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Farmers' perception of the parasitic weed *Alectra vogelii* Benth. and their cowpea varietal preferences in Burkina Faso

DIENI Zakaria[1*], BATIENO T. Benoit Joseph[1], ILBOUDO Dieudonné[1], TIGNEGRE Jean-Baptiste De La Salle[1,2], BAMA B. Hervé[1], ZIDA M. W. Felicien Serge[1], ZONGO Hamadou[1], SIDIBE Hamadou[1], PODA S. Léandre[1], TRAORE Karidiatou[1] and OUEDRAOGO T. Jeremy[1]

[1]Institut de l'Environnement et de Recherches Agricoles, Burkina Faso.
[2]AVDRC-World Vegetable Center, Mali.

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Burkina Faso was the third largest cowpea [*Vigna unguiculata* (L.) Walp.] producing country in West Africa in 2017. Cowpea is the fourth leading staple grain legume crop produced in the country. However, its production is hampered by several constraints, among which parasitic weeds are some of the most devastating. *Alectra vogelii* Benth. and *Striga gesnerioides* Wild Vatke are the main parasitic weeds in cowpea production in Burkina Faso. This study aimed at determining farmers' awareness about *Alectra vogelii* and their cowpea varietal preferences. To achieve this goal, information was obtained via a semi-structured questionnaire and focus group discussions in three districts (Koupela, Tenkodogo and Toussiana) of Burkina Faso, where *Alectra vogelii* occurs. The results showed that farmers in Toussiana district were more aware of this weed than in the other districts. Cowpea yield loss attributable to *Alectra vogelii* was up to 100%. Farmers' preferred traits were short-season varieties, with large size, rough and white grain. However, erect varieties were selected in Koupela and Tenkodogo districts; prostrate varieties were preferred in Toussiana district.

Key words: *Alectra vogelii*, awareness of *Alectra*, parasitic weed, preference, *Vigna unguiculata*, yield loss.

INTRODUCTION

Cowpea is the fourth most important food crop after sorghum, maize and pearl millet in production in Burkina Faso. It also serves as an important cash crop for the producers. The crop is an important source of protein in both human and animal diets. However, the average yield of cowpea remains low (500 kg/ha) (FAOSTAT, 2016). Several production constraints, including parasitic weeds, are responsible for this low yield. The main parasitic weeds in cowpea production are *Striga gesnerioides* and *Alectra vogelii*. Hundred percent (100%) yield losses attributed to *S. gesnerioides* are often times recorded, with an average of 44.2% (Muleba et al., 1997; Tignegre, 2010). In contrast to *Striga*, yield losses related to *Alectra vogelii* in Burkina Faso have not been evaluated yet. In

*Corresponding author. E-mail: dienizakaria@gmail.com.

other countries, such as Kenya, Malawi, Nigeria and Tanzania, more than 50% yield losses have been reported (Mbwaga et al., 2009; Omoigui et al., 2012; Karanja et al., 2013; Mbega et al., 2016).

A survey conducted in Malawi revealed that both agricultural extension agents and farmers were not well aware of the noxiousness of *A. vogelii* (Kabambe et al., 2013). Unlike *S. gesnerioides, A. vogelii* has green leaves like a normal photosynthetic leaf but they lack functional chlorophyll (Parker, 2012). The normal weed like appearance of *Alectra* could contribute to the ignorance by farmers of its noxiousness. This ignorance facilitates the dissemination of the weed, which is reproductive, within and across zones. An individual *Alectra* plant can produce up to 600 000 seeds that can remain viable in the soil for 15 to 20 years (Visser, 1978), making its eradication almost impossible. Nevertheless, control measures can be taken to reduce the effect of *Alectra* on cowpea if all the concerned actors are sensitized about this threat. Many years of efforts were deployed to develop new technologies for several constraints of production. Unfortunately, these technologies were rejected by end-users because they did not meet their needs and preferences. That constitutes a waste of time and resources (Tignegre, 2010).

