



# Survey

## regarding the population & ethology of feral Axios horses in Greece 2008



**Executed by Amaltheia**, Greek Society for the Protection and Preservation of Indigenous Breeds of Domestic Animals  
(Kythnou 1 TK, 54638 Thessaloniki; [www.amaltheia.org.gr](http://www.amaltheia.org.gr))

Dr. Myrto Konstantinidou, Nikolas Kostaras,  
Kostas Papaioannou and 3 students

Supported by

The Administration Authority for the Management of Axios, Lou-  
dias & Aliakmonas Delta, Chalastra, 57300 Thessaloniki Greece

# **TECHNICAL REPORT**

## **SUBPROJECT 8: SURVEY REGARDING THE POPULATION AND THE BEHAVIOUR OF AXIOS FERAL HORSES**

### **PROJECT: REINFORCEMENT OF THE OPERATIONAL COMPETENCE OF THE ADMINISTRATIVE ORGANIZATION FOR THE PROTECTION OF THE “NATURA 2000” RIVER AREA OF AXIOS, LOUDIAS AND ALIAKMNON**

**SUPERVISOR : SAVE FOUNDATION**

**EXECUTOR: GREEK SOCIETY FOR THE PROTECTION AND PRESERVATION OF INDIGENOUS BREEDS OF DOMESTIC ANIMALS “AMALTHEIA”**

**2008**

## **SURVEY REGARDING THE POPULATION AND THE ETHOLOGY OF FERAL AXIOS HORSES**

### **RESEARCH ACTIVITIES**

This project encounters two phases: the first phase and the second phase that totally encompass 5 distinct research activities:

1. A count of the total horses' population and the population of each herd was done. The horses were monitored by our research group with binoculars, portable videos and photcameras.
2. The food stuff that these horses prefer was examined. Additionally, the preferred locations where the horses use to gather, mate and reproduce were monitored.
3. The social behaviour of these horses was monitored within their herds.

4. The age range and sex distribution of the horse population and the rate of their multiplication were assessed. The foals and nursing mares and the elderly horses of each herd were counted.

## **AIMS**

The feral horses of Axios' river are an important part of the regional fauna that additionally attract the tourist's attention. Due to the modernization of the agriculture the domestic horses of this area were left free, since they were not necessary for the ordinary work in the fields. The horses used to wander around the banks of Axios' river, where they found fertile ground and shelter to multiply their population. However the local farmers complain that the horses damage their cultivations, especially during the periods of the river's flood, when the horses are moving elsewhere for food and shelter. Thus the main aim of this project is to monitor the status of these horses and motivate the local community to accept their existence

## **FIRST PHASE (DURATION 1 WEEK)**

During the first phase of the project the members of "Amaltheia" tracked the area in order to find out the natural inhabitant of the feral horses, and especially the paths and the pastures of these horses. Also the local farmers were interviewed in order to specify the locations where the horses are usually found and their possible exits to the neighbouring cultivations.

## **SECOND PHASE (DURATION 4 MONTHS)**

During the second phase, four herds of the feral horses, that are wandering in the eastern bank of the Axios river, were found, monitored and registered (A, B, C, D). One herd was found in the western bank of the river, which was registered as reproductive herd E. The members of each herd were counted, their sex, their age (approximately) and their particular characteristics were registered. Also their social structure and their physical fitness and nutritional status were monitored.

## 1. Data of each herd (Physical Features)

In total, four reproductive herds (A, B, C, E) and one herd of male bachelors (D). Three horses were found outside of these herds, wandering alone. One of them was injured, the second was old and the third was a stallion, who was probably contesting the male leaders of the reproductive herds.

### Reproductive herd (A)

Location: Eastern bank of the river nearby the irrigative channel. This herd is moving in the area between a place called “mulberry” and the channel. During the summer this herd was found also in the western bank of the river.

This herd comprises of one stallion, two mares and a foal born within the year 2008.

1. Brown stallion having small star and snip
2. Gray mare having her mane on the left side and a tuft of hair on her shoulder
3. Red roan mare having her mane on the left side behind her ear and from her shoulder onwards on the right side
4. Blue roan weanling foal



Picture 1.1 Reproductive herd A. (August 2008)

## Reproductive Herd (B)

Location: Eastern bank of the river, near the irrigative channel. This herd is moving in the area between a place called “mulberry” and the channel. During the summer this herd was found also in an island of the bed river.

