

マメ科作物であるヘアリーベッチ作付け後の不耕起栽培による節肥効果とチッソ溶脱

Effects of no-till maize cultivation after leguminous hairy vetch cropping on fertilizer saving and nitrogen (N) leaching

本研究では、マメ科作物のヘアリーベッチ (*Vicia villosa* Roth.)を休耕期に作付け後、その残渣でマルチトウモロコシを不耕起栽培する場合において、降雨の表面流出量と下方浸透量との関係を検討しながら、チッソの溶脱と収支を解明する。

ヘアリーベッチ作付け後のトウモロコシ栽培は、耕起の有無にかかわらず、自然休耕後の栽培(慣行栽培)に比べて、チッソ施肥量を半量にしても同等以上の収量が得られる(図1)。硝酸態チッソ溶脱量は慣行栽培に比べ大きく増大するが、それは、主にヘアリーベッチ残渣の分解で生ずる硝酸態チッソ濃度の上昇に起因しており、不耕起マルチ栽培が降雨の表面流出量を減少させ、下方浸透量を増大することの影響は小さい(表1)。

In the present study, we elucidate N leaching and balance taking into account the relationship between water runoff and percolation in sloping field when no-till maize cultivation with residue mulch of hairy vetch (*Vicia villosa* Roth.).

Maize yield after hairy vetch cropping with half dose of N is equal to or more than that after fallow (conventional treatment). The increase in N leaching after hairy vetch cropping is mainly due to the increase in the concentration of nitrate-N, while the effect of increase in percolation, which is the result of no-till cultivation associated with the residue mulch, is limited (Table 1).

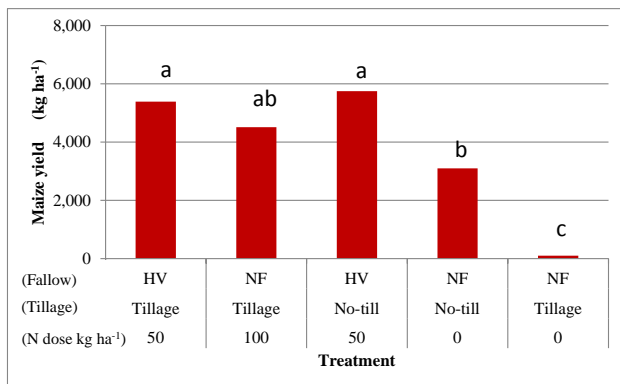


図1 ヘアリーベッチ(HV)作付け、耕起処理および施肥量の組みトウモロコシ収量に及ぼす影響(3傾斜の平均。異なるアルファベットは5%水準で有意)

Fig. 1 Effects of the treatment combination on maize yield. HV: hairy vetch cropping during fallow period, NF: natural fallow. Different alphabets indicate significantly different at 5%

表2 トウモロコシ栽培におけるチッソ(N)収支 (kg ha⁻¹)
Table 2 Nitrogen balance at the maize cropping (kg ha⁻¹)

表1 主要な降雨時の水移動とチッソ溶脱量(傾斜5度、播種後27-28日目の事例)

Table 1 Example of water movement and amount of leached N during a main rain event (Slope gradient: 5°, 27-28 days after planting)

Treatment	(Fallow) (Tillage) (N dose: kg ha⁻¹)	NF Tillage 100	HV No-till 50
Rainfall	mm	145.0	145.0
Water runoff	mm	30.6	7.1
Deep percolation	mm	86.0	130.3
NO ₃ -N Concentration	g m ⁻³	1.1	25.8
NO ₃ -N leached	kg ha ⁻¹	0.9	33.6

Note: Percolated water was collected by a lysimeter installed at 60 cm deep. HV: hairy vetch cropping during fallow period, NF: natural fallow

Treatment	(Fallow) (Tillage) (N dose: kg ha⁻¹)	NF Tillage 100	HV No-till 50
Biomass-N		13.2 (weeds)	150.1 (HV)
Fertilizer-N		100.0	50.0
Input-N		113.2	200.1
Available-N		108.7	133.7
Uptake N		95.6	96.2
Leached N		11.1	36.5
Output-N		106.7	132.7
Available N-Output N		2.0	1.0
N balance		6.5	67.4



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