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Trends in combine harvesting

Presented here are important technical trends in combine harvesting as reflected in the machinery and equipment program at Agritechnica 2001. The preview cannot take the place of a visit to the event and instead only offers preliminary information and does not claim to be comprehensive.

Amongst interesting innovations from combine manufacturers at Agritechnica 2001 will be more threshing capacity and computer-supported systems for increasing daily performance and work quality. Rotary systems are increasingly produced for highest threshing performance. With walker combines reaching their transport width limits, rotary systems are also being offered in the biggest walker classes giving threshing performance better than the walker machines.

The suppliers are focussing development activities on the header for simple adjustments to meet different operational conditions, and offering the possibility to be changed for rape harvesting and even for harvesting reduced row space, or row-independent, grain maize. The capacities of grain transfer wagons have been increased for optimising transport performance and simplifying the logistics of getting the grain in.

For intensive exploitation of harvesting „weather windows", daily servicing requirements have been further reduced. For the further-developed threshing and separation systems, header manufacturers offer technologies to optimise crop inflow and thus help increase performance and minimise header adjustments or changes.

Interesting developments

A cutterbar has been developed by the Austrian manufacturer Biso Schrattenecker with a cutting table that can be steplessly lengthened to 70 cm. The side separation knives are permanently mounted and need only be moved into a vertical position for harvesting rape. The cutterbar enables table length to be adjusted to fit crop conditions so that the crop flow into the machine is consistent. Additionally, there are very few readjustment requirements for rape. Under the most difficult harvesting conditions with a long-strawed crop lodging across the direction of combining, both straw separators and side knives can be used together.

Kemper offers a corn head for harvesting narrow row grain maize allowing, for the first time, almost row-independent harvesting. Again for the first time, this system allows narrow row establishment of maize with the same plant population density so that the higher yield potential can be exploited.

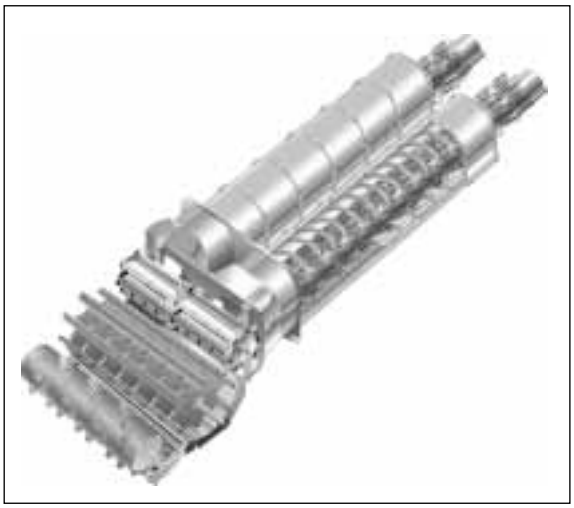
Agri-Broker markets so-called ALFA universal sieves for combines. These sieves, which are known abroad, feature, according to type, broader and longer grids aimed at improving wind channelling within the screening table and thus increasing threshing performance where this is limited by the screening table.

With straw chopping and distribution technology, increasing cutting width, higher yields and increasing proportion of minimum cultivation systems all present higher requirements. Increasingly, chaff is fed into the chopper so that it can be spread evenly along with the straw. For this the Swedish KPAB uses additional fans. AKRON Maskiner AB from the same country uses a chaff distributor which spreads the chaff over the distribution plates of the chopper, even where straw is swathed. Practice indicates that standard chopper technology, especially on the big combines with more than 6 or 7 m working width, has reached its limits. Here more development work is certainly required.

AGCO, marketing its combines in Western Europe under the names MF and Fendt, presented the new tangential combines with eight walkers back in 2000. With an unchanged channel breadth of 1.68 m, eight narrow walkers are used instead of six wide ones. Along with changes in the concave, the aim is increased threshing performance.

In 2000 Case marketed its new CF 80 (Cross Flow) six walker combines as the highest performance conventional threshing system machine. Under this are offered conventional walker systems as well as centrifugal separation. The USA-produced axial flow combines have also been further developed. The new axial rotor presented for these machines is now fitted with an intake auger instead of intake flights for improvement of material flow to the rotor and an increase in threshing performance.

