

EVALUATION OF CHECCHI & MAGLI UNITRIUM 45 TRANSPLANTER.

PROJECT C2021-0101



Respectfully submitted;
Walter J Brown, President
Quality Crop Care Inc.

1: Project title and number:

C2021-0101 – Checchi & Magli Unitrium 45 4-Row transplanter.

2: Project leader and collaborators:

Shawn Pope - Owner

Dale Lewis - Operator

Wally Muir – Maintenance staff

Nadine Simpson – Business Growth Officer, NBDAAF - Sussex

Walter Brown - Quality Crop Care

3: Summary:

The Unitrium 45 transplanter functioned very smoothly in the field resulting in faster planting speeds and improved transplant establishment. The wavy coulter provides an opening for the furrow into which the transplant plug drops with no impact from previous crop debris in the field. The angled press wheels produce good soil contact around the plugs resulting in transplants that are well established and continued to grow in the field where no irrigation was used as well as under irrigation.

With a full crew the Unitrium 45 is capable of transplanting 5 to 6 acres a day across most field conditions compared to 3.5 acres with the old machine. On a field with a silt loam soil in ideal conditions the transplanting crew actually transplanted 7 acres on one day. In comparable field conditions the Unitrium 45 transplanter will result in reducing the planting time by 30%.

4: Introduction:

As a farming operation we produce cabbage as our main crop (year-round storage), sweet corn, strawberries, broccoli, four types of squash, pumpkins and cucumbers totalling over \$850,000 in sales. We currently use transplants for an average of 70 acres of cabbage and broccoli. The planting window for crops is very narrow, with good planting days occurring sporadically here and there over an extended period. Being able to plant more efficiently would allow planting in a more cost-effective manner while saving time. Operating with our traditional planter results in an uneven stand due to skips, doubles and variable seed depth. Extra labour and time is required to go behind the transplanter to fix skips, and transplants that were incorrectly planted. The Trium 45 transplanter ensures high output for efficiency.

5: Project objectives:

To purchase and evaluate a new Unitrium 45 transplanter under NB farming conditions.

6: Project deliverables:

1. Planting speed vs stand uniformity
2. Efficiency analysis (estimation of time and labor savings)

7: Technical Innovation:

On traditional planters, the transplant does not always fall into place and get planted at the correct depth. And debris such as old corn stubble or cabbage stocks can also cause skips and incorrect plantings.

The Unitrium 45 transplanter has a number of improvements over older technology that results in better survival and reduces miss placed transplants. Starting with the planter units a wavy coulter cuts into the ground prior to the transplant being dropped to allow for more uniform planting. The transplant units are independent allowing for semiautomatic plantings for both tapered and pyramid-shaped clod plants. It is also capable of handling transplants with very developed leaves, as well as small plants, and various soil types.

Planting more efficiently also opens up the opportunity to plant more acres over the same planting season. The 10-cups rotating distributor ensures high output and standards of comfort for the operator with an estimated production of 4500-5000 plants per hour per row.

A new self-cleaning aluminum kicking mechanism with a self-adjusting spherical joint ensures that the transplant leaves the unit at the desired depth standing upright. The distributor can also be adjusted placing the plug at an the correct position with relation to the packing wheels

Tapered packing wheels with a reduced edge insure that the soil in packed firmly around the plugs. This results in better plug establishment with quicker moisture uptake by root system of a the transplants.

8: Evaluation Methodology:

A split field experiment will be established to compare uniformity, for the traditional transplanter vs the Unitrium 45. Assessing stand establishment will be done through a count of skips and doubles. A calculation of time and labour savings will also be reported.

9: Results and discussion:

There are a number of technology improvements on the Unitrium 45 transplanter in picture 1 when compared to older machines. A wavy coulter cuts a path for the machine to open the chanel for dropping the transplant plug. The packer wheels are set at an

angle which improves the soil-to-plug contact. The machine came with a 10-cups rotating distributor which ensures high output and standards of comfort for the operator with the capacity to drop 4500-5000 plants per hour per row.

Picture 1: Unitrium 45 Transplanter.



