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STRIP-TILL CORN FIELDS IN INDIA

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ABSTRACT

Until recently, farmers in Italy and other Mediterranean nations had no idea of it, and it has to be tested for its suitability for their soil and climate conditions. Since maize is symbolic of Italian and Southern European intensive agriculture, a two-year field study in the Po Valley examined the effects of strip tillage, minimum tillage, and no-till methods on the crop. Weed infestation, seedbed quality, and maize yield were the primary objectives of this study.Sand-loam soil with excellent chemical fertility and good water availability was used in the experiment. It was necessary to use an old passive tool attached to a pneumatic drill to perform strip tillage at a forward speed of around 6 kilometres per hour 1. As well as determining the resistance to soil penetration, we also looked at soil bulk density and water content as well as clod size distribution and ground residue cover. We also looked at how deep we drilled into the field of maize, as well as how much biomass accumulated and how much grain was produced.Strip tillage moved less soil and left a greater ground residue cover than minimal tillage, but the seedbed prepared by the two approaches was indistinguishable for appropriateness to drilling, root exploration, and crop development. However, strip tillage yielded high biomass and grain yields comparable to those achieved with low tillage.

Keywords: Strip culturing, planting, knives

I. Introduction

Strip culturing is the practise of laying down seedbed tilth in strips of 15-20 cm broad by 15-20 cm long anywhere along the crop lines in order to replace between-push soil. Instead of upsetting soil layers like furrowing, strip cultivation passes crop build-ups to cover about 30% of the soil surface, so it has a position in the collection of protective culturing ways (Singh, 2021). This suggests environmental, agronomic, and financial advantages, such as preventing overflow and soil disintegration, preserving soil water and natural matter, defending biodiversity, improving soil bearing capacity and trac-peak footing in the undisturbed between-column strip, and reducing sources of information (foothold power, fuel, work) and expenses.

With either a power-take-off powered or an inactive device, soil strips can be disturbed. Because of the farm truck's advancing speed, rotating equipment like as cutting plates, line cleaners and knives may be used to loosen the soil and prepare the seedbed. For culturing to be effective, it must have the right instrument kind (coulter regardless of wings), a well-thought-out strategy (width, profundity and rake point), and a fast forward pace. There are a number of files that may be used to assess the influence of the cultivation process (Carman, Cıtıl, & Marakoglu, 2021). These include things like hunk size appropriation files and mass thickness files. Strip culturing has an effect on weed flora development as well. In the absence of cultivating, the lack of soil disturbance produces an increase in weed seeds on the surface of the soil. Only if lumps that may fall from the disturbed area to the

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undisturbed strip produce spots where herbicide distribution is impeded can lingering herbicides be used effectively for weed control.

II. Materials and methods

Experimental design and maize cultivation schedule

Falivera Ranch in Quinzano d'Oglio, Brescia Province, central Po Valley, has hosted the preliminary in 2010 and 2011. The three soil culturing strategies for maize seedbed preparation studied were strip culturing (ST), least culturing (MT), and no culturing (NC) using a ran-domized block layout with three repeats (NT). Middle column soil strips were left intact for strip culturing in 2011. 80 m long by 16.6 m broad was the length of each plot.

Table 1
Sieve hole size, size class for soil aggregates and class index.

Sieve hole diameter (mm)	Size class	Class index
Ø ≥ 200	1	0.0
100 ≤ Ø < 200	2	0.2
50 ≤ Ø < 100	3	0.4
25 ≤ Ø < 50	4	0.6
10 ≤ Ø < 25	5	0.8
Ø ≤ 10	6	1.0