Claas presents the rotary combine Lexion 470.The threshing and separation system is the same as the best-selling top of the range Lexion 480 but with a channel width of 1.42 m. Performance is better than the most powerful walker combine but the transport width with 650 front tyres is 3.2 instead of



Rotary threshing system of the new Claas Lexicon 470 with 1.42 m wide threshing channel

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The 9880 STS John Deere axial combine features well-designed sensor technology

3.5 m. Detail improvements include fuel consumption recorder which will be especially useful for simplifying bills for work spread over several farms, hydraulic elevator chain tensioning, which reduces service time, and an improvement in yield sensor precision.

For each of the highest performance five and six walker models a new walker aid is available in the form of finger rotors. These spread out the straw over the walkers so that the remaining corn can be more intensively separated. The new finger rotors in the John Deere walker combines work to the same principle, although in a different scale, and replace the well-known cross-shaker.

John Deere has completely changed its combine range. The new walker combines have the description WTS (Walker Threshing System). The tangential rotary combines are called CTS (Cylinder Tine Separator). These were presented at the last Agritechnica and are now also assembled at Zweibrücken. The top model is the axial combine STS (Single Tine Separator). With 347 kW engine power it is currently the most powerful in the world. Through clever sensors such as a broken grain sensor and a throughput regulating „intelligent" system through Fuzzy Logic work quality and performance are optimised.

The STS features an axial rotor fitted with threshing segments and tines surrounding by a housing that widens from front to back towards the threshing area to impart a loosening effect. Material flow to the rotor is via a guiding rotor under which lies a patented guidance system. This divides the harvest material flow into three levels to simplify the direction change and intake by the individual rotor flights.

Compared with the 22 Series, the walker combines (WTS) have been intensively reworked. Behind the well-known threshing system with altered concave is now added a half concave for further separation under the turning drum. The walkers are now shallower with more steps up front. The new walker aid, the finger rotor, is situated in the rear area shortly before the service opening. The walker combines are also fitted with the CTS screening table with intake auger and precleaning sieve and also have new cabs. The old 22 Series cab is now on the Brazil-origin five, and now six, walker combines, the models previous to the Z Series.

Deutz-Fahr has concentrated its activities on increasing operator-ease. The three models 5670 to 5690 are based on the well-known Topliner models and feature the ergonomical Commander Cab III. The top model features a water-cooled engine with 235 kW.

New Holland replaces the proven TX combines with the new more powerful CX range with engines of up to 276 kW. The walker combines with unaltered threshing channel breadth of 1.56 m are fitted with a large-dimension centrifugal separation threshing system for increased performance. Drum diameter is 75 cm. The diameter of the turning separation drum has been reduced to 42.5 cm and the diameter of the centrifugal separator increased to 72 cm. Behind this big threshing system rotates the well-known turning drum with new tooth-plates guiding straw onto the elongated walkers.

When required at all, daily servicing of the CX combines consists only of cleaning work. The Bosch electronic cylinder pressure regulating system with oscillation damper is used for the header. This allows complicated sensors to be done without and increases ease of operation at rapid turning on uneven ground and during road journeys with less distractions such as clattering cutterbar or corn head.

Along with their futuristic design the CX combines attract with their large-dimensioned cab which among other things gives the driver a big coolbox for food and drink and offers high comfort. The adjustable monitor shows all harvesting and engine data and the yield sensor requires only one calibration per season.

The grain transport logistic must match high combining performance and thus large hourly yields. To load a truck and trailer in a single operation HAWE have produced a grain transfer wagon with Tridem axles and a capacity of 32 m^3. This reduces haulage contractor waiting times and increases transport performance in the field. More bale collectors are on offer for big bales. Along with pick-up and transport, these can also unload the bales onto stacks. The vehicles are mainly foreign. For instance, Frost markets the Spanish-built collecting vehicle from manufacturers arcusin.

Cutting table and intake of the new Case AFX 2388