Screening wild vigna species and cowpea *(Vigna unguiculata [L.] Walpers)* land races for sources of resistance to *Striga gesnerioides (Wild.) Vatke*.

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INTRODUCTION

- Cowpea, (*Vigna unguiculata* [L.] Walp.)(black-eyed or southern pea) belongs to the genus vigna, section Catiang,species *unguiculata*.
- Four subspecies:

•*unguiculata*
•*stenophylla*
•*dekintiana*
•*tenuis*

Subspecies unguiculata is the only cultivated, others are wild relatives.

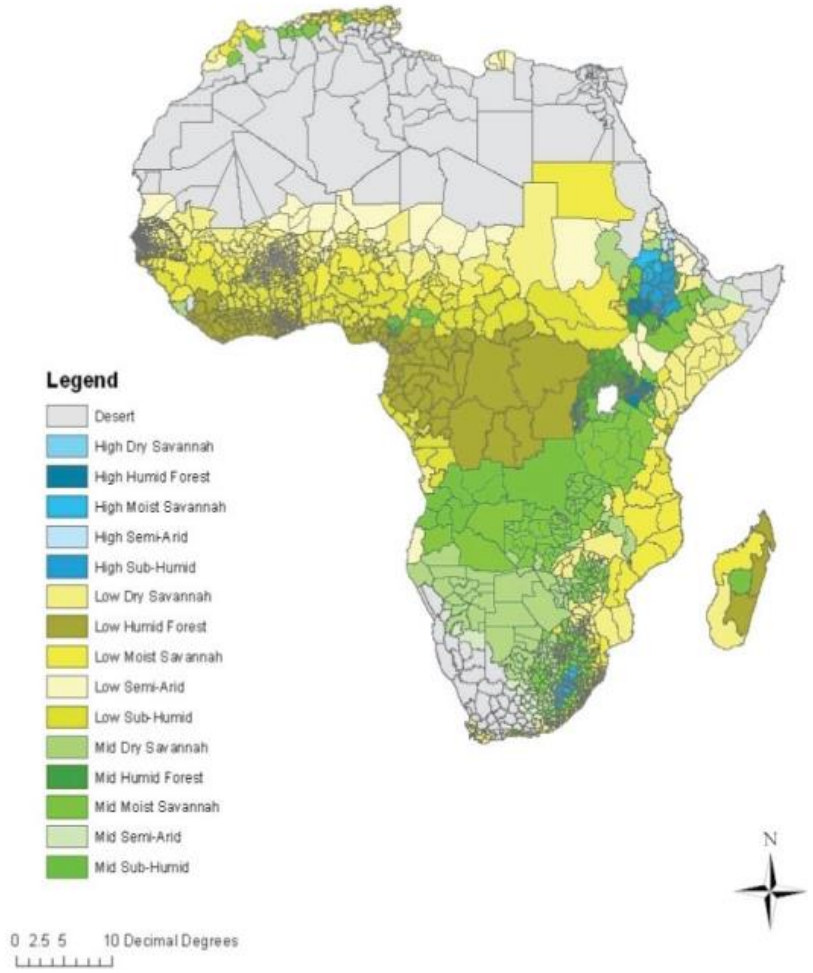
- Cultivated cowpea is grouped under subspecies *unguiculata*, which is subdivided into four cultivar groups.
  - *unguiculata*
  - *biflora*
  - *sesquipedalis*
  - *Testilis*

  unguiculata is the most diverse.
- Widely grown in Africa, Asia and Latin America.

Importance of cowpea.

- Most important food legume in West and Central Africa.
- Represents over 66% of the 12.5 million ha grown worldwide.
- A major source of dietary protein in sub-Saharan Africa.
- Mainly grown with cereals such as sorghum and millet in the dry savanna regions of sub-Saharan Africa.

Figure 1. Agro-ecological zones of Africa



Cowpea production constraints

- Yield losses runs into millions of tons by two parasitic flowering plant species.
  - ✓ *Striga gesnerioides*
  - ✓ *Alectra vogelii*
- Yield reduction up to 100%
- Need for sources of resistance.
- Strong cross incompatibility between the wild vigna species and cowpea *(Vigna unguiculata)* constitutes a major constraint to moving desirable genes into cultivated cowpea varieties.

Experimental Location:

Minjibir, Kano State Nigeria. Sudan savanna (12° 08.997'N, 8° 39.733'E).