There are numerous control points that allow for pin point adjustments for the planter operations. The depth control for the wavy couler that cuts the chanel for the planter, shown in picture 2, reduces the effect of debris from previous crops. There are controls for placement of the plug drop in relation to the packing wheels and planting depth of the plug in picture 3. These controls have a lock mechanism that prevent accidental movement of the adjustments once the desired settings are made.

Picture 2: Couler Depth Control. Picture 3: Control for Plug Depth and Drop Position.



There is one setting for plant populations on each of the 2 row units consists of selecting the drive cog in picture 4 to get the correct distance between the plug drops. As with any new equipment some time was required to find the settings required to give the desired population for the various crops being planted. There is also an adjustment for setting the planting depth on each of the units wither planting on raised beds or at field level.

Picture 4: Plant Population and depth settings.



Some time was spent in the field during the planting operation following the planter and having a discussion with the operator as to how the transplanter compared with their older machine. The Unitrium 45 transplanter was the only machine used at Belleisle Farms during the 2020 planting season. Any comparison of this machine to that of an older transplant technology would have to come from a similar machine being used on another local farm.

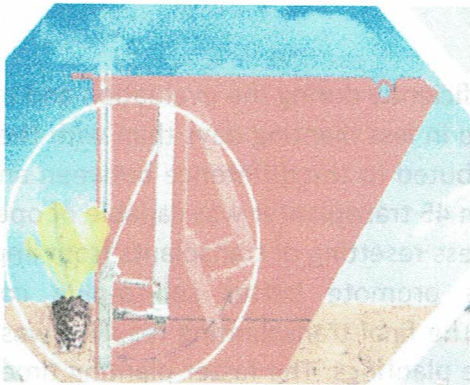
The 4 row transplanter evaluated in this EARL projects consists of 2-2 row units mounted on a tool bar. Both units run off a common drive which results in the plant drop for all 4 rows being dropped in a similar sequence, in picture 5 resulting in a uniform look across the 4 rows. The angled press wheels bring the soil in against the plug resulting in better soil contact.

Picture 5: Plug drop.



The kicker mechanism shown in a schematic taken from the promotional brochure in Picture 6 illustrates the action of mechanism in the planting operation. The in field result of the kicker mechanism is shown in picture 7 with the plug leaving the press wheels standing in an upright position and well placed in relation to the press wheel action.

Picture 6: Kicker Mechanism.



Picture 7: Actual Kicker Mechanism in Machine.



With the packer wheels working at an angle to the rows this transplanter is very effective at setting the plugs firmly in the soil. The number of plugs that require resetting are small however there is still a requirement for people to follow the planter to complete this task.

We did not have the opportunity to have their older transplanter working in the same field but was able to follow a similar transplanter to their old unit working on another farm. Looking at the comparison of two fields 7 weeks later when the plants are well established the rows planted with the Unitrium 45 are full with no skips in picture 8. The

planter using the older technology did have some skips where the transplants did not establish.

Picture 8: Unitrium 45 Field July 27.

Picture 9: Older Transplanter Field July 27.



The Unitrium 45 transplanter functioned very smoothly in the field. The transplants established well and continued to grow comparably in fields where no irrigation was used as well as under irrigation. With a full crew the Unitrium 45 is capable of transplanting 5 to 6 acres a day across most field conditions compared to 3.5 acres with the old machine. In comparable field conditions the Unitrium 45 transplanter will result in reducing the planting time by 30%.

On a field with a silt loam soil in ideal conditions the transplanting crew actually transplanted 7 acres on one day.

10: Conclusions:

The Unitrium 45 transplanter worked very efficiently during the evaluation and resulted in establishing the farms acreage of Cole crop in less planting days than with the older transplanter. While some of this can be attributed to the difference between an older transplanter and a new machine, the Unitrium 45 transplanter was capable of operating at a faster speed in the field while requiring less resetting of transplants from improper plug drops. The angle of the packing wheels promote better soil-to-plug contact resulting in better transplant establishment. The final transplanting resulted was a very uniform looking field free of skips and double plantings. The faster planting time, 30 % faster, resulted the planting crew to do other tasks on the farm.

11: Required next steps:

There are no additional steps required.

12: Communications:

The detailed evaluation will be available to all producers who are interested in obtaining a copy through Nadine Simpson at NBDAAF in Sussex as well as on the Department website. All producers will have an opportunity to come visit us to discuss this technology and see it work.