This herd comprises of one stallion, three mares and three foals born within the year 2008.

5. Gray stallion having his mane on the right side
6. Nursing gray mare having her mane on the right side
7. Nursing gray mare having her mane on the left side behind her ear and from the middle of her neck onwards on the right side
8. Nursing brown mare having her mane on the left side
9. Bay weanling foal
10. Bay weanling foal
11. Bay weanling foal with a star



Picture 1.2 Reproductive herd B. (August 2008)

## Reproductive Herd (C)



Location: Eastern bank of the river, near the irrigative channel. This herd is moving in the area between a place called “mulberry” and the channel. During the summer this herd was found also in an island of the bed river.

This herd comprises of one stallion, two mares and two foals born within the year 2007.

12. Brown stallion having his mane on the left side and a small injury on his ribs on the right side
13. Gray mare having her mane on the left side
14. Chestnut mare having her mane on the right side
15. Dark chestnut yearling foal having its mane on the right side and a tail with a lighter colour
16. Bay yearling foal having a star, a snip, the mane on the right side behind the ear and from the middle of its neck onwards on the left side, and a tail with a lighter colour



Picture 1.3 Stallions of the herd B (on the left) and C (on the right). (August 2008)



Picture 1.4. The herd B on September 2008 on the channel.



Picture.1.5. On the left the stallion of the herd B and the horses 12, 14, 15, and 16 of the herd C



Picture 1.6. The herd C From the left: the horses 14,12,16,15 and 13. September 08. Place channel.



Picture. 1.7 The herd C From the left: the horses 15,13,16,12 and 14. September 08. Place «mulberry».

The bachelors' herd D



Location: Eastern bank of the river. This herd is moving in the area between a place called “sickly tree” and a place called “the grandfather”.

This herd comprises of the herd D1 that encompasses 26 males (stallions) and the subgroup D2 that consists of two stallions and a mare

### Herd (D1)

17. Roan stallion having his mane on the right side, thinner than the others. He is the leader of this herd
18. Grey stallion having a stripe and his mane on the right side behind the ear and then from the shoulder onwards on the left side
19. Grey stallion having a snip and his mane on the left side
20. Grey stallion having a snip and his mane on the right side
21. Grey stallion having his mane on the left side
22. Grey stallion having his mane on the right side
23. Brown stallion having star, a snip and his mane on the right side
24. Grey stallion having a snip
25. Grey sprinkled stallion and his mane on the right side behind the ear and then from the shoulder onwards on the left side
26. Grey stallion with “milky mouth” having his mane on the right side and lump on the neck probably due to anthracosis
27. Grey sprinkled stallion with his mane on the left side
28. Bay stallion with his mane on the right side and a tuft of hair on his left shoulder
29. Roan stallion having his mane on the left side and a tuft of hair behind his right ear and an injury on the left side of his neck
30. Brown stallion having his mane on the left side
31. Bay stallion having a star, a snip and his mane on the right side
32. Bay stallion having an interrupted stripe and his mane on the left side
33. Bay stallion having a snip and his mane on the left side
34. Red roan stallion having a stripe and his mane on the right side
35. Bay stallion with his mane on the left side behind the ear and then from the shoulder onwards on the right side
36. Grey stallion with his mane on the left side

37. Dark grey stallion having a star and his mane on the right side behind the ear and then from the middle neck onwards on the left side
38. Light grey stallion
39. Grey stallion with his mane on the left side and a tuft of hair on his right shoulder
40. Grey stallion with his mane on the left side
41. Grey sprinkled stallion having his mane on the right side
42. Grey stallion having his mane on the right side and from the shoulder onwards on the left side



Picture 1.4 The horses of the Herd D1.



Picture 1.4 The horses of the Herd D1 in August 2008 in the location “sickled tree”

**Subgroup D2:**

43. Bay stallion having a stripe and his mane on the right side and from the shoulder onwards on the left side
44. Dark grey stallion with a snip and his mane on the right side
45. Bay mare with her mane on the right side and from the shoulder onwards on the left side and an injury on the right rump



Picture 1.6 The subgroup D2. August 08, Location “sickled tree”.