•350 accessions of wild vigna from 45 different species and 32 countries from the Genetic Resources Center of IITA were screened for resistance to *S.gesnerioides* in 2012.

• 280 accessions of cultivated cowpea land races geographically co-located with the resistant wild relatives were planted in 2013 .

KANO

Experimental design

- RCBD with three replications was used during the two years of the screening.
- Plots of 2m length with 75cm and 20cm between and within rows.
- Every planting hole was artificially inoculated with seed of *S.gesnerioides* pre-mixed with oven dried sandy soil at ratio of 1g *S.gesnerioides* seed to 1kg oven dried sandy soil.
- 3 seeds per accession sown per hill and thinned to two plants per stand two weeks after planting.

- Manually weeded as necessary and insects were periodically controlled using “Act force”(Chloropyfos 40% EC) at the rate of 1.2l/ha.

Data collection.

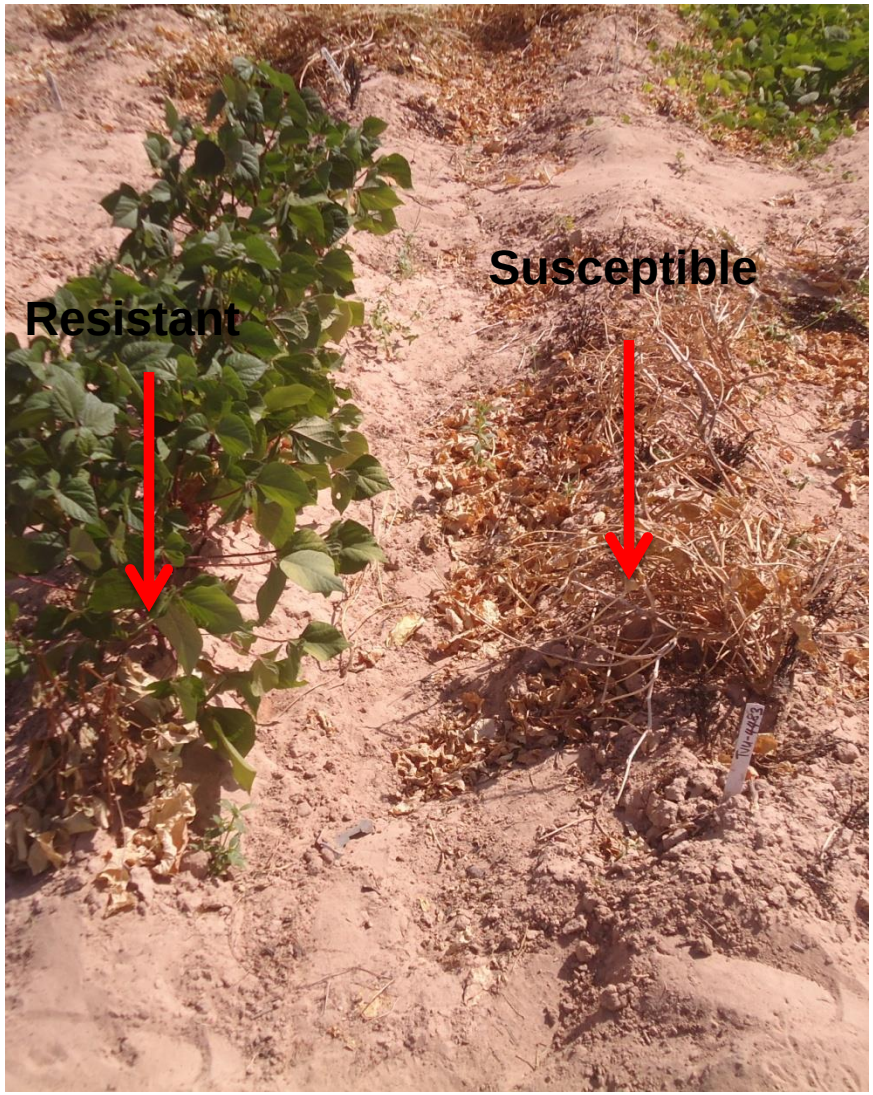
- Data were collected on number of emerged Striga/plot(2m²)at 9 WAP and at harvest.

Results

•Resistant accessions did not show any striga emergence while there were striga emergence for the susceptible accessions.

•21 genotypes from 11 wild vigna species showed resistance to *S.gesnerioides.*

•16 genotypes of the cultivated cowpea land races geographically co-located with the resistant wild relatives were confirmed resistant to *S.gesnerioides*.



