Water Quality Enhancement Activity– WQL10 – Plant a cover crop that will scavenge residual nitrogen

Enhancement Description
Plant a cover crop that will scavenge nitrogen left in the soil after the harvest of a previous crop. Suitable cover crops include those with at least a "Very Good" rating for scavenging nitrogen as documented in "***Managing Cover Crops Profitably, 3rd Edition***" (Sarrantonio, 1998**),** Chart 2 Performance & Roles, pg 67**.** Examples include cereal rye, barley, forage radish and sorghum sudan.

Land Use Applicability
Cropland.

Benefits
Planting an annual cover crop to scavenge residual nutrients from cropland after the harvest of a previous crop effectively utilizes residual nutrient resources to supply following crops with nutrients required to efficiently produce food, forage, fiber, and cover while minimizing environmental degradation.

Criteria
Implementation of this enhancement requires:

1. The cover crop selected shall have the growth rate and rooting depth required to scavenge excess nitrogen from the root zone of the previous crop. Suitable cover crops include those with at least a "Very Good" rating for scavenging nitrogen as documented in ***Managing Cover Crops Profitably, 3rd Edition, Chart 2 Performance & Roles, pg 67.*** Examples include cereal rye, barley, forage radish and sorghum sudan.
2. Timing of planting and seeding rates for cover crops shall follow the recommendations in the respective NRCS Field Office Technical Guide (FOTG).
3. The producer must have a current soil test (no more than 3 years old).
4. Nitrogen application rates for the crop following the cover crop must be reduced by at least 15% from the "Land Grant University (LGU) recommendations to account for the recycling of N by the cover crop.
5. The producer shall not increase soil surface disturbance over existing benchmark conditions.

Documentation Requirements

Documentation for each Treatment area (field) and year of this enhancement describing these items:

1. A map showing where the activities are applied
2. Cover crop species planted
3. Cover crop planting date
4. Cover crop seeding rate (bu/ac)
5. Annual crop planted
6. Nitrogen application rates/amounts for the annual crop
7. Treatment acres

Michigan Supplement

Water Quality Enhancement Activity– WQL10 – Plant a Cover Crop that Will Scavenge Residual Nitrogen

Enhancement Description

Plant a cover crop that will scavenge nitrogen left in the soil after the harvest of a previous crop.

Land Use Applicability

This enhancement is applicable on cropland.

Benefits

Planting an annual cover crop to scavenge residual nutrients from cropland after the harvest of a previous crop effectively utilizes residual nutrient resources to supply following crops with nutrients required to efficiently produce food, forage, fiber, and cover while minimizing environmental degradation.

Criteria for Planting a Cover Crop That Will Scavenge Residual Nitrogen

Follow the Michigan conservation practice standard, Cover Crop (340).

Refer to Table 1, Cover Crop Species, to choose a plant species identified as EN (Excessive Nutrients). Follow "Additional Criteria to Manage Excess Nutrients" in the Soil Profile.

The amount of N that is scavenged by the cover crop is estimated to be approximately 50% of the available soil nitrates. An estimate of available soil nitrate after harvest can be developed using the farm nutrient balance spreadsheet.

Reference

Cavigelli, M.A., S.R Deming, L.K. Probyn, and R.R. Harwood (eds.), 1998. Michigan Field Crop Ecology: Managing Biological Processes for Productivity and Environmental Quality. Michigan State University-Extension Bulletin E-2646, 92 pp.

Chart 2 Performance & Roles, from "Managing Cover Crops Profitably, 3rd Edition", is attached for reference.

