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Curator

with Samuel Flomo

Regional Project NC7 in the
US National Plant Germplasm System

Amaranthus, Celosia, Chenopodium, Perilla,
Portulaca, Spinacia, miscellaneous Forage
Legumes, and Umbelliferae, Millets:
Echinochloa, Panicum, and Setaria

Millets from a gene bank perspective

- Prehistory & tradition
- National Plant Germplasm System's collection
- Activities here in Ames, Iowa
- Crop wild relatives

foxtail and proso millet

origin in China 8,000 years BP

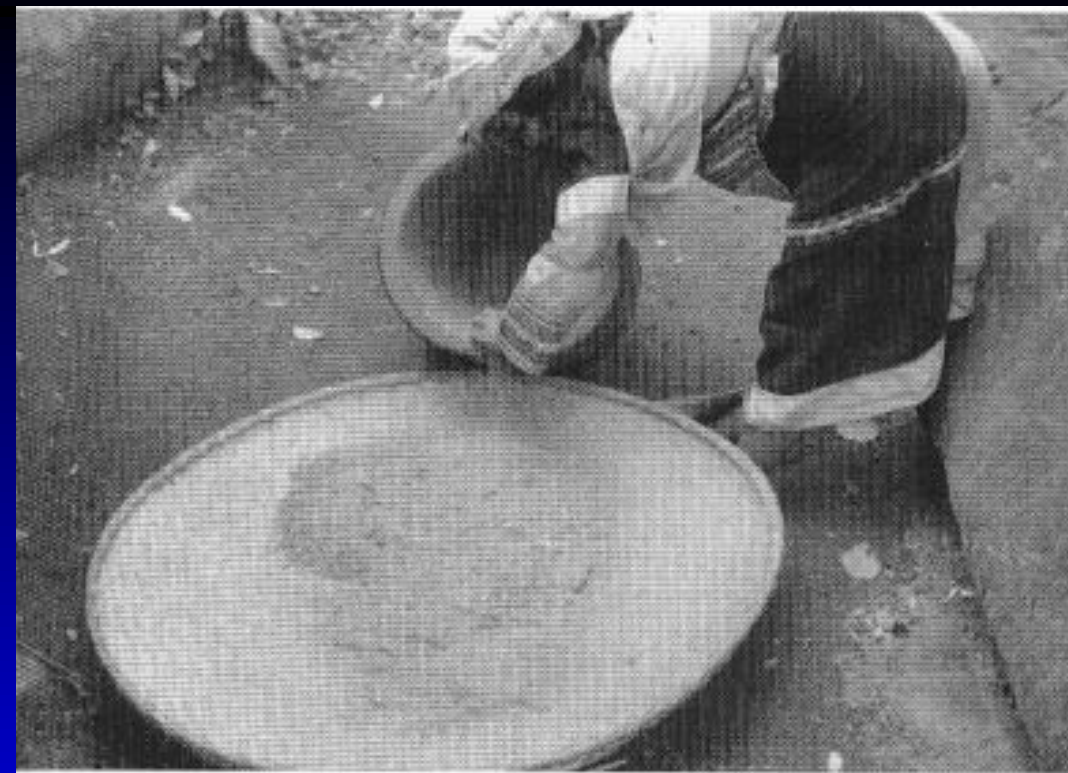
Yellow River basin, North China

- Archeological
 - Evolutionary Anthropology 19:9-21, 2010
- Genetic (proso millet)
 - The Holocene 21:1968-1978, 2018
- Linguistic
 - Nature 599:616-621, 2021



Pounding millets
with a wooden
mortar and pestle
to break the
kernel out of the
husk.

From: Segawa's Illustrated
Ethnography of Indigenous
Formosan People, Yuasa Hiroshi



つき終わったアワを平ざるに移す。サビキ社。

舂搗完後の小米・移至飯籬。Saviki社。

The crushed Italian millet is transferred to a winnowing basket. Saviki Village.