Picture 1.7 The subgroup D2. August 08, on an island in the bedriver.





Picture 1.7 The subgroup D2. August 08, crossing the river

### Reproductive herd (E)

Location: Western bank of the river.

This herd consists of 15 horses totally, three stallions, 6 mares, 2 foals born in 2008 and 4 horses of unidentified sex.

46. Roan stallion with the mane on the left side (probably the leader of the herd)
47. Light gray stallion with the mane on the left side
48. Light gray mare with “milky mouth” and her mane on the right side
49. Grey horse having a darker mane on the left side
50. Bay mare
51. Grey sprinkled mare
52. Grey horse with the mane on the right side
53. Grey sprinkled horse with the mane on the right side
54. Grey sprinkled mare with the mane on the left side
55. Bay mare with a star, probably pregnant
56. Grey nursing mare with mane on the left side

57. Chestnut stallion

58. Chestnut horse with the mane on the right side

59. Bay weanling foal

60. Bay weanling foal



Picture 1.10 Horses of the herd E August 2008



Picture 1.11 10 Horses of the herd E August 2008



Picture 1.12 10 Horses of the herd E August 2008

On the November 2008, photographs were taken from an helicopter and another 4 horses were found in the west bank of the river. Probably one of them is the stallion numbered as 64.

Conclusively, herd E consists of 19 horses and divides in two subgroups (a and b)



Picture 1.25 The herd E. Photograph from the air. November 2008.

**Subgroup (E $\alpha$ ):**

Encompasses 11 horses, from which one is a weanling foal



Picture 1.26 The herd E. In the center the subgroup E $\alpha$  and members of the subgroup E $\beta$  on the right upper corner





Pi

Picture 1.27 The subgroup Ea

**Subgroup (Eb):**

Encompasses 8 horses, from which one is a weanling foal



Picture 1.28 The subgroup Eb The foal lying on the ground.

### Isolated horses that do not consist a herd:

Location: Eastern bank of the river on the location “lame pond”.

61. Grey stallion with mane on the left side

62. Grey sprinkled stallion with mane on the left side behind his ear and on left side from the middle of his neck onwards. He has bad nutritional status and lameness on his right forelimb.



Picture 1.9 The horses 61 και 62 on the location “lame pond”.

Location: Also on the eastern bank of the river an orphan weanling foal was found in a fenced area.

63. Bay weanling colt with a star



Picture 1.10 The colt under the number 63.

Location: On the eastern bank of the river near the irrigative channel. This horse was found latter on the western bank within the herd E.

64. Grey stallion with mane on the right side



Picture 1.11 The horse 64.



Other horses were not found in the region of the Axios river, neither on its banks nor northern over the National motorway and the bridge of Chalastra.

### Nutritional Status:

The nutritional status of the feral horses during all seasons of the year was good (grade 3 in scale 1 to 5). Generally these horses have uniform conformation, medium height and robust trunk. Probably are crossbred, descending from Thessalian, Pindos and Thoroughbred horses.

#### 2. The features of the inhabitant of the feral horses

Most feral horses were found and monitored in the area that encompasses an irrigative channel in the north, a gatehouse in the south, the Axios river in the west and a mound in the east. Each herd has its own location of rest but shares with the others the areas of pasture and watering. The inhabitant where the horses live is restricted by natural and man-made obstacles (channel, river, fences) and the expansion of the edible flora. Since their diet is based on cereals the horses are not found in the southern area nearby the sea, where these plants grow only near the banks of the rivers, which are not easily approachable.

According to the data derived by the Directive 92/43/EOK in the inhabitant of these horses thrive salt-friendly brushes (*Sarcocornetea fruticosi*) and trees belonging to the species (*Nerio - Tamariceteae*) and (*Securinegion tinctoriae*), which form small bushes nearby the banks of the river. These data were verified by samples taken under the following codes 106001, 106002, 106003, 106004, 106005, 106006, 106008, 106015, 106016, 106017, 106031, 106037, 106051, 106054, 106060, 106061, 106073, 106074, 106075, 106076, which were analysed by the lab of Technical Institute of Thessaloniki.

