck microphone to improve call clarity, while stronger

mirror mounts reduce vibrations on rough terrain.

Single piece chassis

The self-propelled Rogator machines are all underpinned by the same one-piece chassis and driveline setup, as Mr Treadgold explains. “The tailored single-frame chassis design has several key advantages in the field. When the sprayer is loaded and the booms are unfolded, the machine registers a perfect 50:50 weight distribution, with the positioning of the engine and spray tank key to allowing the weight to be spread across the whole machine.”



Benefits of the design include reduced soil compaction and ability to travel in less favourable conditions, and, as all the machines use the same layout, servicing and maintenance is also made easier.

Mr Treadgold continues: “The design of the tank has further advantages as it allows the Rogator to achieve a steering angle of 35 degrees and an inner turn radius of 3.14m, which increases manoeuvrability. This means that crop damage is kept to a minimum, with tighter headland turns achievable to reduce the need to reverse into tramlines on awkward shaped short works.”

Rogator range

Fendt’s Rogator machines are the sole offering from the brand in crop protection machinery and the range consists of three models – 645, 655 and 665 – all feature Pommier aluminium booms in widths from 24-39m. Tank options start with the 3,850-litre model and finish with the 6,000-litre unit, which is the only option on the largest Rogator 665. Power comes from a six-cylinder AGCO Power engine with outputs varying from 210hp up to 307hp, depending on the model.

Fendt’s HydroStar CVT transmission powers all models and, as Mr Treadgold says, the integrated Control Drive System (CDS) only uses the power the Rogator requires, helping to trim fuel use.

“The drivetrain consists of a variable displacement pump and wheel motors to deliver the exact amount of oil depending on the ground speed and torque at any given moment, controlled via the CDS. This allows the speed of each wheel to be adjusted independently for automatic traction control and, when run with the automatic engine RPM, which works like Fendt’s TMS system, it can help keep fuel consumption to a minimum,” concludes Mr Treadgold.

HARDI TWIN FORCE

Want to save time, money and reduce your environmental impact during spraying operations? The TWIN FORCE boom from HARDI employs the world's best system for spray control. Using an adjustable curtain of air to entrain and direct the spray, TWIN FORCE can reduce drift by an astounding 80% in comparison to standard boom configurations.

The result is close to no loss of plant protection products or contamination of adjacent areas, saving the grower money and ensuring peace of mind that their crop is consistently and successfully targeted. Air-assisted spraying also guarantees more accurate spray penetration and coverage than conventional applications. All this translates into real savings for the farmer of at least 50% on water usage and up to 30% on plant protection products.

TWIN FORCE booms from HARDI gets the job done faster. Efficient drift control means more spraying days – studies prove an average increase from up from 31 to 76 spray days – as well as higher application speeds and fewer refilling stops. The result is higher sprayer productivity.

As well as an increase in efficiency, HARDI TWIN FORCE gives the operator more options for spray control than other air-assisted sprayers. By adjusting the air curtain's speed and angle, from no air to full air, in effect producing two sprayers in one (hence the name – TWIN), the operator can guide all droplets, irrespective of size, to the target. Two powerful blower units provide air to the left and right side of the boom. Each blower can be automatically adjusted to a maximum output of 2,000 m³/h per metre of boom and a maximum air speed of 35 m/sec.

Weather dictates almost everything a farmer does, and spraying is no

exception. Wind in particular can force a farmer to interrupt or postpone spraying due to the ultimate risk of drift. With efficient drift control, this is factor can become a thing of the past. Not only does air-assisted spraying prevent small droplets from drifting by blowing them downwards. It also opens the crops canopy to encourage better penetration. The air curtain parts and rustles the crop to expose all surfaces to the spray, and the droplets' extra momentum created by the air propels them into the crop.

The outstanding performance of TWIN FORCE has been confirmed by numerous case studies from around the world along with field trials and studies. One independent, scientific study from the Research Centre Flakkebjerg/Aarhus University, Denmark, demonstrated that the spray application quality of a HARDI TWIN sprayer with a 24-metre boom was unaffected by high wind at driving speeds of 8 to 12 km/h.