Presented by the non-profit mama/ag, the strip turner was a first-generation plant model with four operational units. All of the working units are made up of a line cleaner, a moveable elastic wheel, and cutting plates, knives with prongs, as well as various side closing circles (to keep the blocks inside the strip and to shatter lumps and firm the seedbed). Soil conditions can be taken into account when stacking springs and a setup framework for each apparatus are used (Singh, 2021). For maize lines 70 cm apart, a four-column precision drill with double circle openers attached to a John Deere 6420 farm transporter with 120 horsepower was attached to the turner (88 kW) (Hossain, *et al.* 2018). The vehicle was travelling at a rate of around 6 kilometres per hour in the forward direction. In 2010, the least culturing was done using a CDC 32-13, which had 32 66-cm-wide circles with one or the other plain or scored sharp edge, and was linked together. Seven ripper knives were placed between the two plate placements, followed by two lines of wave circles and a final roller for firming the seedbed. It was attached to a John Deere 7530 farm vehicle with a 200-horsepower John Deere 7530 tractor (147 kW). 2011 saw the introduction of an improved turning machine: the mama/ag Combilam I 40/12 (Jaskulska, *et al.* 2020). It features a 12-knife "Mitchel" design split into two staggered columns, three positions of wavy plate cutting edge rollers mounted on an assistant casing support, and an additional crate roller attached to the princi-buddy outline via an adjustable linkage parallelogram.

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Table 2
Percent distribution of clods in size classes and soil refinement index (RI) as recorded in 2010 and 2011 after strip tillage (ST) and minimum tillage (MT).

Treatment	Clod % distribution in size classes (mm diameter)				RI
	50 ≤ Ø < 100	25 ≤ Ø < 50	10 ≤ Ø < 25	Ø ≤ 10	
2010					
ST	2.47	5.5	11.72	80.28	0.94
MT	1.55	8.58	14.03	75.82	0.93
P	0.6988	0.3446	0.2300	0.2555	0.5799
$LSD_{0.05}$	8.861	10.730	5.841	12.160	0.066
2011					
ST	2.03	2.76	16.13	79.08	0.94
MT	1.14	6.20	17.68	74.98	0.93
P	0.4226	0.2476	0.3572	0.3075	0.9040
$LSD_{0.05}$	3.831	9.149	5.639	12.993	0.095

Table 3
Soil bulk density and water content (% by volume) as recorded at 0–10 and 10–20 cm depth in 2010 and 2011 for strip tillage (ST), minimum tillage (MT) and no tillage (NT).

Treatment	Bulk density ($Mg\,m^{-3}$)		Water content (% by volume)	
	0–10 cm	10–20 cm	0–10 cm	10–20 cm
2010				
ST	1.11	1.37	9.63	14.40
MT	1.19	1.43	12.19	16.15
NT	1.26	1.45	15.16	15.17
P	0.0848	0.4715	0.0269	0.4807
$LSD_{0.05}$	0.136	0.168	3.408	3.669
2011				
ST	1.06	1.29	12.56	13.90
MT	1.11	1.19	13.80	16.69
NT	1.21	1.43	15.29	17.82
P	0.2101	0.1170	0.7513	0.0189
$LSD_{0.05}$	0.187	0.238	9.694	2.238

Weeds were first mowed and then treated with glyphosate before being cultivated. Then, one pre-rise and one post-rise treatment in maize development were performed (Gilani, & Loveimi, 2021). Two subplots were created in 2011 to test the effects of different culturing methods on the emergence of weeds in each plot, one with pre-development treatment and the other with no pre-rise treatment. One early and one late post-rise treatment were applied to this last choice subplot to bring the entire plot back to a uniform weed-free condition, which had been achieved 30 days after development (DAS).

III. Results

Season climate

In 2010, the developing season was extremely stormy for the whole month, with dry soil in the upper half of the soil profile and moderate moisture in the deeper layers. In truth, NT and ST's entry resistance remained comparable throughout the course of the two years, however MT's varied significantly. All lumps were less than 10 cm and over 70% less modest than 1 cm in size during the two years of dispersion in ST and MT, with an unusually good refinement record. Table 3 shows that the mass thickness of medications was not significantly different between the two years, while ST and MT had lower mean quality than NT. ST had significantly lower volumetric soil

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water content than either NT or MT for the top 10 cm of soil in 2010 and for the 10-20 cm of soil in 2011 (Yang, *et al.* 2018). The ground buildup cover in ST was more than 70% in the two years, which is closer to NT than MT values.