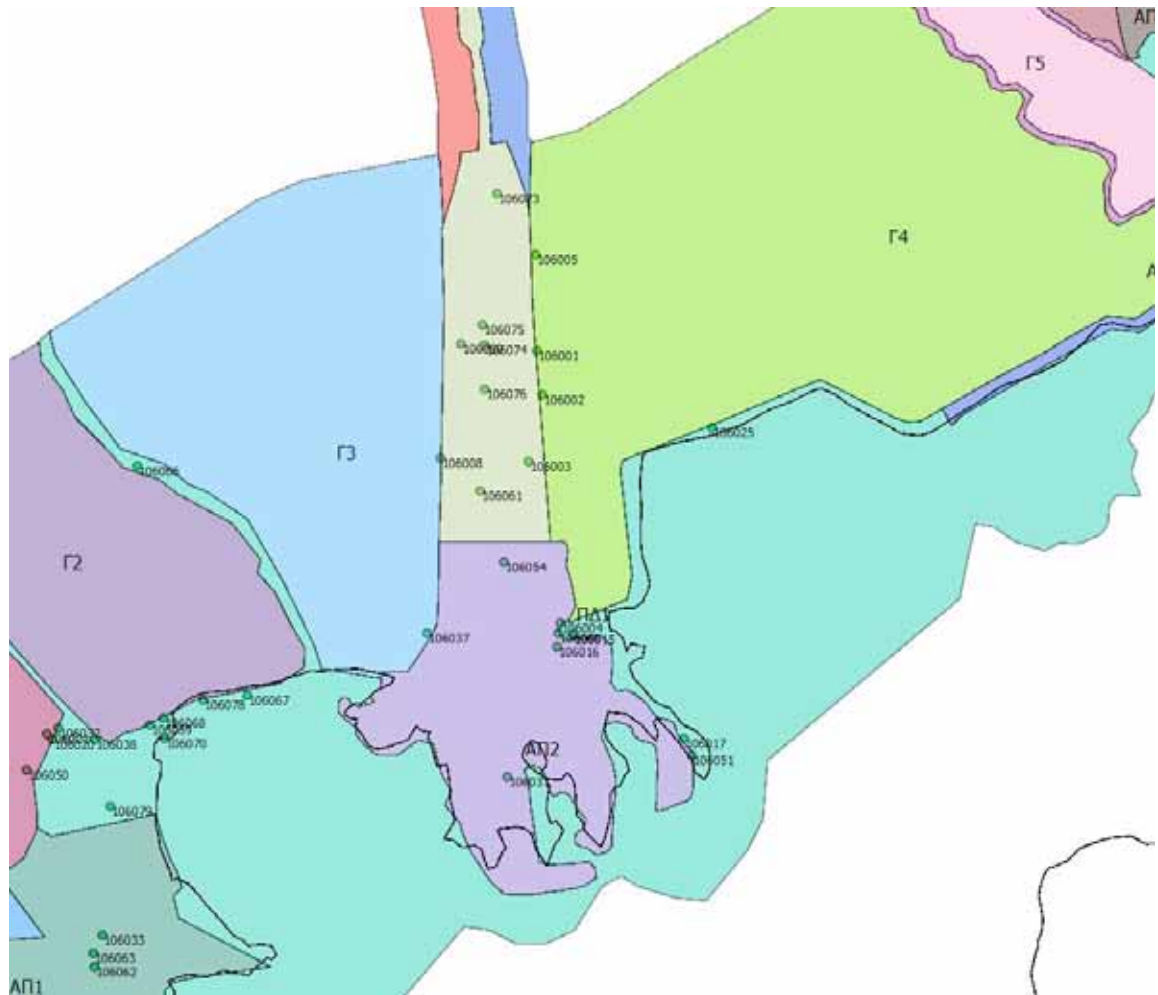




Charter 2.1 Flora types in the area of Axios river

With red colour: salt-friendly brushes (*Sarcocornetea fruticosi*) under the code 1420 NATURA 2000.

With green colour: trees near the banks of the rivers (*Nerio - Tamariceteae*) and (*Securinegion tinctoriae*) under the code 92D0 NATURA 2000.



Charter 2.2 Locations of samples for the identification of the flora in the Axios area



Picture 2.1 Characteristic vegetation in the area marked with red colour, shown in the charter 2.1

The large population of cattle in this area is the main cause of soil deterioration due to overgrazing and depression from their footmarks. In the fenced locations nourishing vegetation was found, which is evidence that cattle deteriorate the rest pastures of this region. Also sheep and goats graze in this area, which are food-competitors of horses. The existence of carnivores (wolves) does not seem to affect significantly the population of the horses.