To bridge the gap between breeders' objectives and the stakeholders' needs and preferences, a new research approach including all the partners was necessary. One of the popular and effective alternative proposed to address this issue is the participatory breeding approach through Participatory Rural Appraisal (PRA) (Cavestro, 2003). The PRA involves identifying with stakeholders the principal constraints in their cropping system and their desired varietal characteristics. This collaborative research is a powerful way for technology adoption and dissemination. It allows a clear communication and understanding of stakeholders' expectations and strengthens the collaboration among stakeholders, researchers and policymakers (McEntee, 2013). In fact, independently of scientists, farmers continuously experiment with new technologies and innovate sometimes on their own. Therefore, involving them in a collaborative research program will greatly contribute to the development and the sustainability of agriculture (Leitgeb and Vogl, 2010). Studies have shown that when stakeholders are associated with the selection process, the adoption rates of the products of breeding, goes up, thereby optimizing efforts deployed by breeders. In Burkina Faso a study implemented to evaluate the socio-economic impacts of cowpea technologies, showed that the income generated by cowpea at Donsin (Central Burkina Faso) had increased from 0.0% (1990) to 14.1% (2001). Within the same period it had increased from 15.7 to 49.9% at Bik Baskoure (Eastern Burkina Faso) (PRONAF, 2003). Cowpea consumers from Ghana and Cameroon are even willing to pay a premium for their preferred grain types (Langyintuo et al., 2004).

Cowpea consumers' preferences are more or less specific to each country and even within areas of a country. However, in West and Central Africa, white color grain is widely preferred (Langyintuo et al., 2003). Other authors reported that white large-sized seeds are the most preferred in these areas (Tignegre, 2010; Saidou et al., 2011; Batieno, 2014; Ibrahim et al., 2014; Horn et al., 2015). In southern Benin, yield performance and resistance to insect pests in this order were reported as the most important criteria for choosing varieties (Gbaguidi et al., 2013).

Participatory Rural Appraisal (PRA) studies reported that low soil fertility, climate change, drought, *Striga gesnerioides,* inaccessibility to markets and lack of inputs were some of the main constraints to cowpea production in Burkina Faso (Tignegre, 2010; Batieno, 2014). However, the importance of some threats and farmers' preferences were specific to the targeted area. In addition, farmers can neglect the importance of a threat. The previous studies did not cover farmers' preferred cowpea varietal growth habits and cropping cycle. Therefore, it was important to determine farmers' preferences for these traits in combination with grain quality for the sake of further capturing their preferred varietal characteristics. It was also necessary to assess farmers' knowledge on the parasitic weed, *Alectra vogelii* in areas where it occurs.

The objectives of this study were to (i) determine the awareness among farmers about the parasitism of *A. vogelii* on cowpea and (ii) identify farmers' preferred varietal characteristics.

MATERIALS AND METHODS

Study sites

The Participatory Rural Appraisal (PRA) was conducted in two regions of the country: the West and the Central-east. These regions are located in the Sudanian and Sudan Sahelian climate zones, respectively. The annual rainfall range is over 900 mm for the former and from 600 to 900 mm for the latter regions. Two districts (Koupela and Tenkodogo) in the central-east region and one from the western region (Bobo-Dioulasso/Toussiana) were selected for this study. In each district, three villages where *Alectra* infested fields have been observed were targeted. Details of these sites are presented in Table 1.

Questionnaire administration

A questionnaire was randomly administrated to 10 to 15 farmers per village making a total of 112 interviewed farmers. Gender ratio was considered as much as possible in each village. Respondents were asked about their personal information, their crop production systems and problems they encountered in cowpea production as well as their varietal preferences. It was further necessary to understand how far farmers know the relation between the parasite and its host. For this purpose, they were asked to identify *A. vogelii* host crops they knew. It was also important to know farmers' perceptions about the effects of *Alectra* on cowpea yield. To

Table 1. Geographical description of the study sites.

Region	District	Village	Longitude (N)	Latitude (W)	Altitude (m)	Rainfall (mm)
Central-east	Koupela	Boantenga	12º.12,8’	0º20	330	600-900
	Tenkodogo	Zano	11º42,5’	0º22, 4’	325	
		Dabare	11º33, 3’	0º20, 59’	323	
		Laylay	11º34,3’	0º23, 44’	328	
Haut Bassin	Bobo-Dioulasso (Toussiana)	Wempea I	10º52,9’	4º33, 59’	339	>900
		Wempea II	10º51,52’	4º18, 56’	339	
		Tapoko-deni	10º52,44’	4º32, 44’	339	

facilitate this estimation, farmers were told to assume that they harvest 100 bags of 100 kg if *Alectra* does not occur. Subsequently, they estimated the number of bags they lost due to the prevalence of *Alectra*.