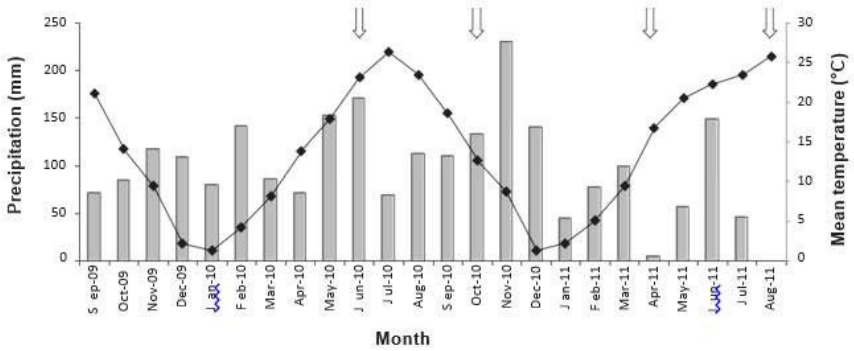

Fig. 1. Monthly precipitation and mean temperature between September 2009 and August 2011 as recorded by the weather station of Monsanto Italia located at Pontevico, Brescia Province. Downward arrows indicate maize sowing and harvest dates in the two growing seasons.

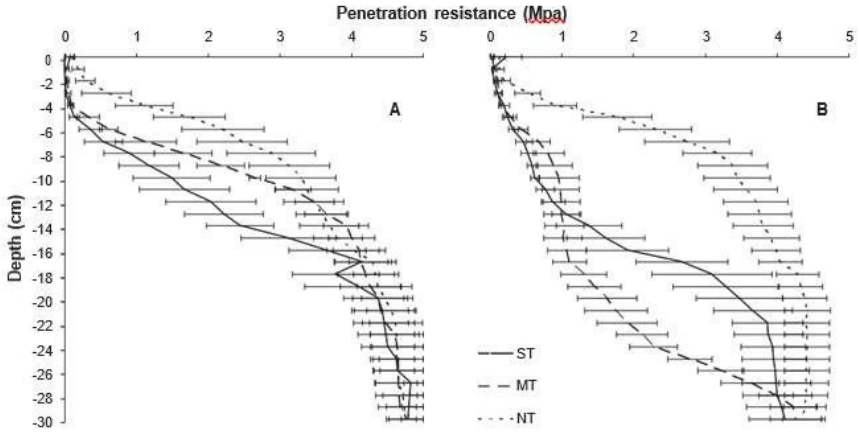

Fig. 2. Penetration resistance measured just after sowing in 2010 (A) and 2011 (B) for strip tillage (ST), minimum tillage (MT) and no tillage (NT). Bars represent ±1 standard error.

IV. Discussion

Strip culturing produced seedbeds similar to those created by least culturing, as evidenced by data on soil boundaries. There were differences in entrance obstruction between strip cultivation and minimum cultivation during the course of the two years, mostly as a result of modifications to least cultivation (Mitra, *et al.* 2018). Entrance blockage was extremely high in this treatment in 2010, maybe as a result of the procedure being equipped with a simple sharp edge circle roller, which could have induced compaction of the subterranean soil. There are two ways to explain the lower pene-tration blockage documented for least culturing in 2011: the more powerful turner and its more profound setup, and culturing in 2010. Due to the fact that strips were disturbed in 2011 as opposed to 2010's undisturbed between-line pieces, no effect from the previous year could be predicted on strip culturing in 2011. Infiltration blockage might have been affected by the difference in soil water content between least culturing and strip culturing, however the influence was limited when compared to the impact of various soil minimising approaches represented by culturing methods. Despite the fact that MT had a significantly larger water content, soil entry obstruction was higher in MT than in ST in 2010. Results are consistent with those obtained by (Gilani, & Loveimi, 2021) in silty-sandy soils and by (Gilani, & Loveimi, 2021) in silty soils, while (Gilani, &

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Loveimi, 2021) on earth silty soils noticed that strip turner generated an obstruction in the 20 cm dirt like no culturing and higher than etch.

