SF724 (Revised)

Soil Fertility Considerations for Buckwheat in North Dakota

Revised by:

D.W. Franzen
Soil Science Specialist
NDSU Extension Service

J.M. Teboh
Soil Scientist
Carrington Research Extension Center

Buckwheat grows well in fields with lower fertility, and particularly on low-nitrogen (N) and low-phosphorus (P) soils. Buckwheat has a tendency to lodge at higher N rates, so increasing N rates beyond those indicated in these recommendations would not be wise.

One of the limitations to buckwheat cultivation in this region is the fear of shattering and volunteer buckwheat germination the next season because buckwheat can be an aggressive weed in other crops. Lodged buckwheat tends to shatter much more than erect buckwheat.

Buckwheat also is tolerant to a wide range of soil pH. In North Dakota, buckwheat grows well in soil pH of more than 8, while studies in other regions indicate tolerance to pH at least as low as 5.

Yield goal was a former consideration for crop nutrition in the region, but in North Dakota, similar rates of fertilizer are required for maximum profit/yield regardless of yield achieved. A similar rate of nutrient is required to produce maximum yield in a low-yielding environment as in a high-yielding environment. This probably is due to increased nutrient availability and more efficient nutrient uptake in a high-yielding environment, compared with a low-yielding environment.

NDSU EXTENSION SERVICE
September 2017

Nutrient recommendations for N, P and K (potassium) can be found in **Table 1**. No other nutrient considerations have been found for buckwheat in North Dakota.

Table 1. Nitrogen, phosphorus and potassium recommendations for buckwheat in North Dakota.

	Olsen P, ppm					Soil test K, ppm			
Total N recommended	VL 0-3	L 4-7	M 8-11	H 12-15	VH 16+	VL 0-40	L 41-80	M 81-120	H 121+
lb/acre*	lb/acre P_2O_5					lb/acre K_2O			
80	40	30	20	10	0	60	40	30	0

*Total N recommended is the sum of soil test nitrate-N to 2 feet in depth, previous crop N credit, long-term no-till N credit and supplemental N to be applied.

In recent N rate trials in spring wheat, durum wheat, corn and sunflower, comparisons of N rates necessary for maximum yield indicate less N was needed when the trials were conducted on long-term no-till fields (six years or more consecutive no-till), compared with conventional-till fields. For this reason, in buckwheat production, a 30-pound N/acre credit should be considered when the field has a six-year or more history of continuous no-till/strip-till systems. Previous crop N credits can be found in **Table 2**.

Table 2. Previous crop N credits.

Previous Crop	Credit
Soybean	40 lb. N/acre
Dry edible bean	40 lb. N/acre
Other grain legume crops (field pea, lentil, chickpea, faba bean, lupin)	40 lb. N/acre
Harvested sweet clover	40 lb. N/acre
Alfalfa that was harvested and unharvested sweet clover:	
>5 plants/sq. ft.	150 lb. N/acre
3 4 plants/sq. ft.	100 lb. N/acre
1 2 plants/sq. ft.	50 lb. N/acre
<1 plant /sq. ft.	0 lb. N/acre
Sugar beet	
Yellow leaves	0 lb. N/acre
Yellow/green leaves	30 lb. N/acre
Dark green leaves	80 lb. N/acre

This publication was adapted from one authored by W.C. Dahnke, C. Fanning and A. Cattanach, former NDSU researchers and Extension specialists, 1992.

Photos by Jasper Teboh, NDSU.

For more information on this and other topics, see www.ag.ndsu.edu

web-9-17

Second-year N Credits

Half of the N credit indicated for the first year for sweet clover and alfalfa is recommended, but no N credit is recommended after the second year for other crops.

Additional Soil Fertility Considerations

As a rotational crop, buckwheat solubilizes calcium-bound P in North Dakota soils and provides this relatively unavailable source of P to its growth (Teboh and Franzen, 2011). Much of this P is returned to the soil through residue, increasing the P availability to the following crop.

If buckwheat is used as a rotational cover crop for weed suppression and nutrient cycling in an organic crop rotation, terminating the buckwheat crop at early flowering, when perhaps 1 ton/acre of dry-matter content is available, would return about 100 pounds of N/acre to the soil, along with substantial P and K.

References

Teboh, J.M., and D.W. Franzen. 2011. Buckwheat (*Fagopyrum esculentum* Moench) potential to contribute solubilized soil phosphorus to subsequent crops. Communications in Soil Science and Plant Analysis 42:1544-1550.