

**ORIGINAL ARTICLE**

**THE HUNTING TRENDS OF WILD BOAR (*SUS SCROFA*) HUNTERS IN NORTHEASTERN ALGERIA**

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**Keywords**

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**Abstract**

Wild boar have been expanding their range in the northern part of Algeria probably as a consequence of decreasing hunting pressure since the Algerian government has banned hunting for more than 20 years because of civil war. Wild boar is causing a lot of damages and is considered in rural areas as a permanent threat to the crops, livestock and people in recent years. Such situation is obvious in the Annaba district situated in northeastern Algeria. Population control is strongly requested by farmers. However, the number of hunters has been drastically decreasing since the 1990’s. To maintain hunting activity and increase the number of hunters, which in the end can lead to hunting as a management tool, we must understand their dynamic by investigating their activities and attitudes.

This study is the first investigation in Algeria dealing with the assessment of wild boar hunters’ activities and attitudes. Questionnaires were conducted in 2014; out of 150 licensed hunters at the local hunters’ associations in Annaba, 114 were questioned and interviewed. Almost half of hunters (47.4 %) were more than 60 years old. We found that most of them (56.2 %) practice hunting for over 30 years; hunting was seen by 40.4 % of hunters as a traditional sport-leisure, which means that for the majority of hunters the idea of “hunting to control” is not considered. The major problem encountered by 36 % of hunters is the lack of munitions, followed by the difficulty of weapon purchase.

**Introduction**

The wild boar is a large mammal that has the most widely distribution range of all suid species [1-3]. This animal can occupy a wide range of environments, including semi-deserts, wetlands, high mountain environments, forest and agro ecosystems [4-8]. It occurs in Europe, the Middle East as far as the Zagros Range, and North Africa [9]. Wild boar occurrence in North Africa ranged from Morocco eastward through Tunisia [10-12]. The species was abundant in ancient Egypt, inhabiting the ranges of the Nile Valley before it disappeared in the 1900’s [13].

After the expansion of the wild boar distribution in Europe, which began in the 1960s [3, 14] the species has caused enormous damages, notably in crop fields and forest ecosystems [15-20]. Wild boar is also suspected of transmitting diseases to livestock and humans [21-23], and involved in traffic collisions in some parts of Europe [24, 25]. In order to control the wild boar populations, hunting remains a major tool for population management worldwide [3, 26-28]. Although hunting of this game species in some European countries is an ancient tradition and part of the local culture [28-30], its evolution in the future is still unclear, and the number of hunters, one of the effective elements in wild boar regulation [3, 28, 30-32], is declining in some countries [3].

In some parts of northern Africa the distribution range of wild boar is expanding, in Tunisia a small population of wild boar has occupied the southern part of the country [10, 33]. In Morocco, this species occurs in forested regions and in the Sahara in wetlands and swampy areas [11]. In Algeria, wild boar are native and are present throughout the northern part of the country but they are gradually expanding southwards [12, 34]. This species occurs mainly in forested mountains, which extend from the Tellien Atlas to the pre-Saharan Atlas. In the Saharan area, wild boar can be only observed in wetlands such as palm trees, north of the Sahara (Direction Générale des Forêts, personal communication, 2014).

According to a census study elaborated by a group of experts in forestry management from Bulgaria in 1987, the population size of the Algerian wild boar was estimated to be in the range of 125.000 individuals [35]. According to the same source the proportion of wild boar that should be hunted each year was about 10.0 - 20.0 % (12,500 - 25,000). Apart from this census study, there has been no recorded data concerning the evolution of wild boar population size in Algeria but it seems to be in demographic expansion, probably as a consequence of decreasing hunting pressure [36] since the Algerian government has banned hunting for more than 20 years (from 1992 to date) because of civil war and the ban is still in force except in the case of wild boar and other small game species, for which special permission can be obtained.

The decrease in the number of hunters in some Algerian provinces (Annaba, Oran and Algiers) is clear and this affects agriculture since wild boar causes direct and indirect damage to the crops, livestock and people in recent years [36]. However, in Algeria, maintaining hunting pressure on wild boar in order to control its demographic expansion will be difficult. Hunting is practiced in a regulated setting called "battues administratives". The latter, are carried out by the hunters' federation under the supervision of the forestry department "Direction Générale des Forêts". Outside this official framework, hunters do not have the right to organize hunting trips on their own. They must always have permission from the highest authority at the provincial level in which the number of harvested animals is specified, as it does not occur in the case of wild boar hunting in Tunisia [33] and Morocco [11]. Nowadays, hunting is only practiced by hunters' associations who get only a short-timed license, but the main constraint hampering the hunt is the lack of munitions which are furnished only by foresters in a limited amount; it is forbidden to sale/trade munitions in Algeria. As in all Muslim countries, the wild boar meat is seldom eaten in Algeria and there is no commercial wild boar hunting. After shooting, the wild boar meat is generally offered to zoos, illegally and discretely sold to expatriates, especially the sizeable

Chinese community or eaten discretely by Algerians less scrupulous about religions observance.