In terms of lump size dispersal, it's worth mentioning that a slow entrance with the strip turner produced the equal fine tilth of two least culturing portions at twofold speed.. Although it has been proven that hunk size decreases with increasing number of sections and forward speed, this may not hold true in sandy soils.

No culture compared favourably with both culturing approaches (Table 3), although this was to be expected given that culturing generally reduces bulk thickness save for a few isolated examples in sandy soils. Because soil aggravation causes a more prominent soil circulation, the soil water content was lower for strip culturing than for no culturing (Table 3). As an anomaly, strip culturing was shown to have a lower water content than least culturing, albeit not always significantly, because the prior upset less soil. This is in contrast to the findings of (Gilani, & Loveimi, 2021), who found that strip culturing had a larger, but non-significant, water content than normal mum culturing via etch furrow. For our proof, we speculate that dirt climbing in upset sections rotated toundisturbed strips created an edge and wrinkle-like form for the soil surface, enlarging the area exposed to dissipation for the disturbed strips.

There was an undesirable development due to no culturing as well as shallow penetration and soil minimising, as well as maybe decreased soil temperature. To tell the truth, while comparing no culturing to strip culturing and the least culturing, (Gilani, & Loveimi, 2021) found lower soil temperatures, and they found that strategic location building cover delayed soil warming. In our experiment, soil temperature was not considered. In addition, the presence of unburied seeds and a little gain in elevation made predation more difficult. A larger pre-development weed pervasion was also seen by (Gilani, & Loveimi, 2021), who made sense of this fact by a reduced maize thickness for no cultivation.

Prior planting dates and a well-maintained water system contributed to the greater quality of maize biomass and grain production in 2011 for all medications, which is a result of earlier planting and a well-maintained water system (Mitra, *et al.* 2018). Using strip culturing, maize growth was accelerated much beyond what has been shown by other researchers to be typical. (Gilani, & Loveimi, 2021), on the other hand, found significant differences in biomass between strip culture and no culturing, depending on the year, region, and preparation pace of the experiment. If you look at the two years in which strip culturing resulted in high grain yields, it is a beneficial outcome. Strip culture produced maize yields that were on par with or lower than those obtained through other approaches, according to (Gilani, & Loveimi, 2021). (Singh, 2021) strip culturing output was higher in the first year than traditional culturing's, but the reverse was true after that. With conventional culturing, the yields were higher, and the costs were lower, but after one year, there were no significant differences between (Gilani, & Loveimi, 2021) and the other mild techniques. While cultivating on mud soil, (Gilani, & Loveimi, 2021) didn't observe any differences in cultivating techniques. Even if the mean quality of medications were dramatically different, in most of the studies above, the large test error created non-significant contrasts between medicines, regardless of their mean quality.

There is little or no influence on grain water content and weight per hectoliter because of the impact culturing has on planting conditions. This is despite its significance in 2011.

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V. Conclusion

Researchers found that a seedbed arrangement not unique in respect to least cultivation may be achieved in two years' time by strip culturing soil borders, leaving higher ground accumulation cover while still moving less soil volume. This yielded significant financial and ecological benefits. Comparative reasonableness was found in seedbed arrangements based on strip cultivation and least cultivation for digging, root exploration, and harvest development (Singh, 2021). When grown via strip culturing, corn demonstrated high absolute biomass and grain yields comparable with those obtained by small-scale mum culturing because it grew quickly and consistently to the desired plant nook sity, faced less weed invasion, and so on (Carman, Cıtıl, & Marakoglu, 2021). Another point worth mentioning is how well uncultivated maize developed and produced, which shows how much more comfortable ploughing the ground is than drilling directly into untouched soil, especially in our harsh environment (sandy-topsoil soil with high substance fruitfulness and great water accessibility for the harvest).

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