

# PUREBRED ARABIAN HORSE BREEDING PROGRAMME

## 1. General data of the Breeding Programme

### Entity in charge of the original stud book of the breed:

Name: Spanish Association of Arabian Horse Breeders (AECCA).

Website: <http://www.aecca.es/>

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## 2. Breed name: Arabian Purebred.

## 3. Aim of the Breeding Programme:

X Improvement (selection)

### Geographical territory of implementation of the Breeding Programme:

X Spain

**Exceptions and special features: Not applicable**

## 4. Participants in the Breeding Programme:

- **List of farms collaborating in the Breeding Programme:** As of 31<sup>st</sup> December 2018, the number of farms collaborating with the race Breeding Programme in Spain was 341 and a total of 5,339 herds with 17,333 total animals registered for this breed in Spain. The list of collaborating farms and herds will be updated annually in the National Breed Information System, ARCA, along with other data of interest.
- **Other participants:** Activities foreseen to be subcontracted, name and details of the third party in the following table.

Activities to be subcontracted	Subcontractor	Own resources
Qualified Centre for animal genetics (Technical Directorate of the Breeding and Genetic Evaluation Programme)	Complutense University of Madrid (UCM)	-
Official Performance Monitoring (PSCJ)	Approved centres, riding clubs and farms	
Animal molecular genetics laboratory ( Genotyping, parentage analysis and identity control)	Central Veterinary Laboratory of Algete	

Germplasm bank (Storage of reproductive material)	Not	
Reproductive centres (semen collection and processing)	Officially approved reproductive centres	
Development and maintenance of the Stud Book management system	TRAGSATEC	X

## **Structure of the Breeding Programme:**

### **I. DESCRIPTIVE INTRODUCTION OF THE INITIAL SITUATION**

This Breeding Programme has been drawn according to the guidelines laid down in Regulation (EU) 2016/1012 of the European Parliament and of the Council of 8<sup>th</sup> June 2016 on the zootechnical and genealogical conditions for breeding, trade and entry into the Union of pure-bred breeding animals, hybrid breeding pigs and their reproductive material, and Royal Decree 45/2019 laying down the zootechnical rules applying to the breeding, trade and entry into the European Union of Purebred breeding animals, hybrid breeding pigs and their reproductive material and updating the National Programme for the Preservation, Improvement and Promotion of Livestock Breeds.

The World Arabian Horse Organization (WAHO) is the international body that establishes breeding and Stud Book registration guidelines for this breed. It was established in the 1970s. In 1999 the WAHO defined the Arabian Purebred (hereinafter AP) as a horse that is registered in a Stud Book of the breed accepted as valid by this organisation. The Spanish Association of Arabian Horse Breeders (AECCA) was founded in 1970 at the same time as the creation of the WAHO and is under the guidance of this organisation. The main objective of this Association is the management of the breed at Spanish level, promoting the improvement of its morphological, behavioural, and functional abilities.

Previously, the stud book in Spain for this breed was managed by the Horses Breeding Service of the Ministry of Defence. In 2008, following the publication of various zootechnical regulations by the Ministry of Agriculture, Fisheries and Food, the Spanish Association of Arabian Horse Breeders (AECCA) was officially recognised for the keeping of the stud book of the AP horse and became

responsible for identifying and registering all AP horses born in Spain and imported, as well as managing all the other tasks stipulated in the Regulations of the breed.

Later, in 2010, the specific regulations of the Improvement Programme were approved and, in 2012, the Improvement Dissemination Programme for this breed was approved.

The AP horse is a breed recognised in the Official Breed Catalogue of Spain and classified as an "Integrated Breed in Spain". It is also a parent breed that participates in the creation of other breeds such as the Anglo-Arabian, Hispano-Arabian and Spanish Sport Horse.

## **II. ASPECTS RELATED TO THE STUD BOOK OF THE BREED**

### **1. Breed characteristics, breed prototype**

There is no specific regulation in Spain that describes its breed pattern, but it could be said that some characteristics of the breed are a concave head, high tail carriage, prominent wide-set eyes, well-defined jaw bones and a small muzzle with large nostrils. It is a horse of extraordinary beauty, full of quality, vigour, elegance, dignity, and refined power. It is gentle, docile, and noble, but also fiery and very intelligent.

The breed is also known for its courage, strong constitution, and great endurance.