平ざるで精白したアワと殻を風選する。サビキ社。

以飯籬揀選搗白的小米和殼。Saviki社。

The winnowing basket is used to separate the chaff from the grain. Saviki Village.

From: Segawa's Illustrated
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Winnowing
wild rice,
traditional
method in
Minnesota

Image from
the North
House Folk
School web
site

Millets in the US National Plant Germplasm System

state	genera	common names
Georgia	wild Panicum	switchgrass etc
Georgia	Sorghum	sorghum
Georgia	Eleusine	finger millet
	Cenchrus	
Georgia	(Pennisetum)	pearl millet
Georgia	Paspalum	kodo millet
Georgia	Urochloa	browntop millet
Georgia	Digitaria	fonio
Iowa	Panicum	proso, little millet, *sowi millet
Iowa	Setaria	foxtail millet
Iowa	Echinochloa	barnyard millet, Japanese millet
Washington	Eragrostis	teff

Panicum is in two locations

Sowi millet is an interesting novelty

Each accession is grown separately and has a unique accession number.



Millet seed jars, & “accession”



Millets at the NCRPIS

Ames, Iowa, and online data

Genera	Accessions	% available	Adaptation observations on accessions
<i>Echinochloa</i> Barnyard millet and other <i>Echinochloa</i>	315	285 (90%)	58
<i>Panicum</i> Proso millet and other <i>Panicum</i> millets	936	911 (97%)	271
<i>Setaria</i> Foxtail millet and other <i>Setaria</i>	1,117	1,047 (94%)	268 (180 from Hermuth in the Czech Republic)

Echinochloa, barnyard millet

- 285 available accessions
- 18 taxa, but mostly *E. frumentacea*
- Seed weight stand-out PI 182304, 0.913 gram hundred seed weight.
- Two new *E. walteri* collected in Florida.
- *Echinochloa* tolerates standing in water.



Panicum, proso millet

- 910 available accessions
- *P. miliaceum* 702 acc., *P. sumatrense* 205 acc., *P. hirticaule* 3 acc.
- PI 436626 is a parent of 'Plateau'
- We have good seeds grown in 1951 (72 years)
- Most of the *Panicum* wild relatives including switchgrass are at our sister station in Griffin, Georgia.

Proso millet





Panicum hirticaule

PI 654448

(domesticated type)

cultivated in indigenous
Sonoran Desert agriculture
of the Colorado River basin,
and widely adapted.

Economic Botany 38:65-82,
1984. (= *P. sonorum*)

sowi millet, sagui

Setaria, foxtail

- 1,046 available accessions
- 38 taxa, primarily *S. italica*, *S. viridis*, and *S. sphacelata*
- New research as a model organism. PI 687376 (Estep_ME034V) transforms well.
- Three new *S. corrugata* and one *S. magna* from Florida.
- PI 642746 largest seeds .54 g/100 seeds

foxtail millet



2018 millet observation field, 200 entries



Mixed head types in PI 614817 and other accessions



Crop wild relatives

- Where the genes are

Setaria magna



Setaria corrugata



Echinochloa walteri



Collecting millet crop wild relatives

- Two plant collecting trips to Florida for millet genera and also *Chenopodium*: October 2017 and June 2018. I collected four millet crop-wild-relative species, but was unable to find *Echinochloa paludigena* and *Setaria macrosperma*.
- Brenner, D.M., H.E. Bockelman, and K.A. Williams. 2019. North American Wild Relatives of Grain Crops. In: S.L. Greene, K.A. Williams, C.K. Khoury, M.B. Kantar, and L.F. Marek (Eds.), North American Crop Wild Relatives, Volume 2: Important Species, (pp. 41–82). Cham: Springer. doi:10.1007/978-3-319-97121-6_2

Curation Goals

- Regenerating fresh seeds as the collection ages
- Adding temperate adaptation observations
- Seeking crop wild relatives especially from the United States

The End

Online database at: [search GRIN](#)

Thank you

David Brenner

NC7 Regional Project