The researchers concluded that



TWIN gives a more uniform deposition and significantly lower drift than conventional applications, especially in windy conditions. The study confirmed that TWIN can reduce spray drift by up to 80% – translating into a reduction in use of chemical products of up to 30%.

HARDI however are determined to further enhance growers' savings with spraying technologies and in-house developed techniques, available from the original crop care specialists. Needless to say, the manufacturers can now prevent under and over-dosing with their PWM system, 'HARDI PulseSystem'. The HARDI PulseSystem is the future of application technologies, currently available on the conventional DELTA FORCE boom on AEON and NAVIGATOR, plus the TWIN boom on AEON.

Together with the TWIN boom configuration on the HARDI AEON, which already has best-in-class drift reduction and penetration characteristics, the Danish in-house manufactured pulse-width modulation system, HARDI PulseSystem is an essential additional step forward in controlling where pesticides are applied directly from the driver's seat. Combining two innovative drift-reducing technologies, HARDI has developed an application solution with the potential to deliver spray directly into the crop where the plant needs



it, with minimal drift, thus improving efficiency and reducing costs for the grower.

By opening and closing the nozzles, the HARDI PulseSystem can keep the nozzles open from 30-100% at the same pressure flow while ensuring the droplet size is unaffected, regardless of working speeds. Drift is also minimised while the flow rate is optimised, as the desired droplet size can be maintained throughout spraying operations.

In addition, the PulseSystem works with a single nozzle on/off – at a width of 36m, control of all 72 nozzles at a single nozzle level. This can be done via a digital field map – and savings of up to 90% are possible by treating only the desired areas within the field.

Built onto the new HARDI AEON CenturaLine, HARDI's high-tech sprayer, developed in guidance by the principles of lean farming – to do more with less, HARDI presents the latest in sprayer innovations. Available with tank capacity of 4200 and 5200 litres, and boom widths from 24 to 39 metres, the AEON is the solution to the future of crop care for the forward-thinking farmer.

HARDI have used the latest



technology and the most up-to-date automation solutions to allow farmers to improve productivity while reducing drift and chemical loss with the CenturaLine product line. The HARDI AEON sets a new benchmark for increasing food production in the face of growing environmental and climatic concerns.

The starting point when developing new machines at HARDI is always the

farmer, and the AEON CenturaLine is no different. The AEON is designed to be user-friendly and with optimal safety in mind. As with the whole HARDI product range, the new AEON is built to last, without compromising on design. It is a stand-out machine with a sleek and dynamic modern look. The newly developed chassis and unique tank design provide maximum stability both in the field and on the road.

AGRIFAC TECHNOLOGY

Growers need the guarantee that chemicals are sprayed with the desired rate in the right place, so the solution can work to protect and feed the right plants in the exact location necessary. Over the years, Agrifac have continuously worked alongside the grower to fulfil innovative solutions in the form of spraying technology to aid in this guarantee. Developed, manufactured and proven in-house, Agrifac technologies are meticulously designed based on years of research both in the field and in the farm office alongside growers. Dedicated to ensuring the highest quality yield without compromising on quantity, Agrifac's tailored solutions are proving beneficial worldwide, as the company soars ahead of competitors as the only manufacturer to offer in-house solutions built into the machine during production; streamlining the assurance of having one point of contact for all machine questions throughout the customers' ownership experience.

Since self-propelled crop sprayer production began at Agrifac nearly 30 years ago, machines have always been manufactured to offer the most stable chassis on the market; Agrifac call this StabiloPlus. This patented chassis design prevents the boom from swaying on uneven terrain and reduces tracking by ensuring equal weight distribution across all four wheels, ensuring operator comfort and peace of mind that the boom is working at perfect harmony parallel to the crop. StabiloPlus also

assures an ideal weight distribution in all situations for optimum traction and the least possible ground pressure. Through its low weight and low centre of gravity, the sprayer can also maintain its standard high ground clearance of 125cm during road transport. Thanks to this proven patented base design, growers are safe in the knowledge that their machines are built on a strong foundation.