In fact, based on hunting bag estimates (Direction Générale des Forêts, personal communication, 2014) the number of wild boar hunted is on the continuing decline with a number of battues remaining relatively stable. However, the number of wild boar hunters is unknown. It is also thought to be reducing due to the ban of hunting for over than 20 years.

Ueda and Kanzaki (2005), in their study on wild boar hunters profile in Western Japonon, concluded that to discuss the necessary measures which will contribute to maintaining and increasing the number of hunters, it is important to understand their activities and attitudes [27]. This conclusion was supported by the study of Tsachalidis and Hadjisterkotis (2008) on wild boar hunting and socioeconomic trends in Northern Greece [38].

Taking into consideration the assumed reduction of wild boar hunters observed in Algeria since the 1990's and the decreasing trend in the number of hunting licenses, this study investigates the dynamics of the hunter population in Annaba which is known for its very active hunters' federation. Annaba is located in the North East of Algeria (Fig. 1); it contains one of the most old and active hunters' federation. In this region, battues are regularly organized and the number of hunters licensed decreased from 633 in 2000 [37] to 150 in 2014 (Belhatem Rabia, president of hunters' association of Annaba, personal communication, 2014). Reasons for this decrease are still unknown.

This is the first study to survey the activity, attitudes and socioeconomic trends of wild boar hunters in the province of Annaba, to understand the dynamic of hunter population, to shed light on new trends of hunting activity and provide land managers with information on factors hampering hunting in Algeria.

## Study area

Our study was realized in the province of Annaba, located in the extreme north-east of Algeria (36°49'58"N 7°48'40"E, Fig. 1), extending over an area of about 1439 km<sup>2</sup>. The coastal province of Annaba has a population of over 600,000 inhabitants it is the fourth most populous province in Algeria after Algiers, Oran and Constantine.

Annaba has a Mediterranean climate and is known for the long, hot, dry summers. Winters are warm and wet. Rainfall is abundant and can be torrential. Generally, it is hot from mid-July to mid-August. The sunburn (exposure) is considerable in summer. Rainfall is uncommon in summer and important in winter [39]. The living space of the province is divided into three main areas clearly differentiated and distinct from one to another: 1) The coastal area which covers about 26.0 % of the territory, consists of small hills and foothills; 2) The mountainous area, which covers 52.0 % of the territory, is mainly composed of scrub (almost 64.0 %), the rest are natural essences (*Quercus suber* and *Quercus canariensis*) and reforestation plants (*Eucalyptus sp.* and *Pinus pinaster*); this area is home to the wild boar; 3) the lowland area, which covers about 18.0 % of the territory has very fertile soils. About 26.0 % of that area is dedicated to agriculture, particularly (cereals, vegetables, fodder, citrus, gardening

culture, olives, industrial culture and vine). These areas are, for the most part, greatly exploited by the wild boar. 4.0 % of the resting area consists of plateau areas.

Wild boar hunting in the province of Annaba is organized by the Forestry Conservation Fund “la Conservation des Forêts” in coordination with the hunters’ federation of Annaba. The latter regroups five hunters’ associations which hold a total of 150 members.

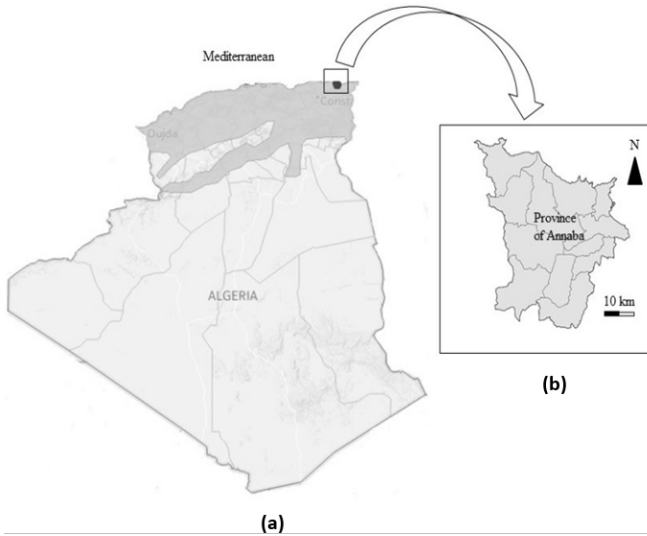


Figure 1: Present wild boar distribution in Algeria. The dark grey color refers to the distribution range of *Sus scrofa* in Algeria. Within this range, wild boar are not distributed continuously but detailed information is as yet not available (a); study area localization (b).