Other sources of degradation of the river area is the existence of illegal farm premises, where considerable number of animals are kept, the old wire fences, and the contamination of the river by garbage and the existence of a disposal centre nearby the river.

Also in the area a lot of cadavers and skeletons of horses and cattle were founded. The local Veterinary Service has isolated the lethal bacterium *Bacillus anthracis* from some of these cadavers. Due to the outbreak of anthracosis in the livestock of the area, strict sanitary measures should be followed as the burning or deep burying of the cadavers and the vaccination of the ruminants and the equids every spring.



Picture 2.2 Fenced area with nourishing vegetation.



Picture 2.2 Area devastated by the cattle





Picture 2.3 Garbage in the Axios river



Picture 2.4 Fire in the disposal area nearby the river.



Picture 2.5 Stable premises with cattle stock in its premises



Picture 2.6 Wire fencing in the area that is a possible cause of injury of horses.





Picture 2.7 Decaying mare cadaver



Picture 2.8 Skull

### 3. Ethology (Study of the horse behaviour)

In the feral horse population were found 4 reproductive herds (natal bands, birth bands ı family groups) and one bachelor group. Only three horses were found alone, mainly due to injury or debility.

Each reproductive herd consists of stallion(s) and several mares followed by their foals. Usually a strict hierarchy is established between its members. One member is the leader, which leads the herd during its activities (grazing, watering, rest e.t.c.) Generally, leader is an adult mare but also it can be a stallion, especially when there the herd is endangered by predators or other pasture rivals. Between the mares' group of each herd there is a social rank. Mainly an elderly mare is the leader of the mares' group.

In the herds which encompass more than one stallion, there is hierarchy between the males is established too. The stallion, who is leader, is mating with more mares and inevitably is the father of the majority of the herd's foals. The other stallions usually mate only with the mares of the inferior social rank.

The bachelor herd consists mainly of young males that have left their mother after the birth of a younger brother, due to the lack of food. Some of them are banished by the leader stallion, which consider them as possible rivals. Also some members of the bachelor herd are elderly males or adult stallions that were defeated by another stallion of their herd during a conflict for the leadership. The bachelors, especially during the mating season, follow the reproductive herds and attempt to mate with their mares. Sometimes some males fight against the leader stallion of the herd, in order to regain the leadership.

#### The role of the leader stallion in the cohesion of the mare group:

The main concern of the leader stallion of the herd is to protect its members from predators and to prevent other male horses to mate with its mares. The social cohesion of the herd is usually threatened by the existence of inferior, in the hierarchy, stallions, which contest the leader stallion.



Usually the leader stallion patrols the herd in an area 10-15metres around its members. Due to this task the leader stallion, does not has a strong bondage with the rest members of the herd (pair bonds). Under the threat of a predator, the leader stallion unites the herd members and guides them away using snaking gestures. Usually the leader protects the herd's members by placing himself between the predator and the herd.

In case that another stallion contests its leadership, the leader stallion persecutes the invader. The conflict is usually stronger between two leaders than between a leader and a bachelor. Usually the bachelor compromises, while the leader is more aggressive in order to keep his mares under control.

### The role of the mares in the social cohesion of the herd:

The possibility of inbreeding between the leader stallion and its daughters is diminished due to the immigration to other reproductive herds. About 75% per cent of the mares were found to join other herds and 30% changed herd during the winter, probably to lack of food. Nevertheless, the mare that are more or less permanent in each herd, tend to take the leadership of its female group.

The females tend to keep stronger pair bonds in comparison with the males. Mainly the mares maintain their emotional bondage with their mothers and sisters. The leader mare of the female group keeps an equivalent relation with the leader stallion of the herd, while the other subordinate mares comply with their instructions.



Picture 3.1 Alarm posture



Picture 3.2 Approach between two stallions



Picture 3.3 Threatening of the rival stallion



Picture 3.4 Fight between stallions



Picture 3.5 Threatening by standing up in front of the rival



Picture 3.6 Estimation of the rival's capabilities



#### 4. Estimation of dynamic horse population

During this survey were counted 37 adult males and 14 adult females. Also were observed 2 female yearlings (born in 2007), and 7 foals that were born in 2008 (two of them are orphans) and one pregnant mare in the herd E.