### **2. Identification of animals and measures for parentage control**

All animals that are registered in the Purebred Arabian Horse Stud Book must be individually identified, if possible, at birth, in accordance with the current regulations on equine identification. A unique identification code will be assigned to them, which will be used in the registration in the Stud Book and must be included in the rest of the zootechnical documentation referring to the animal. It is mandatory for the registration of the foal to present a mating certificate signed by the stallion's owner in addition to the birth certificate.

Likewise, to guarantee the pedigree of the animals that are registered in the

Stud Book, an obligatory filiation control will be carried out, by genetic markers, for all the animals before their definitive registration. For the registration of imported animals, their identity will also be verified in accordance with the regulations in force. Once verified, it is registered in the Spanish Stud Book, always indicating the country of birth in brackets after the name.

### 3. Studbook structure and registration procedure

The Purebred Arabian Horse Stud Book consists of a **main section** which itself is made up of the following categories and registers:

#### 3.1. Basic category:

- **Register of Births**: for those specimens of both sexes born from breeders registered in the stud book of this breed and that fulfil the conditions of identification and filiation, according to the procedures established by the breeders' association.
- **Permanent Register**: for those breeding animals from the Register of Births that have reached three years of age and have been imported.

#### 3.2. Merit Category:

Within the Definitive Register there are the following categories of breeding animals that stand out for their genetic merit:

3.2.1. Register of Recommended Young Breeding Stock (RYBS): for those national breeding animals in yield control, up to 7 years of age and with a Global Genetic Index above the average.

3.2.2. Register of Improver Breeding Stock (IB): for those animals registered in the Spanish Stud Book of 7 or more years old, with a Global Genetic Index above average, precision greater than or equal to 0.50 and with a minimum number of offspring in performance controls to be determined annually by the Breeding Programme Governing Committee (IB with proof of offspring). Those animals that meet the requirements for Improver Breeding Stock, but no

information on control offspring is yet available, shall be IB without proof of progeny.

3.2.3. Register of Elite Breeding Stock: for those animals that meet the requirements of the Register of Improver Breeding Stock for more than one selection target.

#### **4. Artificial insemination**

Artificial insemination methods using fresh, chilled, or frozen semen are authorised. Artificial insemination methods, using fresh, chilled, or frozen semen, are authorised. For this purpose, the criteria established internationally and by the officially acknowledged Association for the management of the Stud Book of the breed shall be followed, always within the framework of the zootechnical-sanitary legislation in force.

#### **5. Embryo Transplant**

According to the current international regulations approved by the WAHO in Spain, two embryo transplants are allowed per year per mare. Likewise, and following the international regulations of the WAHO, the registration of individuals from gametes that have undergone any genetic modification is not allowed.

#### **6. Governing Committee of the Breed**

The Governing Committee of the Arabian Purebred will be composed of the following members:

1° President: The President of the Breeders' Association or the person he designates.

2° Technical Inspector: Technician specialised in the breed appointed by the Breeders' Association.

3° Secretary: The Secretary of the Breeders' Association or the person he designates.

4° Vocals:

- The person in charge of the Breed Selection and Improvement Programme shall act as genetic advisor on this Commission, if required.

- The Technical Director of the Stud Book of the breed or the person

designated by him.

- 1st Vice-president of the Breeders' Association.
- 2nd Vice-president of the Breeders' Association.
- Treasurer of the Breeders' Association.

The Commission shall ensure the correct operation of the Breeding Programme (including the revision and updating, if necessary, of its Annex), establish its internal rules of operation and deal with incidents and complaints arising from its management.

### III. BREEDING PROGRAMME AND DISSEMINATION PROGRAMME FOR THE IMPROVEMENT OF THE PUREBRED ARABIAN HORSE BREED

#### 1. Breeding objectives and selection criteria.

The **GENERAL OBJECTIVE** of breeding and selection followed by the Spanish Arabian Horse Breeders' Association is to obtain a horse that excels in the equestrian discipline in which it participates, as well as maintaining the breed characteristics of the Purebred Arabian Horse.

This main objective is structured into several **specific objectives**:

- Obtaining horses that, while complying with the breed characteristics of the Purebred Arabian Horse, maintain a morphology, temperament, and movements in accordance with their functionality as a sport and riding horse.
- Obtaining horses with a functional aptitude that allows them to stand out in Raid competition.
- Obtaining horses that stand out in other sporting competitions in which they compete (races, complete equestrian competition, harness, dressage, etc.) provided that sufficient information is available to evaluate the rest of the disciplines in which they participate.