Chart 2 **PERFORMANCE AND ROLES**

	Species	Legume N Source	Total N (lb./A)[1]	Dry Matter (lb./A/yr.)	N Scavenger[2]	Soil Builder[3]	Erosion Fighter[4]	Weed Fighter	Good Grazing[5]	Quick Growth
NONLEGUMES	Annual ryegrass *p. 74*			2,000–9,000	◕	◕	◕	◕	◕	◕
	Barley *p. 77*			2,000–10,000	◕	◕	●	◕	◕	◕
	Oats *p. 93*			2,000–10,000	◕	◑	◕	●	◑	●
	Rye *p. 98*			3,000–10,000	●	●	●	●	◑	●
	Wheat *p. 111*			3,000–8,000	◕	◕	◕	◕	◕	◕
	Buckwheat *p. 90*			2,000–4,000	○	◑	◔	●	○	●
	Sorghum–sudan. *p. 106*			8,000–10,000	●	●	●	◕	◕	●
BRASSICAS	Mustards *p.81*		30–120	3,000–9,000	◑	◕	◕	◕	◑	◕
	Radish *p. 81*		50–200	4,000–7,000	●	◕	◕	●	◑	◕
	Rapeseed *p. 81*		40–160	2,000–5,000	◕	◑	◕	◕	◑	◕
LEGUMES	Berseem clover *p. 118*	●	75–220	6,000–10,000	◕	◕	◕	●	●	●
	Cowpeas *p. 125*	●	100–150	2,500–4,500	◔	◑	●	●	◑	◕
	Crimson clover *p. 130*	◕	70–130	3,500–5,500	◑	◕	◕	◕	●	◑
	Field peas *p. 135*	●	90–150	4,000–5,000	◔	◑	◕	◑	◕	◕
	Hairy vetch *p. 142*	●	90–200	2,300–5,000	◔	◕	◑	◑	◑	◔
	Medics *p. 152*	◑	50–120	1,500–4,000	◔	◑	◑	◕	◕	●
	Red clover *p. 159*	◕	70–150	2,000–5,000	◑	◕	◑	◕	●	◔
	Subterranean clovers *p.164*	●	75–200	3,000–8,500	◔	◕	◕	●	◕	◑
	Sweetclovers *p. 171*	●	90–170	3,000–5,000	◔	●	◕	◕	◕	◑
	White clover *p. 179*	●	80–200	2,000–6,000	◔	◑	◕	◕	●	◔
	Woollypod vetch *p. 185*	●	100–250	4,000–8,000	◑	●	◑	●	◑	◕

[1]**Total N**—Total N from all plant. Grasses not considered N source. [2]**N Scavenger**—Ability to take up/store excess nitrogen.
[3]**Soil Builder**—Organic matter yield and soil structure improvement. [4]**Erosion Fighter**—Soil-holding ability of roots and total plant.
[5]**Good Grazing**—Production, nutritional quality and palatability. Feeding pure legumes can cause bloat.

○=Poor; ◔=Fair; ◑=Good; ◕=Very Good; ●=Excellent

Chart 2 **PERFORMANCE AND ROLES** continued

	Species	Lasting Residue[1]	Duration[2]	Harvest Value[3] F*	Harvest Value[3] S*	Cash Crop Interseed[4]	Comments
NONLEGUMES	Annual ryegrass	◕	◕	◑	◔	●	Heavy N and H_20 user; cutting boosts dry matter significantly.
	Barley	●	◑	◕	◑	◕	Tolerates moderately alkaline conditions but does poorly in acid soil < pH 6.0.
	Oats	◑	◔	◑	◑	●	Prone to lodging in N-rich soil.
	Rye	●	◕	◔	◔	◕	Tolerates triazine herbicides.
	Wheat	◕	◕	◑	◕	◔	Heavy N and H_20 user in spring.
	Buckwheat	○	◔	○	◔	◕	Summer smother crop; breaks down quickly.
	Sorghum–sudangrass	◕	●	●	○	○	Mid-season cutting increases yield & root penetration.
BRASSICAS	Mustards	◔	◑	○	◔	○	Suppresses nematodes and weeds.
	Radish	◔	◑	◕	◔	◔	Good N scavenging and weed control; N released rapidly.
	Rapeseed	◑	◕	◔	●	○	Suppresses *Rhizoctonia.*
LEGUMES	Berseem clover	◑	●	●	◕	◑	Very flexible cover crop, green manure, forage.
	Cowpeas	◔	●	◑	◑	◑	Season length, habit vary by cultivar.
	Crimson clover	◑	◔	●	◕	●	Established easily, grows quickly if planted early in fall; matures early in spring.
	Field peas	◔	◑	●	◕	●	Biomass breaks down quickly.
	Hairy vetch	◔	◕	◔	◕	◑	Bi-culture with small grain expands seasonal adaptability.
	Medics	◑	◕	◑	◑	◑	Use annual medics for interseeding.
	Red clover	◔	◑	●	◕	●	Excellent forage, easily established; widely adapted.
	Subterranean clover	◕	◕	◕	○	●	Strong seedlings, quick to nodulate.
	Sweetclovers	◕	◕	◕	◑	◑	Tall stalks, deep roots in second year.
	White clover	◔	●	◕	◑	◕	Persistent after first year.
	Woollypod vetch	◔	◕	◔	◕	◑	Reseeds poorly if mowed within 2 months of seeddrop; overgrazing can be toxic.

[1]**Lasting Residue**—Rates how long the killed residue remains on the surface. [2]**Duration**—Length of vegetative stage.
[3]**Harvest Value**—Economic value as a forage (F) or as seed (S) or grain. [4]**Cash Crop Interseed**—Rates how well the cover crop will perform with an appropriate companion crop.

○=Poor; ◔=Fair; ◑=Good; ◕=Very Good; ●=Excellent