The horses of unknown sex that belong to the herd E are presumably female. The herd D of the bachelors encompasses at least two yearling colts and 4 young stallions (3 year old). One of them is the leader. In herd E probably there is one more yearling colt.

	Herd A	Herd B	Herd C	Herd D	Herd E	Isolated	Total
Stallions	1	1	1	26	3	2	34
Mares	2	3	2	1	6	0	14
Unknown sex	0	0	0	0	7	0	7
Foal 2007	0	0	2	2	1	0	5
Foal 2008	1	3	0	0	2	1	7
Total	4	7	5	29	19	3	67

The total number of feral horses on both sides of the Axios river is 67.

#### Conclusions

- The total equine population in Axios region is 67 individuals, i.e. 34 males, 14 females, 7 of non-identified sex and 12 foals. Therefore, the number of males is double in comparison to females. This fact leads to the conclusion that the main reason for the disparity between males and females must be the capture of the mares by the locals.
- The number of the horses in the eastern bank of the river does not exceed the 49 individuals, from which 29 consist the bachelor herd. However the local farmers had the impression that over 200 horses live in this area. Probably, they gained this wrong impression, because these horses tend to move constantly and cover rather long distances. On the west bank of the river live only 19 horses.

- The mean number of foals per year is 6 ( $5+7=12/2 \text{ years}=6$ ). This reproduction rate is normal, since the mares in the wild statistically deliver a foal every 2 and half years.
- Nevertheless, the population of the feral horses seems to be stable or slightly decreased in relation to their previous years according to older reports (approximately 80 horses were counted in 1997). The main causes of death are the injuries and the anthracosis.
- The sanitary measures for the control of anthracosis should be followed strictly (burial deeply in the ground of the cadavers) and also the feral horses should be vaccinated.
- Additionally, it is strongly recommended that the water of the river Axios should be tested for toxic pollutants, since there are several industries beside the river both in FYROM and Greece.
- However the main reason for the horse population decrease must be the capture and withdrawal of females from the region. The locals have verified our postulation, since they informed us that some horses, especially mares, have been captivated and withdrawn from the area.
- The capture of these horses should not be a very difficult task, because they do not seem to be frightened by the humans, since we managed to approach in a distance up to 10-15 meters.
- The majority of their herds share partly their territories and pastures. This fact enforces our postulation that their population is on critical state, because otherwise each stallion would prefer to keep his herd out of the reach of his competitors.
- The good nutritional status of the horses throughout the year 2008, shows that the deterioration of the pastures mainly affects the cattle, which are multiple in number in comparison with horses. However, in order to estimate appropriately the sufficiency of food for horses in this area, their body score should be checked again on late February, because the development of vegetation is ceased during the winter.
- Another issue is the fact that most of the region of the Axios's river is not suitable environment for the horses. A large area beside the sea has been saturated with salty water and is absolutely inappropriate for their survival, since no cereals can grow there. Also several pumps use to draw the river's

water for irrigating the cultivated area. This fact deprives the soil from valuable fresh water.

- Additionally the remaining area is not easily approachable to horses, since there are several illegal fences and stables all over the place. This fencing is against the convention Ramsar and should be removed.
- Also in the same area live about 1.775 cattle, which deteriorate the quality of the pastures, because they overgraze the vegetation.
- Conclusively, the way of living and the demeanor of these horses is not a result of their choice, since their primary goal is to survive under harsh environmental conditions, especially during winter, when the cereals do not thrive due to low temperatures. This must be the main reason for their immigration to the collateral cultivated places.
- Therefore the feral horses usually move to the cultivated areas during the winter. In order to restrain them from moving away from their inhabitant, fences should be placed under the bridge of the National Motorway and over the west mound.
- Also the supply of forage during the winter should prevent the horses from wandering around to the cultivated areas. However it is not recommended to build permanent shelters for the horses because it is likely that the cattle are going to occupy such places, restricting even more the horses' territory.
- Conclusively, it is vital to follow a rational administration of the Axios region, since the population of the feral horses is on critical level.