The **Selection Criteria** of the present Purebred Arabian Horse Breeding Programme are the results of the performance controls collected through the Linear Morphological Qualification for morphology; and for functionality, the results of participation in endurance races officially recognised by the Royal Spanish Equestrian Raid Federation and by other competent bodies, and in the Young Raid Horse Selection Tests (YRHS) for animals between 4 and 7 years of age organised by AECCA.

#### 2. Performance Monitoring

Linear Morphological Qualification: This will be done by means of a breed-specific form. As soon as sufficient data is collected, a genetic evaluation can

be carried out and genetic categories for morphology can be proposed.

Functional raid testing: These tests will be organised for young animals for Raid (4-7 years old) by AECCA and will also include tests organised by the RFHE. Depending on the event, the following will be collected:

- Running time.
- Recovery time.
- Total time.
- Qualifying position.
- Eliminated or not eliminated status.

In addition, environmental correction factors, which have a proven influence, shall be included in the assessment model.

Results from other sport disciplines may be considered and collected, if the data can be used for genetic evaluation (equestrian all-round competition, among others) and, where appropriate, genetic categories for these disciplines may be established and published.

### **3. Genetic evaluation requirements and methods**

The Performance Control of the functional ability for the Raid together with the pedigree of the participating animals establishing the parentage relationships will be used to perform the genetic evaluation of the breeders. The animals will be evaluated based on obtaining a multi-character Global Genetic Index (GGI) determined with the mixed models' methodology (BLUP) including importance weightings for the Improvement of each of the genetic values included in the Index. The formula is given in the Annex.

The statistical genetic model shall be corrected for environmental factors (sex, age, test, kilometres, rider, rider-animal, permanent environmental effect, etc.) that have been found to have a significant influence on the character.

Thus, depending on the IGG and the level of precision of the genetic values (calculated as the correlation between the predictor and the true value), the



animals can obtain the genetic categories of:

- *Young Recommended Raid Breeding Stock*: breeding animals registered in the Spanish Stud Book under performance testing, up to 7 years of age and with an above average Global Genetic Index.
- *Raid Improver Breeding Stock*: breeding animals registered in the Spanish Stud Book of 7 or more years old, with a Global Genetic Index above average, accuracy equal or higher than 0.50 and with a minimum number of offspring in performance controls (IB with proof of progeny). Those animals that fulfil the requirements of Improver Breeding Stock, but there is still no information of offspring in control will be IB without progeny test.  
\* RYBS and IB genetic categories for morphology will be established as soon as sufficient LMQ data are available.
- *Elite Breeding Stock*: animals meeting the requirements of Improver Breeding Stock for more than one selection target.

#### **4. Detailed description of each stage of the breeding programme and timetable**

The Purebred Arabian Horse Breeding Programme is structured in 5 stages:

1. Carrying out performance controls and related activities genetic management of the breed.

During the current year, the respective functional tests will be held. The PSCJ will be collected by AECCA. The Royal Equestrian Federation will collaborate in the collection and computerisation of the data. As for the collection of MLQ data, it will be carried out during the PSCJ, but the possibility of carrying out this performance control in livestock will be considered.

Likewise, the Stud Book of the Breed will be updated, where the new specimens will be registered and genotyped for paternity control.

2. Preparation and submission of available genealogical and performance monitoring information for the Breed.

AECCA will send to the technical managers of the Improvement Programme the genealogical and performance control information of Raid generated during the previous year, for its integration in the Breed Improvement Programme to address the planned selection actions.

### 3. Data preparation, genetic evaluation, and submission of results.

The technical managers of the Improvement Programme shall prepare the information received in order to carry out the genetic evaluation of the animals, following the methodology described and the selection criteria detailed in Annex I.

Once the genetic values of the different evaluated traits have been obtained, the technical managers of the Improvement Breeding Programme will estimate the Global Genetic Index described in Annex I and will send to AECCA the available information from the selection point of view, as well as the proposal of animals that will obtain the official Genetic Categories previously described.

### 4. Communication of the results to the owners and collection of the additional information for the compilation of the Breeding Stock Catalogue.