Focus group discussion

Focus group discussions (FGD) were held with 10 to 15 farmers in November 2015 in the selected villages about the issues encountered in cowpea production in general and particularly about the parasitism of *A. vogelii* on cowpea as well as their expectations in terms of cowpea varietal improvement. Heads of farmers’ local organizations and/or extension agents were involved in the organization of the FGD. A group discussion was organized in each village. A multi-disciplinary team, composed of a breeder, a social scientist and a weed scientist had full day discussions with farmers in each village.

Data analysis

Data collected were analyzed with Sphinx Lexica version 4.5.0.28. Chi-square tests were run to check for similarities and dissimilarities of responses. Computation was done for each district or as a combination of the three districts. Factorial analysis and principal component analysis were also used. Results are presented in tables and graphs. The yield loss estimates were grouped into three classes as follows:

Class one: Yield loss of less than 50%;
Class two: 50% yield loss and
Class three: More than 50% yield loss.

RESULTS

Farmers’ awareness on *A. vogelii* as a parasitic weed to cowpea production

A total of 112 farmers were interviewed, among them 23.2% were women. The sample was distributed as follows: 33 farmers from Koupela, 32 farmers from Tenkodogo and 47 farmers from Toussiana (Table 2). Most of the respondents (72%) have seen *Alectra* before the survey but some of them did not recognize it as a parasite (Figure 1).

The results of the study also showed that nearly sixty percent (59.8%) of the interviewed farmers knew *Alectra vogelii* as a parasitic weed. However, a large variability was observed in farmers’ awareness across regions (Table 3). The results of the factorial analysis of farmers’ awareness on *A. vogelii* showed that 66% of this variability was explained by the two first principal components (Figure 2). The district of Toussiana was associated to farmers’ awareness. The chi-square test for awareness between districts was highly significant ($P<0.001$), in contrast it was not significant for gender ($P=0.34$) (Table 3).

Eighty-nine percent (89%) of the interviewed farmers from Toussiana knew *Alectra* as a parasitic weed. This locality accounted for 62.7% of the global farmers’ knowledge about *Alectra*. On the other hand, 89.9% of the farmers who ignored its noxiousness were from Koupela and Tenkodogo (Table 3). No significant difference was observed between men and women awareness of *Alectra vogelii* (Table 3).

Farmers’ identification of *Alectra vogelii host* crops

The results of farmers’ identification of *A. vogelii* host crops are presented in Table 4. 65.2% of the respondents identified cowpea as host crop of *Alectra* followed by groundnut (48.2%). Three cereal crops: Pearl millet, sorghum and rice were identified as hosts of *Alectra* by 16.1% of the respondents. These farmers thought that *S. gesnerioides* and/or *A. vogelii* change into *S. hermonthica* and vice versa depending on the crop grown (legume or cereal). They did ignore that *Alectra* and *Striga* are different species of parasitic weeds parasitizing crop plants from different classes. The remaining legume crops (soybean and Bambara groundnut) were not well known by farmers as host crops as was expected because they were produced by few respondents.

Farmers’ identification of cowpea production constraints

Five biotic constraints to cowpea production were ranked

Table 2. Number of interviewed farmers per district and per sex.

Gender	District			Total	p-value
	Koupela	Tenkodogo	Toussiana		
Female	6 (23) †	10 (38.5) †	10 (38.5) †	26 (100) †	
Male	27 (31.4) †	22 (25.6) †	37 (43) †	86 (100) †	0.19^{ns}
Total	**33**	**32**	**47**	**112**	

†Percentage in brackets; ^{ns}not significant.

