

TWO WHEEL TRACTOR NEWSLETTER – OCTOBER 2014.

A group of colleagues at the Conservation Agriculture module of China Agricultural University in Beijing have published a comprehensive review of seed drills for 2WT.

It is entitled:

Development of small/medium size no-till and minimum-till seeders in Asia: A review

He Jin, Zhang Zhiqiang, Li Hongwen*, Wang Qingjie

The reference is: International Journal of Agriculture & Biological Engineering Vol. 7 4 pp 1-12

It can also be found at the link below.

<http://www.ijabe.org/index.php/ijabe/article/view/1399>

Another review of the available CA equipment for 2WT was presented by Frederic Baudron of CIMMYT East Africa at WCCA6 in Winnipeg in mid-2014. This can be found at:

<http://www.ctic.org/media/pdf/WCCA/06%20Appropriate%20and%20Equitable%20Frederic%20Baudron.pdf>

Enamul Haque (Ide Bangladesh) has provided me with some pictures of the most recent models of the VMP rotary tillage seed drills in Bangladesh.



These units have the vertical plate seed meters, and also now have a seat for the operator. However I assume the tail wheel needs to be manually lowered for transport, and the soil engaging components cannot be conveniently raised at the end of each row.

Progress with 2WT ‘Happy Seeder’.

Jack McHugh (CIMMYT CA specialist located in NW China) has sent a picture of the latest prototype 2WT ‘Happy Seeder’ being developed in China. This implement operates on the same principle as the 4WT ‘Happy Seeder’ models. This consists of a set of high speed flails which operate close to (but not touching) the soil. These flails chop up the previous crop residue. These are followed by a set of tines which plant the new crop. A set of press wheels track behind to press the rows, and also act as a depth control.

At this stage, this development looks promising. However a 20 HP 2WT is necessary, as the flail chopper takes considerable power to operate.

For more details, contact Jack at a.mchugh@cgiar.org



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Scott Justice has alerted me to a recently published article- details of which are shown below.

Walking the Tight Rope of Tillage Technology Choice: The Peasant’s Dilemma in the Ubaruku Village of Tanzania

http://www.globelicsacademy.org/2013_pdf/Full%20papers/Agvei-Holmes%20full%20paper.pdf

There is no mention of CA discussion but it still an interesting analysis of Siam Kubota vs Chinese 2WTs in Tanzania.

Which unit do you prefer?

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Latest Modifications to the 'Gongli Africa' 2WT seed drill.

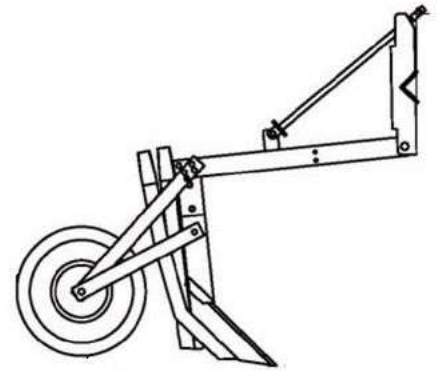


This is a side view of the latest prototype. The original tool bar setup has been retained. However the centre bar has been removed. At this time the original 4 row seed box is in position. This will be changed over to a 2 row vertical spoon seed metering system, as on the first 'Gongli Africa' seed drill. An operator seat has been fitted, along with a steerable tail wheel (taken from standard 2WT)

However the principal modification is the incorporation of a mechanical lift system for the unit. This will allow the mechanical raising and/or lowering of the tine assemblies whilst remaining seated.



An additional 50 mm square sub-bar has been fitted 90 mm behind the front bar of the implement. This bar is on an axle (currently two 20mm bolts). A 20mm hole has been drilled through each side rail and a 20 mm HT bolt fitted.



The Stumborg/Mongolia spring tine.

A close view of the spring layout on the tine assembly, showing the retaining clips. This is modelled on the unit designed by Mark Stumborg (ex Canada Ag. & Food), and was developed for a small seed drill in a joint project in Inner Mongolia.

Each tine is bolted to the sub-bar which can rotate to raise and lower the tine assemblies. The whole sub-bar can swivel through 20 degrees up and 20 degrees down, whilst the main tool bar frame is still rigidly attached to the tractor, and supported by the tail wheel at the rear. Note that the spring on the 45 degree strut assembly (which gives the down pressure to the tine) is adjustable for pressure by setting the retaining clips in various holes on the tube.



The LH picture shows a rear view of a 'rope trip lift'. The rope trip lift is also shown in RH picture. This drives from the countershaft above the front tool bar.

This is from a 65 year old seed drill. These lift systems are driven by a chain from the main drive wheel of the traction unit. With each trip of the lever the whole mechanism rotates through 180 degrees. When fitted with a crank and lever system this device can raise and lower the tine assemblies. One trip to fully raise the tines, a second trip to return the tines to the operating position. These are sometimes called 'half revolution clutches'. Full details of the patent for this lift system can be found at: <http://www.google.com/patents/US1967826>
The combined weight of the two tine assemblies and associated parts is 60 Kg, and a manual lever lift system may require too much effort.

If any reader knows of an alternative simple and compact half revolution clutch which can be used, please let me know.

I realise that in addition some more structural modification of the tool bars may be required from the previous version of the 'Gongli Africa'. The current width of the tool bars is 1000 mm and the maximum row width attainable is 800mm. In order to obtain a row width of 1000 mm a pair of 1200 mm wide tool bars is required. Also, as the sub-bar reduced the front-rear bar spacing by 90 mm, the side rails will be extended by 90mm to give proper clearance to the tine assemblies. Appropriate changes to the seat support rail will also have to be made.

There are also issues with the tool bars flexing when the trip lift system is operated. Some structural alterations may be necessary.

With these extra modifications, there are several advantages.

- The operator can raise and lower the tines readily while staying seated.
- The lift system to raise and lower the tine assemblies is completely separate from the pressure spring system for the tines
- The tine pressure is adjustable. This ensures that different spring settings can be made for varying soil conditions.
- The original 50 x 12 tines are retained, and are fully adjustable.
- Other soil engaging assemblies (disc openers) can be fitted in lieu of tines.
- There is still provision for cutting coulters if required.

A short (33 second) video of the seed drill in action can be viewed at

<http://s134.photobucket.com/user/nswnotill/media/Two%20wheel%20tractor%20videoes/Gongli%20Africa%20mechanical%20lift.mp4.html>

For this demonstration the seed box drives have not been connected, and the unit is fitted with a cereal seed box. The row crop seed box is yet to be fabricated.

I acknowledge the advice and practical support of Paul Nash (Dept. Primary Industries-Tamworth) and helpful suggestions of Des Mason (Sow Ezy P/L Toowoomba Q'ld)

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Late News:

A final year Ag. Eng. student from University of Southern Queensland, Toowoomba, Australia will be doing a project in 2015 on the design of the latest 'Gongli Africa' 2WT seed drill. Miss Amy Brumpton (who is from a farming family in South Western Queensland) will be supervised by Prof. Guangnan Chen, who has directed the previous Ag. Eng. student projects on 2WT at USQ. Amy will be critically examining and testing the design, so that the complete implement is structurally robust and durable enough to operate in a range of soil and residue conditions. Different drive systems for the seed and fertiliser meters may also be studied.

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Feel free to send comment and opinion on any aspect of the subjects being discussed.

Back issues of the 2WT Newsletter can be found at:

<http://conservationagriculture.mannlib.cornell.edu/pages/resources/twowheel.html>

Note: This newsletter has been sent in a low resolution pdf. format for those on slow internet connections. If you require the newsletter or parts of it in higher resolution please let me know.

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