## Methods

During the 2014 hunting season, we travelled to 17 locations in 8 of the 12 communities of the Annaba Province to perform a questionnaire survey and observe field hunting behavior. From a total of 150 licensed hunters at the local hunters’ associations, 114 were questioned and interviewed on the spot just before the beginning of the wild boar battue.

Questionnaires were administrated through face-to-face interviews to hunters in Annaba Province. Each hunter was asked to his personal characteristics (age, level of education, occupation, resident area, monthly income, family condition) and his behavior towards hunting and present condition of hunting activities (distance traveled for hunting, number of days spent for hunting, if he hunt at night or not, reasons for selecting wild boar species, problems of hunting and perceived constraints related to declining number of days spent in hunting). Most of questions were chosen referring to previous similar studies [27, 38].

The results of our questionnaire were collected, organized in a matrix made into Microsoft® Excel 2013 and expressed simply as a percentage of the total number of respondents.

## Results

The personal characteristics of wild boar hunters in Annaba (Table 1) showed that the average age of hunters was  $55.02 \pm 13.14$  (SD) years ( $n=114$ ). Almost the half (47.4 %) of hunters were age 60 or older and very few respondents (18.4 %) belonged to age group “30-39 years”. The respondents were generally very experienced hunters, more than half of them (56.2 %) practice wild boar hunting for over 30 years. About a third (31.6 %) of wild boar hunters were university graduates. The equivalent percentages for the other educational levels (elementary school, gymnasium, lyceum, and analphabet) were 25.5 %, 18.4 %, 18.4 % and 6.1 %, respectively. The majority of hunters were self-employed (43.9 %) or pensioner (40.3 %) and the others were employees of public service (15.8 %). Nearly half (46.5 %) of the respondents possessed a monthly income ranging from 24000 to 120000 Algerian dinar (1 euro = 123 DA); the average monthly income in Algeria is 39 200 DA (about 334 euro). A vast majority of hunters (71.9 %) lived in cities, many lived in villages (18.4 %) and a few lived in mountainous area (9.7 %).

Table 1: Personal characteristics of wild boar (*Sus scrofa*) hunters in Annaba.

Personal characteristics	Items	n	(%)
<b>Age</b>	30 - 39 years	21	18,4
	40 - 49 years	18	15,8
	50 - 59 years	21	18,4
	60 - 69 years	36	31,6
	over 69 years	18	15,8
<b>Hunting experience (year)</b>	0-9	21	18,4
	10-19	21	18,4
	20 - 29	8	7,0
	30 - 39	39	34,2
	over 40	25	22,0
<b>Level of education</b>	Analphabet	7	6,1
	Elementary school	29	25,5
	Gymnasium	21	18,4
	Lyceum	21	18,4
	University	36	31,6
<b>Occupation</b>	Public service	18	15,8
	Self employed	50	43,9
	Pensioner	46	40,3
<b>monthly income (DA)</b> 1 Euro=123 DA	12000 - 24000	25	21,9
	24000 - 120000	53	46,5
	Over 120000	36	31,6
<b>Location of home</b>	Urban area	82	71,9
	Rural area	21	18,4
	Mountainous area	11	9,7

The analysis of the behavior of hunters (Table 2) indicated that the average distance traveled for hunting was  $9.4 \pm 4.3$  (SD) km. Most hunters (60.5 %) traveled distance ranging from 8 to 13 km. Frequency outing spend for hunting by month balanced between 1 and 4 times, we found that almost half of hunters (47.4 %) hunted wild boar

4 times a month. Whereas, 8.8 % of them hunted only one time a month. A two third of the respondents (71.9 %) didn't hunt at night. The remaining third is divided into two groups; the first group hunted discretely and practice generally individual wild boar hunting. The second one represents those who participated in the battues so-called "les battues administratives" organized by the hunters' federation in coordination with "la Conservation des Forêts" of Annaba. The average number of hunting during nighttime spent per hunter each year varied considerably. Hunters, participating in battues and representing 65.6 % of the total respondents who hunt at night, spend  $15 \pm 9.6$  (SD) nights away even though the individual hunters (34.4 %), who hunted discretely at night, spend  $172.7 \pm 84.7$  (SD) nights away. The average number of hours hunted per day was  $8.4 \pm 1.0$  (SD) hours.