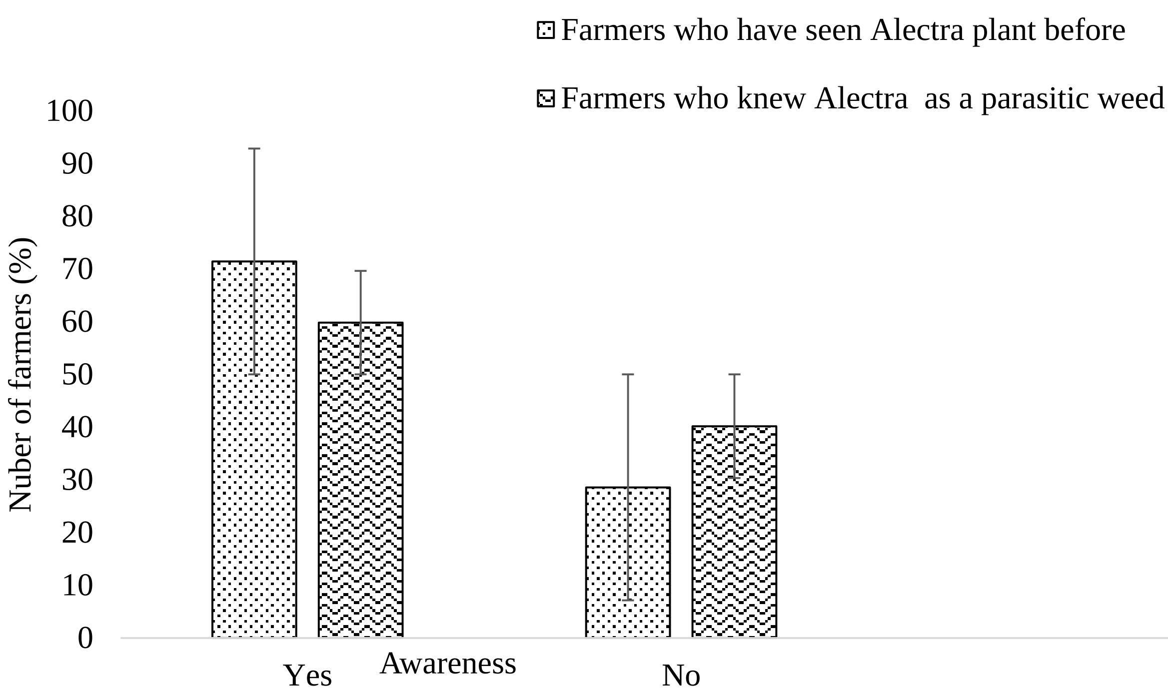

Figure 1. Proportion of farmers for their awareness on *Alectra vogelii* in the study areas.

Table 3. Famers' awareness of *Alectra* as a parasitic weed per gender and locality.

Variable	Awareness				Total	p-value
	Yes		No			
	Observed	Expected	Observed	Expected		
Gender						
Male	53 (61.6)†	51.45	33 (38.4) †	34.55	86	0.34^{ns}
Female	14 (53.8) †	15.55	12 (46.2) †	10.45	26	
Locality						
Koupela	11 (16.4) †	19.74	22 (48.9) †	13.26	33	
Tenkodogo	14 (20.9) †	19.14	18 (40) †	12.86	32	<0.001**
Toussiana	42 (62.7) †	28.12	5 (11.1) †	18.88	**47**	

†Percentage in brackets, ^{ns}not significant, **highly significant.

by farmers in the three sites as presented in Table 5. At Koupela, *S. gesnerioides* was ranked as the most important constraint to cowpea production followed by insect pests, foliar diseases and stem diseases. *A. vogelii*

Table 4. Farmers' perception of host crops of *A. vogelii*.

Potential *Alectra* host corps identified by farmers	Number
No response	31 (27.7) †
Cowpea	73 (65.2) †
Groundnut	54 (48.2) †
Soybean	1 (0.9) †
Bambara groundnut	3 (2.7) †
Pearl millet	11 (9.8) †
Sorghum	5 (4.5) †
Rice	2 (1.8) †
Total observation	**112**

†Percentage of respondents in brackets

Table 5. Farmers' ranking of the importance of biotic constraints of cowpea production in the study areas.

Constraint	District						Total	Rank
	Koupela	Rank	Tenkodogo	Rank	Toussiana	Rank		
Foliar diseases	5	**3**	0		9	**4**	14	4
Stem diseases	3	**4**	0		2	**5**	5	5
Insects	19	**2**	23	**2**	27	**2**	69	1
S. gesnerioides	25	**1**	26	**1**	9	**3**	60	2
Alectra vogelii	1	**5**	4	**3**	34	**1**	39	3
Total	**53**		**53**		**81**		**187**	

Table 6. Farmers' perception of cowpea yield loss related to *Alectra* infestation per locality.