After receiving the lists, AECCA will contact the owners of the animals with relevant genetic information to request other complementary information necessary for their incorporation in the Breed Breeding Stock Catalogue: to confirm the status of the animal (alive/dead, whole/neutered), to obtain illustrative pictures, etc.

### 5. Elaboration, edition, distribution, and promotion of the Breeding Stock Catalogue.

With all the updated information available for the improvement of the Breed, the Breeding Stock Catalogue will be elaborated and edited, for its correct distribution

and promotion by the most effective means. Likewise, AECCA will be able to provide owners with reports of interest on the results obtained by their animals.

After the genetic evaluation, an annual Breeding Stock Catalogue will be published, which includes all the animals, both males and females, that have obtained a Genetic Category, following the criteria set out above.

The aim of this Breeding Stock Catalogue is the dissemination and promotion of the specimens with Genetic Category, to encourage their reproductive use with a view to achieving greater genetic progress by contributing to the reduction of the generation interval of the Breed.

## 5. Dissemination of Improvement and Sustainable Use of the Breed

### 5.1. Technical advice to farms

The fundamental pillar that supports the conservation of the Purebred Arabian Horse is undoubtedly the Stud Book, since, through an exhaustive and rigorous control of the registered specimens (genealogy, exports and imports, births...) it allows a better knowledge and control of the breed to those who manage it. Therefore, the Stud Book is the appropriate tool to advise breeders involved in the breeding of Arabian horses, and it is responsible for advising breeders on the documentation required in each case (change of ownership, exports, etc.), acting as an intermediary and link between breeders and veterinarians, ensuring compliance with regulations, controlling the development and improvement of the breed, and representing it at European (ECAHO) and international (WAHO) level.

In this sense, the Director of the Stud Book, and certain members of the Board of Directors of the A.E.C.C.A., in representation of the organisation, attend the annual meetings to which both organisations invite their member associations. At these meetings, fundamental aspects of interest for the member countries are dealt with, who must subsequently transmit the matters dealt with to the breeders (changes in regulations, etc.), and based on which decisions will subsequently be taken (competition regulations...) and breeders, judges and assessors will be instructed.

The Spanish Association of Arabian Horse Breeders took over the keeping of the Stud Book in 2008, and since then they have been working together, since, as we have mentioned, it is the tool that keeps track of the animals that will make up the Improvement Programme, hence its importance in the development of the whole process. This exhaustive control is a fundamental task to achieve the morphological, breeding and functional profiles expected from the AP

### 5.2. Training Courses

Among other possible courses, AECCA will organise periodic Linear

Morphological Qualifier Courses for the training of linear morphological qualifiers within the Purebred Arabian Horse Improvement Programme. A reminder of the criteria of the Linear Morphological Qualification (LMQ) proposed for the AP will be provided. The main objective of these courses is to homogenize criteria between qualifiers. This methodology consists of objectively describing each variable on a linear scale. It is intended to obtain objective and useful information to be incorporated in the Genetic Evaluation of breeding stock for selective purposes. It is conceived as a tool for the genetic improvement of animals within a Improvement Programme.

### 5.3. Publications and programmes to promote the breed and its products and uses.

The A.E.C.C.A. not only aims to train and inform those people related to the world of the Arabian horse, but also among its objectives is to make the breed and its abilities and functionality for disciplines such as the Raid, as well as its great morphological beauty, known to new audiences.

Through its website (**[www.aecca.es](http://www.aecca.es)**), the Association provides its visitors with a tool to find out about all the sporting events and shows where the Arabian horse is one of the protagonists. In addition, it is used as a direct way to communicate news that have an impact on the lovers and breeders of this breed.

In the menu we find different categories where we compile all the information about the association, the member studs, Morphology and Sport.

The sections of morphology and sport are updated weekly publishing all the selection tests of young horses organised by A.E.C.C.A., as well as the morphology Shows where a great number of breeders of the breed participate.

The studbook section allows easy and efficient consultation of the genealogy of the registered animals. It is also easy and quick to download the forms for requesting services.

The annual breeding stock catalogue is constantly advertised on the homepage of the website. Here, breeders can find out about the genetic value of the animals with a breeding stock category and the method used for their genetic evaluation. The catalogue of breeding stock will be distributed both virtually and physically. Virtually through the website and social networks and physically by means of pen

drives with it, being distributed at the Young Horse Selection Tests, as well as sent to different breeders by post.