Table 2: Hunting.

Hunting behavior	Items	n	(%)
Average distance traveled (Km)	2 - 4	21	(18,4)
	5 - 7	14	12,3
	8 - 10	25	21,9
	11 - 13	44	38,6
	14 - 16	7	6,2
	Over 16	3	2,6
Hunting frequency per month	1 time	10	8,8
	2 times	22	19,3
	3 times	28	24,5
	4 times	54	47,4
Hunting at night	don't hunt	82	71,9
	hunt	32	28,1
Hunting type if hunting at night	battues	21	65,6
	individual hunt	11	34,4

behavior of wild boar hunters in Annaba

Fewer than half of the respondents (40.4 %) considered wild boar hunting as a traditional practice. There were 29.8 % of the hunters selected wild boar for leisure and 18.4% of them selected it to reduce agricultural damage whereas very few people (1.7 %) who hunt for commerce purposes (Fig. 2). Based on the survey data, the constraints related to decreasing number of days spent hunting can be categorized into two groups: 1) personal constraints mostly included lack of time and finances; and 2) situational constraints represented by reducing game species, reducing damage caused by wild boar, and regulation restrictions. The latter one was the most important constraint perceived by 44.7% of hunters followed by "lack of time because of their busy schedule" and/or "reducing game species" (17.5% and 16.7% respectively, Fig. 3).

The major problems frequently faced by the hunters included specific issues such as the lack of munitions (36.0 %) and difficulty of weapons purchase (18.4 %, Fig. 4).

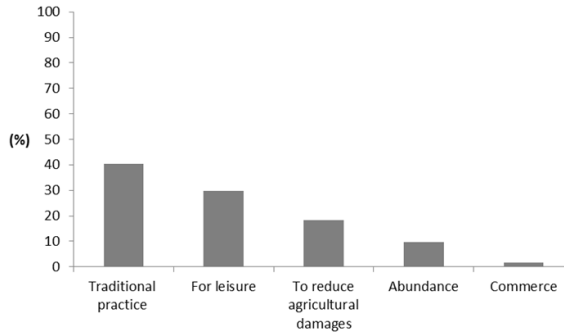


Figure 2: Reasons for hunting wild boar in Annaba.

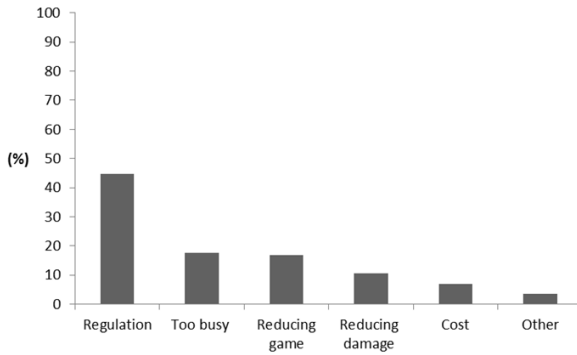


Figure 3: Constraints related to declining number of days of wild boar hunting.

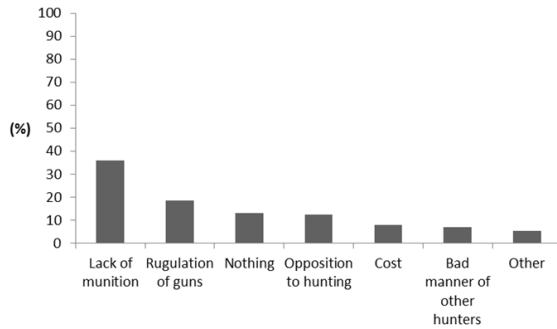


Figure 4: Problems faced by wild boar hunters in Annaba.

**Discussion**

In Europe, hunters hunt for meat, leisure, commerce and/or to reduce agriculture damage caused by wild boar or another game species [1]. In Algeria, hunting was seen by a considerable number of hunters as a traditional sport-leisure activity. It is clear that this activity remains a very well established culture in the country. It

appears that stimulating hunting as a leisure activity remains important in the sense that leisure hunters tend to maintain their activity [27]. Moreover, actions should be taken to stimulate hunting having management purposes.