Locality	Yield loss				Total	p-value
	No idea	<50%	50%	>50%		
Koupela	26	2	3	2	**33**	
Tenkodogo	20	3	6	3	**32**	<0.001**
Toussiana	5	6	10	26	**47**	
Total	**51**	**11**	**19**	**31**		

**Highly significant.

was ranked the least important. Farmers at Tenkodogo did not recognize foliar and stem diseases as constraints to cowpea production. *S. gesnerioides*, insects and *A. vogelii* in this order were ranked as the main biotic constraints. However, at Toussiana, *Alectra* was ranked first before insects and *Striga*. Overall, the most important biotic constraints in cowpea production identified in the three sites by farmers were *S. gesnerioides*, insects and *A. vogelii* in this order. The prevalence of both *S. gesnerioides* and *A. vogelii* was linked with low soil fertility which was also identified as a production constraint. Poor soil was thought to be a channel for *A. vogelii*. Farmers at Koupela mentioned that damages caused by *Striga* are more severe when drought occurs at the reproductive stage. Besides, post-harvest problems were mentioned at Toussiana principally the high cost of the Purdue Improved Cowpea Storage (PICS) bags for safe storage. Inaccessibility to seeds of improved varieties and other inputs (fertilizers, pesticides) also came out as constraints in cowpea production.

Farmers' perception on the effects of *A. vogelii*

Yield loss due to *A. vogelii* was differently appreciated by farmers. The chi-square test was highly significant for the estimate of yield loss between farmers from the three locations (Table 6). The yield loss estimates were grouped into three classes like mentioned in materials and methods. The proportions of farmers for their perception of cowpea yield reduction related to *Alectra* are presented in Tables 6 and 7. Many farmers (45.5%)

Table 7. Farmers' perception on cowpea yield losses due to *A. vogelii.*

Yield loss	Number of respondent
No idea	51 (45.5)†
Less than 50%	11 (10.5)†
50%	19 (17)†
More than 50%	31 (27)†

†Percentage in brackets.

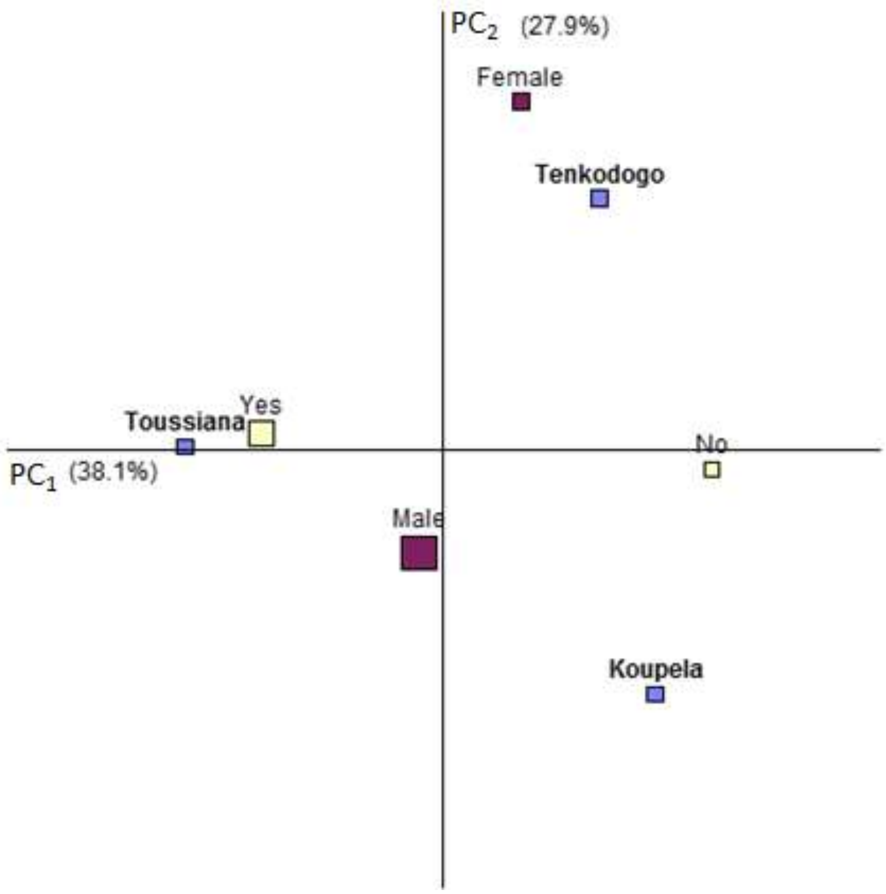

Figure 2. Factorial analysis of farmers' awareness on *A. vogelii* according to their locality and gender.

did not have an idea on the damages caused by *Alectra* on cowpea. Farmers' perceived yield losses ranged from 5 to 100% yield loss (Table 7). The study also showed that 44% of the farmers attributed at least 50% yield reduction due to *A. vogelii* (Table 7). At Toussiana 76.6% of the respondent were in favor for this opinion (Table 6). The principal component analysis graph showed that Koupela and Tenkodogo were grouped at the opposite sides of Toussiana from the origin of the graph (Figure 3). The first axe accounted for the total weight of estimated yield loss.