Currently, the best way to interact with those interested in the breed is through social networks. These allow to interact with one or many people at the same time, even if they are at a long distance, being nowadays, a basic tool in the dissemination of information. Actually A.E.C.C.A is on Facebook (@AECcaballosArabes), Instagram (@A.E.C.C.A) and YouTube (AECCA Caballos Árabes) to reach as many users as possible.

#### 5.4. Selected livestock events

The A.E.C.C.A. organises annually what is the most important morphological competition at national level, the National Arabian Horse Championship. This contest is an excellent exhibition of those horses with the best morphological conditions, allowing the meeting of breeders of the breed at national and international level.

On the other hand, regional (AECCA category), national C, International C and B competitions are organised. These competitions help to promote the selection of horses that contribute to the improvement of the breed. They also have an educational and dissemination function, as it is the best scenario for breeders and judges to monitor the breed.

#### 5.5. Organisation and sale of selected breeding stock and genetic material

As we explained before, member breeders have the possibility to advertise their stallions on the website [www.aecca.es](http://www.aecca.es), in the same way that any user can consult the pedigree of each registered specimen. In this way, the breeder is provided with valuable information for breeding, and therefore, for the Improvement of the breed.

#### 5.6. Promotion and export plans

As Spain is one of the AP horse breeding countries with the greatest recognition and history, contacts with foreign countries are constant in the usual practice of

the Stud Book. Among the services provided are export and import certificates, since, as we have said, the recognition of the characteristics of the Spanish Arabian horse is high.

In this sense, the A.E.C.C.A. is in constant contact with the international organisations that govern the regulations regarding the breed (ECAHO and WAHO), which allows it to present and disseminate the advantages of Spanish horses to the representatives of other breeding countries.

## ANNEX

### SELECTION CRITERIA CHOSEN TO ACHIEVE THE OBJECTIVES PROPOSED IN THE BREEDING PROGRAMME AND OVERALL GENETIC INDEXES APPLIED

The selection criteria applied in this Breed Improvement Programme to achieve the above objectives are detailed below:

#### 1. Genetic Evaluation with data from Young Horse Selection Tests

The following characteristics shall be used to obtain the Recommended Young Breeding Stock:

**Running time (TM):** Time, measured in hours, during which the animal performed the run.

**Recovery time (TR):** Time, measured in minutes, to recover the animal before passing the veterinary control.

**Probability of not being eliminated (PE):** Dichotomous variable indicating with 1 the unfinished races and 2 the finished races of the animal.

The heritabilities for each of the traits on the diagonal and the genetic correlations between them off the diagonal are presented below

Characters	TM	TR	PE
TM	0,18	0,26	0,20
TR		0,24	-0,34
PE			0,17

For the awarding of the genetic categories, the genetic values obtained for the traits of greatest interest are weighted according to their importance for improvement, obtaining a Global Genetic Index with the following specific weights:

$$IG_{\text{GRAID}} = 50\%IG_{\text{TM}} + 25\%IG_{\text{TR}} + 25\%IG_{\text{PE}}$$



## 2. Genetic Evaluation with data from Tests collected by the Royal Spanish Equestrian Federation

The following characters shall be used for the achievement of RYBS, Improver and Elite Breeding Stock:

**Total Time (TT):** Total time, measured in hours, during which the animal performs the test and recovers before passing the veterinary check.

**Qualifying Position (QP):** Final ranking obtained by the animal in the test.

**Probability of not being eliminated (PE):** Dichotomous variable that indicates with 1 the non-finished races and 2 the finished races of the animal.

The heritabilities for each of the traits on the diagonal and the genetic correlations between them off the diagonal are presented below

Characters	TT	QP	PE
TT	0,11	-0,75*	-0,13
QP		0,12	0,19
PE			0,12

\*This negative correlation is due to the fact that the ranking position is evaluated using a Thurstonian model where the animal with the highest value is the one that performs the best and corresponds to the shortest time.

For the awarding of the genetic categories, the genetic values obtained for the traits of greatest interest are weighted according to their importance for improvement, obtaining a Global Genetic Index with the following specific weigh:

$$IG_{GRAID} = 10\%IG_{TT} + 50\%IG_{PC} + 40\%IG_{PE}$$