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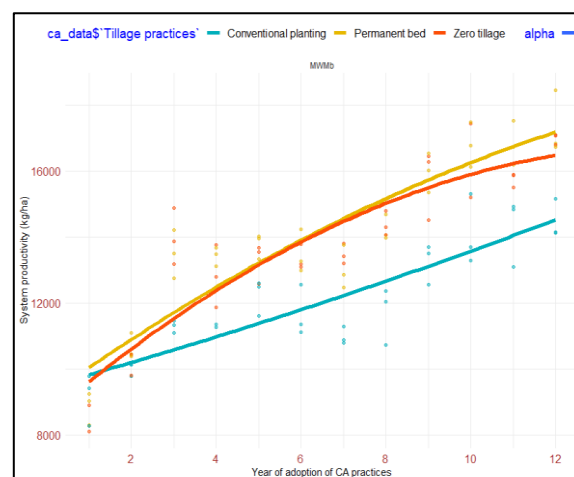
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Introduction: Non remarkable response in crop productivity, degrading soil structures, scarcity of production resources such as water, energy and labour along with changing climate provides a pace towards adoption of maize based cropping systems along with conservation agriculture (CA) based best bet crop management practices in rice-wheat dominated agro-ecologies of north-western IGP. Although CA delivers promising result in higher productivity and environmental sustainability, **Can the right placement of split applied N in the residue retained soil surface further improve the productivity ?**

Methods:

- We assessed the impact of 3-nitrogen placement methods (NPM1: where both the N splits was surface band placed, NPM2: where only 1st split of N was sub-surface point placed and second N split (late vegetative stage) was surface band applied and in NPM3: where both the N splits was sub-surface point placed) under 4-long term tillage and residue management (+R) options (permanent raised bed: PB+R; zero till flat: ZT+R; conventional till flat: CT+R; first time zero till flat sowing of crop on last 10-year fallow land FZT+R) in an on-going long-term study (since 2008) in maize.
- Quadratic equation fitted for 12-year trend, non linear sigmoid shaped empirical models used to estimate the crop growth rate (CGR), Balance method was used to find the N remobilization.
- Data analysis in agricolae R, plots in ggplot2 and MS-excel.

Fig 1: 12 year trend of system productivity in CA



Results:

- Over the year CA increased the productivity (Fig 1)
- CA favored early vegetative growth (Fig 2a), but not the N placement methods (Fig 2b).
- N remobilization as well as reproductive stage N uptake was more in CA and N point placed plots (Fig 3).
- Late vegetative stage N point placement could improve maize yield in CA, but not in CT (data not shown).

Fig 2: Impact of CA (a) and NPM (b) on Crop growth rate of maize: estimated from empirical model

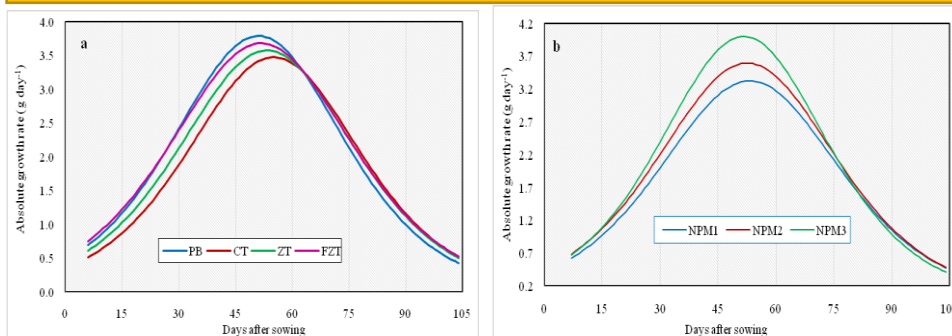
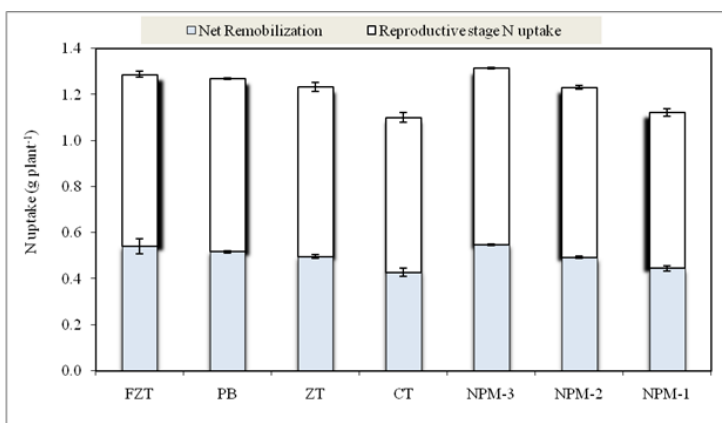


Fig 3: N remobilization and reproductive stage N uptake in maize



Discussion

- Better nutrient supplying capacity and soil health favors vigorous vegetative growth, hence plant acquire and stores nutrient in vegetative parts, which later translocated to maize cobs.
- Also the N placement methods increase the crop growth rate, but the days of attainment of peak CGR is same in all the NPMs.
- In conventional tillage, the root might not be active to respond to late vegetative stage point placed N.

Conclusion:

- Machineries development for point placement of split applied N under residue retained condition can still improve the productivity, N use efficiency and profitability of maize production under CA.