Production system and control measures

Two main cropping systems were used by farmers: Crop rotation (61%) and intercropping (36%) (Figure 4). The two systems were simultaneously used in some cases. Cereal-legumes or cereal-cereal (sorghum, pearl millet) rotations were used. A few of them were practicing mono-cropping. These practices are often used for restoring soil fertility and weed management. Cultural practices have been farmers' main method for controlling *Striga* sp. and *A. vogelii*. Manual uprooting has been the widest

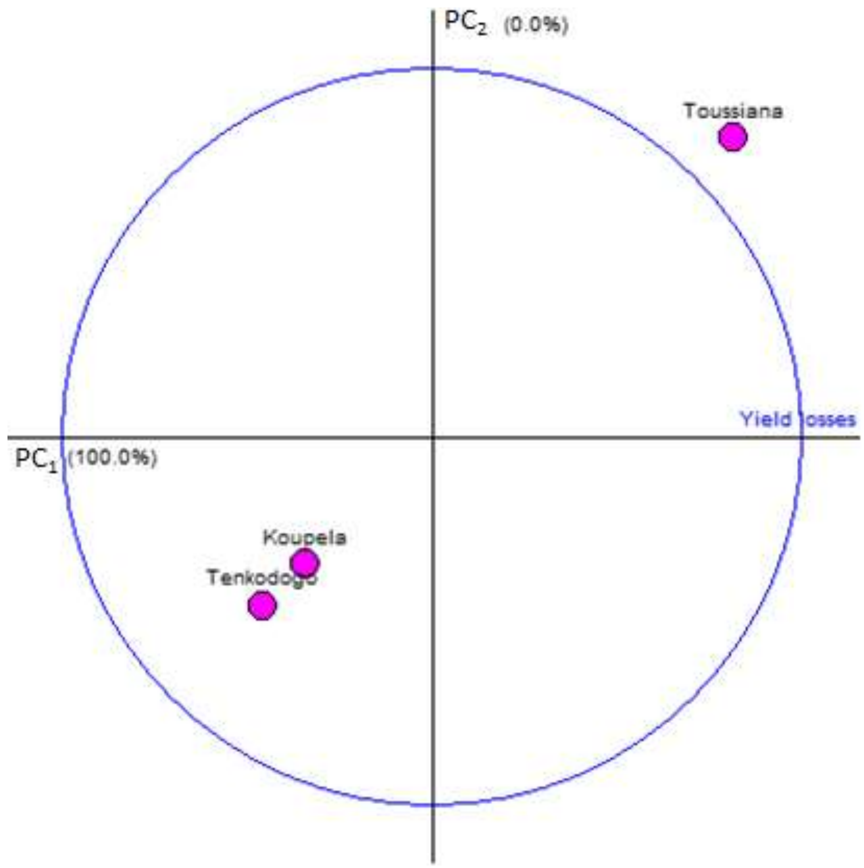

Figure 3. Principal component analysis showing the importance of estimated yield losses due to Alectra vogelii.

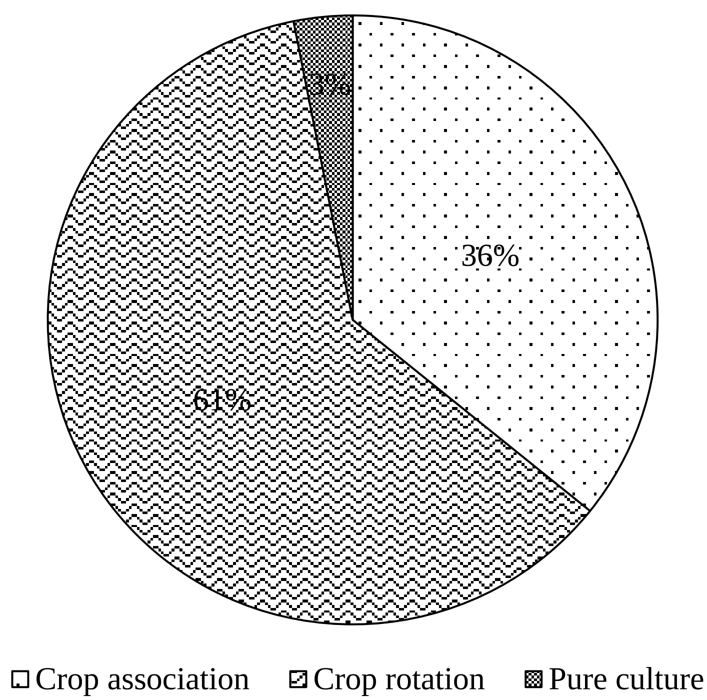

Figure 4. Cropping systems used by farmers in the studied areas.

