



## Digital Tools for Supporting Breeding Progress in Horse Breeding

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# Digital platforms as a tool for supporting breeding progress in horse breeding

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**Abstract.** The predominance of small-scale enterprises in horse breeding in European countries in the absence of government intervention in breeding work led to the establishing of breeders' associations. Important tasks of the breeding societies are marketing and advising breeders on selection issues. In a pandemic world traditional forms of breeding and marketing activities were not available, which stimulated an expansion of digital solutions in horse breeding too. Since 1992 Russian horse breeding has gone through the stages of downsizing. This requires providing breeders with modern breeding tools on digital base to simplify document management and ensure traceability and reliability of breeding information, taking into account the experience of European horse breeding organizations.

**Keywords:** Horse Breeding, Selection, Chromosoft, Digitalization.

## 1 Introduction

The structural reforms of the 1990s in agriculture also affected the horse breeding industry: large enterprises were replaced by private primarily small-scale farms. Warm-blood breeds in Russia are represented by a small number of breeding farms and studs: Hanoverian - 2, Trakehner - 1 [1] and only small part of breeding stock is concentrated in the state approved breeding enterprises.

In 2019, in relatively large farms (10+ foals per year) have been registered only 30% of foals, 70% of young stock was born in 51 small enterprises, half of them (27 foals) on farm with only one breeding mare. Two thirds of foals a year are registered on small breeding farms (Table 1).

## 2 Horse breeding structure in Europe

Horse breeding as an industry requires an individual registration of born foals and breeding processes (insemination, covers etc.) even on farms without state registration as a breeding farm. A breeder should timely inform the breed registrar (the Horse breeding Research Institute) about changes in his livestock and send registration forms.

While large studs often had selection-manager on their staff, private breeders do not have enough experience or qualifications to work with documentation. At present, it is generally accepted practice to fill in the appropriate forms (mating and foaling journal, offspring identification act, summary of evaluation etc) manually or on computer and send them by e-mail to the supervising organization..

**Table 1.** Distribution of foals by farm category.

Size of farm (foals per year)	2018		2019	
	Farms	Foals	Farms	Foals
1 foal	89	89	27	27
2 - 5	25	71	17	44
6- 9	8	60	7	48
10 and more	6	128	3	42

Dissemination of artificial insemination (AI) by private specialists make the problem of registration more serious, because as it requires additional documentation (breeding certificate).

Horse breeding in European countries and in Germany in particular is traditionally sphere of small-scale enterprises. By almost complete absence of state management in sector of horse breeding led to creation of associations of breeders. The most important aims of breeding societies are marketing and advisory service of breeders. The most of breeding societies in Germany have been established at the end of the 19th century and now they set the vector of breeding work.

The largest of German breeding societies is the Hanoverian Verband, originally united breeders from Lower Saxony, but now represented in whole Europe, North America, Australia and New Zealand.

In 2020 the Hannoverian Society had 7348 members, 8283 mares have been covered (inseminated – an average 1.1 mares per breeder. 6683 foals have been registered (table 2). European legislation requires identification of an animal using a breeding certificate and, in some cases, as a where required by the breeding program, as ‘foal at foot’ [3].

**Table 2.** Characteristics of the breeding process in the Hanoverian Society.

	1990	2005	2020
Members	8871	10257	7348
Covered mares	13392	12664	8283
Born foals	7624	8034	6683
Foal per breeder	1.5	1.2	1.1

To get the paperwork and document flow easier, the Hanoverian breeding association launched the online platform MyHannoveraner, where a member can manage his livestock (to add mares or activate them, report the death or sale), notify the society about the birth of foals and register animals for events (performance tests, mare shows etc.) . Russian members of the Hanoverian Union also can use this digital tool.

An additional section of the online platform is the information system on brood families, which provides complete and reliable information about the ancestors and relatives of the horse, which facilitates the selection of parental pairs.

### **3 Digital platforms to support Russian horse breeders**

The Russian information system for horse breeding "Koni-3", developed by the Federal State Research Institute of Horse Breeding [4], provides access to information on pedigree animals and their breeding use on a paid basis; for a number of breeds there're the performance test results. But there's no support for the breeders by documenting of breeding processes.

The paid program "Horse Breeder's Assistant" [5] was brought to the market in 2010, but it did not receive support among breeders for a number of reasons: high price of the standard version, comparable to the price of a foal, technical features (the program requires to be installed on a stationary computer, synchronization with the database of horse breeding institute, etc.).

In Russia from cattle breeding sectors is known an unified Eurasian zootechnical base, formed on the Austrian online platform named Chromosoft [6], and it is currently being tested. The Austrian program was originally cloud-based and provided a wide range of breeding tools, incl.the for small breeds: calculating of genetic coefficients, virtual matching and evaluation of virtual matching, performance recording etc. The Chromosoft has multilingual interface and allowed working with of all agricultural and domestic animals populations.

The operator of the upgraded and adapted for the Russia version is the National Association of Cattle Traders. The Bene Soft Group company has finalized and improved the platform by creating additional modules for managing and storing data in different areas of animal husbandry.

An important feature of the database is to ensure transparence of the animal carrier and tracing them. Each type of users gets access to certain information. The breeder and owner can enter data on breeding use, birth, death, veterinary treatments, productivity, performance etc. The program is able to create standard reports and to provide insurance companies and government agencies by necessary information. This specialists and experts have access to the information and records in real time.

Unlike previously offered products for horse breeders, Chromosoft allows to document mating / insemination, and on basis of this information create forms of the identification and registration of the offspring. There's a module in the program for managing of genetic material – (semen, embryos etc.).

These functions ensure the traceability and history of ownership, which is important for law aspects, and history of the breeding using.

An important area of the Chromosoft base is marketing support: owners can offer animals for sale and receive documentation that is necessary for trade (breeding certificates, reports etc.). The platform has been integrated with external information systems, for example the Vexpay digital contracting system.

All these tools allow in the absence of centralized management of horse breeding to create horizontal contacts and relations between breeders and to make frame for establishing of breeder' associations.

An important task of breeding records is the accumulation of traits information for analyses and evaluation of the breeding values (indexes). At present, no unified database on sports breeds in Russia has been developed, so Chromosoft is the first step in this direction.

The reliability of information has to be ensured by the control of the database administrator. An authorized specialist, foal evaluation and identification - by accredited inspectors, enter the Information about artificial insemination.

## 4 Conclusions

The digitalization of the equestrian industry in Russia lags significantly behind European countries, but the request from the practice led to the development of digital products. With the Chromosoft platform horsebreeders get the new tool for documentation and tracing the breeding and improve the selections progress.

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