IANR NebGuide

University of Nebraska Lincoln

Published by University of Nebraska–Lincoln Extension, Institute of Agriculture and Natural Resources

G1945
(Revised July 2015)

Fertilizing Proso Millet

Gary W. Hergert, Soil and Nutrient Management Specialist
Dipak K. Santra, Alternative Crops Breeding Specialist

Soil testing and crop rotation are the basis for fertilization of proso millet.

Soil Testing

Soil testing is the foundation of proper nutrient management for optimum production of proso millet. The goal of soil testing is to characterize the amount of nutrients in the soil prior to planting. Fertilizer management that provides adequate but not excessive plant nutrients is essential for high yield of proso millet in the High Plains. Soil samples from the surface (0 to 8 inches depth) should be analyzed for organic matter, pH, phosphorus, potassium, and nitrate-N. A subsoil sample from 30 to 36 inches depth should be taken for nitrate-N only. Refer to NebGuide G1740, *Guidelines for Soil Sampling* (http://www.ianrpubs.unl.edu/sendIt/g1740.pdf) for more information. Soil testing for nitrate-N before planting each proso millet crop is recommended. Other soil tests for other nutrients are recommended every three to four years.

Nitrogen (N) Recommendations

Proso millet is generally grown under dryland conditions, either in continuous cropping or after summer fallow. Nitrogen fertilizer is often required for profitable production of proso millet. Proso millet planted following another crop, such as wheat, usually has a higher nitrogen requirement than after summer fallow due to lower residual soil nitrate. Suggested nitrogen fertilizer rates for proso millet are shown in *Table I.*

All nitrogen fertilizer sources are generally effective. Urea-based fertilizers are commonly used (urea and urea-ammonium nitrate solutions) and should be incorporated to avoid N volatilization (gaseous loss as ammonia). When nitrogen fertilizers are placed with the seed at planting, no more than 20 lb of nitrogen per acre should be applied to avoid germination damage. Higher rates of nitrogen can be applied safely when placed at least 2 inches away from the seed. Anhydrous ammonia can be used, but is not a typical source due to soil disruption, knife spacing, and soil drying that might affect stand.

Figure 1. Proso millet nearing maturity.

Table I. Nitrogen recommendations for proso millet using a 3-foot soil sampling depth for nitrate-N.

Soil Test		*Previous Crop*	
Nitrate-N		Fallow	Wheat
lb NO_3-N/acre	ppm NO_3-N	lb N/acre to apply	lb N/acre to apply
0-20	0-1.9	55	75
21-35	1.9-3.2	35	55
36-50	3.2-4.6	20	35
51-65	4.6-6.0	10	20
66-80	6.0-7.4	0	10
>80	>7.4	0	0

Phosphorus (P) Recommendations

In the western High Plains, proso millet is commonly grown on high pH or calcareous soils. The Olsen-P soil test is recommended for high pH soil, whereas the Bray P-1 soil test is suggested for neutral to acidic soil. The Mehlich 3 soil test is used by many commercial laboratories because it works well across acidic to calcareous soils.

Phosphorus fertilizer application method affects plant response to P. Banded phosphorus fertilizer with the seed has been more effective than broadcasting P. Phosphorus recommendations are given in *Table II*.

Table II. Phosphorus recommendations for proso millet.

Soil Test Value ppm				
Bray P-1	Mehlich 3	Olsen-P	Banded lb P_2O_5/acre to apply	Broadcast lb P_2O_5/acre to apply
<10	<12	<6.7	30	60
10-15	12-18	6.7-10	20	40
15-20	18-24	10-13.3	10	20
>20	>24	13.3	0	0

Potassium (K) Recommendations

Adequate potassium nutrition is essential; however, most High Plains soils contain sufficient K for maximum proso millet production. *Table III* shows potassium needed for low K soils.

Table III. Potassium recommendations for proso millet.

Soil Test Level ppm K	*Broadcast lb K_2O/acre to apply*
0-39	120
40-74	80
75-124	40
>125	0

Figure 2. Harvesting millet with a stripper head combine.

Other Nutrients

Proso millet rarely shows increases from sulfur or micronutrients. Zinc deficiency can be determined by soil testing. When the DPTA-Zn test is less than 0.5 ppm, zinc application is recommended. One-half to one pound of zinc with 10-34-0 (seed-applied) is usually sufficient to prevent Zn deficiency.

Acknowledgment

Thanks to Frank Anderson and Juan Rodriguez at the University of Nebraska Panhandle Research and Extension Center who provided much of the original research and to David Baltensperger and Juerg Blumenthal for earlier versions of this NebGuide.

This publication has been peer reviewed.

UNL Extension publications are available online at *http://extension.unl.edu/publications*.

Index: Crop Production/Field Crops
Miscellaneous Crops
Issued July 2015