Table 8. Farmers' preferred varietal characteristics and chi-square p-value.

Trait	Varietal characteristic	Number of respondents				p-value
		Koupela	Tenkodogo	Toussiana	Total	
Growth habit	Prostrate	9	6	35	50 (44.6) †	
	Semi-erect	9	9	5	23 (20.5) †	0.012*
	Erect	18	20	12	50 (44.6) †	
Cycle	Short	30	27	34	91 (81.3) †	
	Medium	5	7	10	22 (19.6) †	0.042*
	Long	0	0	6	6 (5.4) †	
Grain color	White	33	31	45	109 (97.3) †	
	Red	0	1	4	5 (4.5) †	0.508 ns
	Black	0	0	0	0 (0) †	
Grain size	Big size	31	28	38	97 (86.6) †	
	Medium size	5	6	9	20 (17.9) †	0.313 ns
	Small size	0	0	3	3 (2.7) †	
Grain texture	Wrinkled	25	22	25	72 (64.3) †	0.134 ns
	Smooth	8	10	22	40 (35.7) †	

†Percentages in brackets; *Significant, ns, not significant.

practiced control measure. The application of organic matter was mentioned as a control method as well. However, farmers recognized the limitations of these methods and were therefore willing to experiment with new technologies such as the use of resistant varieties.

Farmers' varietal preferences

Farmers' preferred characteristics of cowpea varieties are presented in Table 8. Results indicated that varieties with wrinkled grain texture (64.3%) large grain size (86.4%) and white grain color (97.3%) were largely preferred by farmers across the three locations. For grain quality no difference was observed between farmers' preferences in the different locations. However, with regard to the growth habit and the cropping cycle slight differences were observed even though prostrate (44.6%) and erect (44.6%) short cycle varieties (81.3%) were preferred. Prostrate varieties were more preferred at Toussiana whilst erect varieties were preferred at Koupela and Tenkodogo. In summary, farmers' preferred cowpea varietal characteristics for all the locations were: Prostrate and erect sort cropping cycle varieties with rough big sized white grains.

DISCUSSION

The results of this study showed a large variability in farmers' awareness on the parasitic effects of *A. vogelii*. Whilst the weed was well known by farmers from Toussiana in western Burkina Faso, its parasitic status was not known by the large majority of farmers from the districts of Koupela and Tenkodogo in the central-eastern part of the country. In contrast to its related species, *S. gesnerioides* was very familiar to the farmers from this region where it has been considered as first biotic constraint. Because of the appearance of *A. vogelii* to ordinary weeds, farmers do not pay particular attention to it until it becomes a serious problem. Actually farmers generally recognize a threat as such from the importance of its damages. For example in western Burkina Faso where *Alectra* was first observed (Subrahmanyam et al., 1989) (probably from where it was introduced into the country), it had enough time to disseminate and increase the seed bank in the soil freely without any control measure. In addition, little research and communication was done to help farmers recognize it as a constraint, because the economic importance of *Alectra* was neglected by researchers. Thus the ignorance of farmers about the parasitic weed status of *Alectra* could have contributed to its dissemination. Therefore, it is undoubtedly the gradual effects of the weed that led most farmers to get familiar with it in the district of Toussiana. The ignorance by most farmers at Koupela and Tenkodogo of the parasitic effects of *A. vogelii* could be related to its relatively low infestation density in these areas.

Though farmers identified very well the main host crops of *A. vogelii*, cowpea (65.2%) and groundnut (48.2%) were recognized to be associated with the occurrence of *Alectra* in the field. These crops are the largest grain legume crops produced in Burkina Faso. It was realized that some farmers thought that *S. gesnerioides* changed into *A. vogelii* or *S. hermonthica.* They did not know that these weeds are different species of parasitic weeds. This opinion could be explained from their cultural practices. Legume-cereal rotation in *Alectra* infested field will make farmers think that the legume crops spread *Alectra* because the weed only emerges when its hosts (cowpea and groundnut) are grown. Farmers' knowledge on the link between a parasite and its host derives from their skill in determining host-parasite interaction in the field. This skill allows them to identify the various types of threats hampering their production. However, this study revealed that some farmers failed to recognize *A. vogelii* as a parasitic weed even though they have seen it before and identify its host crops. Collaborative research and other scientific training should be intensified to strengthen farmers' knowledge about production constraints and the new technologies as well.