Adding to the balance of the machine and contributing further to the stability



of the spray boom, Agrifac developed a naturally balanced J-boom which is standardly equipped on all Condor variants. The boom is naturally balanced, meaning that no overbearing balance system must be developed: Brilliant Simple. The Agrifac J-boom rolls freely over a moon-shaped suspension which ensures that the boom is perfectly in balance at all times: Agrifac call this BalancePlus. To further improve the balance under all spraying conditions, Agrifac developed the StrictHeightPlus height control system. With this system, BalancePlus and variable geometry work in harmony to keep the boom free hanging in all situations. Therefore, the boom can move freely, and the movements of the machine, even in rough and uneven terrain, are not passed onto the boom, resulting in the calmest and most stable boom ride possible, ensuring boom balance and improving



quality as the boom stays at the correct pre-set height. The full integration with Agrifac's BalancePlus system enables the boom to stay completely balanced, which means that machine movements

Single nozzle sections to prevent overlapping, overdosing and allows each nozzle to be switched on/off individually. Turn compensation for 100% coverage is achieved by ensuring a consistent spray rate when making a turn, determined by fast and slow-moving nozzles, depending on the placement and swoop of the boom. Pressure independent rate control is also executed by changing the flow rate automatically, keeping the spray pattern and droplet size the same irrespective of speed or pressure.

In order to achieve all this, StrictSprayPlus calculates the speed and required spraying rate for every nozzle. These values are used to determine how much every single nozzle needs to spray. The flow is controlled by changing the time the fast (up to 100 times a second) switching nozzle body is open and closed. By varying the frequency and the open/close ratio the final rate per nozzle is established. Due to the ability to change the opening and closing time individually, the number of switches per second is as low as possible, but as high as necessary. This ensures the spray pattern is always accurate, while the lifespan of the valves is extended.



spray quality. Due to the full integration in the EcoTronicPlus user interface control system, it is very easy to use.

This fully integrated boom control system from Agrifac guarantees the chosen distance to the crop is consistently maintained. By using four wide view sensors on the boom, Agrifac machines receive a reliable and accurate measurement of the crop. The benefit of using wide view sensors is simple: a wide view gives a better overview of the crop. This means that the system can 'read' the situation better and it will not be affected by irregularities in the crop. This leads to no crop damage and optimal spraying

will not impact the boom. Together with the variable geometry and the accurate reading from the sensors, it makes StrictHeightPlus the most accurate and advanced height control system on the market, resulting in a more accurate spraying height, better spray quality and longer machine lifetime.

Need a solution to help control a consistent rate of application across the whole field without compromise? With Agrifac's in-house PWM system StrictSprayPlus you can and will apply perfect amounts everywhere every time. StrictSprayPlus has three characteristics which help it to apply the exact amounts.



Save up to 30% chemicals

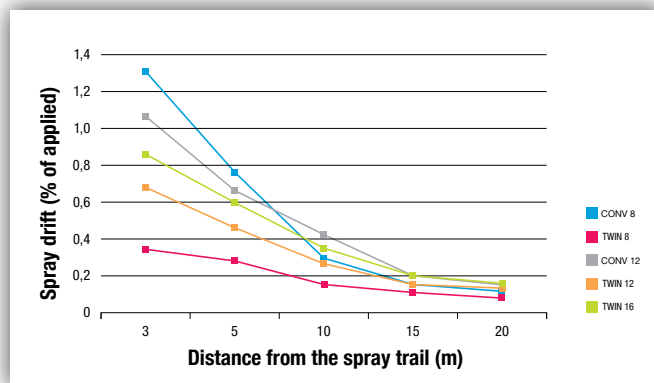
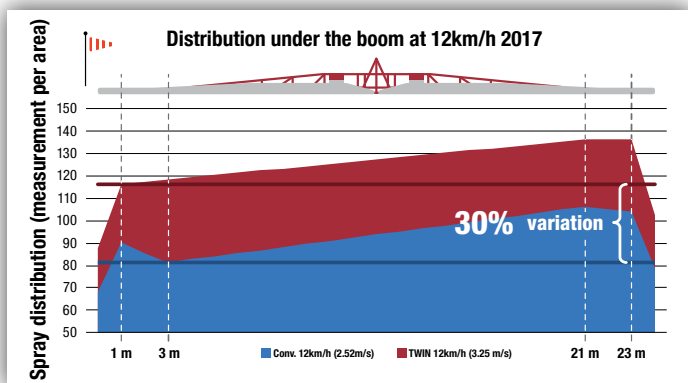
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