Reaction of wild vigna spp to *S.gesnerioides*.

Acc no	Genus	Specie	Subtaxa	Subspecie	Variety	Origin	Emerged Striga/plot(2m²)	reaction to S.gesnerioides
IT98k 573-1-1(Res check)							0	R
TVNu-1064	Vigna	ambacensis			ambacensis	Zaire	0	R
TVNu-1070	Vigna	ambacensis			pubigera	Ghana	0	R
TVNu-1083	Vigna	parkeri	maraguensis	maraguensis		Kenya	0	R
TVNu-1268	Vigna	mungo			silvestris	Japan	0	R
TVNu-1335	Vigna	davyi				South Africa	0	R
TVNu-1477	Vigna	marina	oblonga	oblonga		Equatorial Guinea	0	R
TVNu-1478	Vigna	marina	oblonga	oblonga		Equatorial Guinea	0	R
TVNu-1514	Vigna	racemosa				Benin	0	R
TVNu-1523	Vigna	ambacensis				Benin	0	R
TVNu-1535	Vigna	oblongifolia			oblongifolia	Zimbabwe	0	R
TVNu-1537	Vigna	oblongifolia			oblongifolia	Zimbabwe	0	R

Reaction of wild vigna spp to *S.gesnerioides* contd.

Acc no	Genus	Specie	Subtaxa	Subspecie	Variety	Origin	Emerged Striga/plot(2 m^2)	reaction to S.gesnerioides
TVNu-1589	Vigna	unguiculata	dekindtiana	dekindtiana	dekindtiana	Ghana	0	R
TVNu-1647	Vigna	reticulata				Ghana	0	R
TVNu-1762	Vigna	oblongifolia			parviflora	Namibia	0	R
TVNu-37	Vigna	oblongifolia			oblongifolia	Costa Rica	0	R
TVNu-491	Vigna	reticulata				Zambia	0	R
TVNu-585	Vigna	ambacensis				Niger	0	R
TVNu-72	Vigna	vexillata			vexillata	Costa Rica	0	R
TVNu-73	Vigna	vexillata			vexillata	Costa Rica	0	R
TVNu-892	Vigna	glabrescens				Philippines	0	R
TVNu-995	Vigna	reticulata				Gambia	0	R
TVu-4(Sus check)	Vigna	unguiculata					6	S
TVu-8(Sus check)	Vigna	unguiculata					4	S

R=Resistance
S=Susceptible

Reaction of Cowpea land races Geographically co-located with the resistant wild relatives

Acc no	Genus	Specie	Origin	Emerged Striga/plot(2m²)	reaction to S.gesnerioides
TVu-12431	Vigna	unguiculata	Zambia	0	R
TVu-12432	Vigna	unguiculata	Zambia	0	R
TVu-12449	Vigna	unguiculata	Zambia	0	R
TVu-12470	Vigna	unguiculata	Zambia	0	R
TVu-13035	Vigna	unguiculata	Zambia	0	R
TVu-13297	Vigna	unguiculata	Zambia	0	R
TVu-13485	Vigna	unguiculata	Kenya	0	R
TVu-14980	Vigna	unguiculata	Niger	0	R
TVu-15011	Vigna	unguiculata	Niger	0	R
TVu-15016	Vigna	unguiculata	Niger	0	R

Reaction of Cowpea land races Geographically co-located with the resistant wild relatives contd.

Acc no	Genus	Specie	Origin	Emerged Striga/plot(2m²)	reaction to S.gesnerioides
IT98K-573-1-1	Vigna	unguiculata		0	R
TVu-12430	Vigna	unguiculata	Zambia	0	R
Tvu-4	Vigna	unguiculata		17	S
TVu-4806	Vigna	unguiculata	Niger	0	R
TVu-5498	Vigna	unguiculata	Niger	0	R
TVu-5500	Vigna	unguiculata	Niger	0	R
Tvu-8	Vigna	unguiculata		12	S
TVu-8453	Vigna	unguiculata	Kenya	0	R
TVu-997	Vigna	unguiculata	Ghana	0	R

Conclusion

- Screening cowpea wild relatives and land races germplasm identified sources of resistance to *S.gesnerioides*.

- Cross incompatibility between wild vigna species and cultivated cowpea land races is a major constraint to transferability of resistance to *S.gesnerioides* from wild vigna species.

- Cowpea land races from geographical locations of resistant wild relatives are sources of resistance to *S.gesnerioides*.

THANK YOU