Wild boar hunters are mainly middle and high-income class. Most of them reported a monthly budget, which enables them to cover spending linked to hunting activities that do not exceed, in general, 5000 DA (40 euro) which represents the annual fee required from each association hunter-member. This amount is paid as membership fee to hunters' association and does not include insurance. However, in many European countries hunters are required to pay annually other costs and prices for hunting. Those costs, reaching sometimes up to several thousand euros, depending on the country, are the fee for leasing the hunting grounds from the state or landowner; the compensation for damages paid to farmers; and the amount to buy a hunting license and hunting rights fee [1]. In fact, in Annaba there were a minority of respondents who complained about the cost of hunting activities. Major difficulties that most hunters are facing are the lack of munitions and the unavailability of weapons. These factors became relevant only as from 1992 onwards, the year in which the hunting practice was prohibited outside a formal legal and regulatory framework. It is also the year in which the activity of gunsmiths was stopped to date. This may account for the fact that hunters are able to practice this activity only starting at a certain age; many of them inherited their guns from their fathers or from a close family member. Other reasons for this current recruitment deficit among young hunters are probably related to the traditional character of the hunting activity. We should also point out that a large number of hunters in Annaba were pensioners. In the study of Rakotoarison (2009) on the economic valuation of renewable natural resources with the big game case (wild boar, roe deer and red deer), it was confirmed that hunting is a recreational activity drawing rather older people than younger ones [40]. The aging hunter population trend seems to be evident in many countries in Europe [3], where hunting is thought to be a big part of wild boar management [28, 30]. This trend could have a negative impact on the hunting effort, as the elderly hunters are more likely to reduce their hunting participation [41-42].

In our study, nearly half of the hunters (47.4 %) aged 60 years old and older. This result, on the basis of the above, suggests an alarming situation for the future evolution of hunting in the region. The hunting administration may need to focus on younger age groups for promotion of hunting.

It is clear, that the Algerian hunter has a long-term involvement in hunting. More than half of them have an extensive experience of more than 30 years. In other studies performed throughout the world, the same proportion of respondents reported they were not skilled hunters, with less than 10 years' experience [27, 43].

In Europe, the wild boar hunting seasons differ from one county to another (Estonia: all year round [44]; Germany: 16 June to 31 January and all year round for piglets [45]; Austria all year except female mothers [46]; France: 15 April to 14 August stalking or fixed point hunting with special authorization to limited damage, 15 August to 28 February driving and other methods, 01-31 March only coursing [47]. For more examples, see [1]. In Algeria, the wild boar hunting season extends from October to the end of January [48], but wild boar may be also hunted outside this timeframe. In Annaba wild boar battues are allowed all year round about 4 times a month, in



general every Saturday during the daytime and can be practiced only by order of the State's representative in the province "the Wali" [48]. Generally, night hunting is unlawful. The urbanization, a phenomenon seen in some European countries [49-51] and also in Algeria [52], forces the animals to attempt a deeper penetration in urban areas [50, 53]. Annaba is not immune to this trend. Consequently, «la Direction des Forêts» enables hunters to conduct overnight battues to regulate the problem of wild boar outbreaks especially in those cities located closer to mountains or forest areas. Based on hunting bag estimate in the region of Annaba, an average of 16 battues are organized annually at night resulting in the elimination of about twenty wild boar per battue (Conservation des Forêts de Annaba, personal communication, 2014). On other hand, we found that a certain hunters (generally farmers who would protect their land against wild boar attacks) practice hunting during dark hours (single hunt). Although, this behavior is tolerated by the authorities and is considered a justified measure, the proportion of the single hunters remains at a low level (see table 2). Keuling et al. (2016) reported the same finding, in their study on wild boar in northwestern Germany [30]. Indeed, the combination of hunting methods (single hunt and different types of driven hunts) would be an effective management tool to the regulation and reduction of wild boar populations [6, 54].

In our study, we found that the large number of hunters lives in urban areas, a dissimilar pattern to that reported for hunters in Central Europe [42]. The hunter residence in urban areas is revealed as a real brake for the hunting. In a study performed on the assessment of factors related to hunting and sport shooting participation, it was reported that the urban demographic group is becoming even less likely to hunt in USA and US hunters living in urban areas tended to be more active than those who live in rural areas [42]. Another study reported by Scherrer (2002) for the "Economic and Social Council" on the hunting in France, confirmed that urban trends of hunters is one of the major causes of quitting hunting [55]. No studies on the impact of the hunter residence on the hunting have been conducted to date in Algeria nor in many other countries.

Finally, through our results it can be seen that attitudes to hunting are likely to be influenced by a number of factors, amongst them: legal status of the game; legislation and administrative structure for management; the place of hunting within cultural tradition and the way how hunters perceive it; level of urbanization; the hunting organization; and wild boar management objectives. Most of these were reviewed by Putman et al., (2011) as factors influencing attitudes to hunting in Europe [2].

Our aim in the future is to conduct more studies on the attitudes of hunters towards wild boar hunting within other regions in Algeria and highlight which of the factors outlined above stimulate hunter's activities and which of them discourage them.

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