The extent of *A. vogelii* damage on cowpea depends on the degree of infestation of the field. The current study revealed that farmers from western Burkina Faso, regardless of gender, knew better about *A. vogelii* compared to those from the other studied localities because the weed is more widely spread in the former region. Similarly, the highest yield loss was reported by farmers from this locality. The prevalence of *A. vogelii* in this locality was reported 30 years ago. However, rigorous measures were not implemented to control it and its highly invasive potential allowed an exponential increase of the seed bank in the soil. Consequently, in heavily infested field, 100% yield losses were registered. Elsewhere in Africa, yield losses ranged from 30 to 100% (Mbwaga et al., 2009; Omoigui et al., 2012; Karanja et al., 2013; Mbega et al., 2016). The economic importance of *A. vogelii* revealed by this study calls for urgent measures to control it. However, it is important to notice that this weed like the other related parasitic weeds is very difficult to manage. In addition, the occurrence and severity of *A. vogelii* is tightly related to poor soils. Therefore, only an appropriate integrated management strategy with genetic resistance as the principal component could allow addressing this threat.

A successful use of genetic resistance in the control of *A. vogelii* will depend on farmers' acceptance of the resistant varieties proposed. So the study also included farmers' varietal preferences as selection criteria. In all PRA sites, farmers' preferred varietal characteristics were large-sized, rough texture and white seed-coat grains. These criteria refer to productivity and market demand. Yield performance coupled with market demand are by far the most important criteria of farmers' choice (Tignegre, 2010; Gbaguidi et al., 2013; Batieno, 2014). Besides these characteristics, farmers also selected varieties for culinary characteristics. In the study areas brown and red colored seed were entirely rejected by farmers. However, Tignegre (2010) found that farmers in the Sahel (Oudalan province) preferred brown colored seeds. Therefore, a small variation is observed in farmers' choice for this trait within the country. Similar report was done by Langyintuo et al. (2003), though white grain testa remains largely preferred by farmers in West and Central Africa according to these authors. Cowpea growth habit and reproduction cycle were also important criteria of choice in the areas covered in this study. Unanimously, farmers chose short cycle varieties in all three localities but prostrate and erect varieties were equally preferred by farmers from the western region and central-east regions respectively. On the one hand, low and irregular rainfall within and across years has heavily influenced farmers' decision about choosing short cycle varieties. Drought was mentioned by farmers as one of the most important constraints to cowpea production (Tignegre, 2010; Batieno, 2014) by putting emphasis on terminal drought (Batieno, 2014). As such, short cycle varieties will be ideal for them to escape terminal drought. On the other hand, cultural practices (pure culture or intercropping) guided farmers' choice. Whilst farmers from Western Burkina Faso (Toussiana) favored prostrate varieties, erect ones were chosen in central-east (Koupela, Tenkodogo). In the latter region, farmers have progressively moved from intercropping to cowpea mono-cropping with the release of new varieties. In contrast at Toussiana local varieties are still widely produced. Farmers mentioned the lack of improved cowpea varieties and technical packages as production constraints. From the above analysis, it can be undoubtedly inferred that to meet farmers' preferred varietal characteristics, breeding objectives in Burkina Faso should be focused on selecting varieties possessing large-sized and white-colored grain with adaptation for both the local food consumption and market demand for all the covered zones. These selection criteria corroborate those suggested by Tignegre (2010) and Batieno (2014). Such varieties should be able to withstand most biotic constraints (*S. gesnerioides*, *A. vogelii* and insects) and abiotic constraints (drought, heat).

CONCLUSION

This study showed that *S. gesnerioides,* insects and *A. vogelii* were the most important biotic constraints to cowpea production. *A. vogelii* was ranked third biotic constraint. Farmers from western Burkina Faso were more aware about its damage on the host crop. Both female and male farmers' in the three study areas preferred short cycle varieties with large-sized, rough texture and white grain for both consumption and market demand. Consequently, selecting new improved varieties for Burkina Faso should take into account the aforementioned characteristics coupled with resistance to the main biotic and abiotic constraints identified. The development of such varieties will speed up their adoption by the stakeholders.

CONFLICT OF INTERESTS

The authors have no conflicts of interest to disclose

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