



## Guidance on the use of SPARKS Data Sheets

### INTRODUCTION

**SPARKS** is a breed advisory scheme designed to promote the genetic health of the global Cleveland Bay Horse population. The data sheets have been produced annually since 2004, as an aid to Mare owners when selecting prospective stallions. They are based on pedigree & genetic analysis of the studbook using the SPARKS and GENES software packages. They do not look at the physical attributes of any stallion or potential progeny. **Mare owners must continue to use their own best judgment regarding this.**

The analysis calculates **Mean Kinships** for every known pure-bred Cleveland Bay in the global population registered in the CBHS Studbook. This is a measure of how related an individual is to every other living Cleveland Bay. It also calculates the potential inbreeding resulting from every possible male / female pairing within the population.

Each datasheet provides a **Mean Kinship figure** for a named mare and assigns the mare to a **Mean Kinship Band (A to G)** based on this figure.

The table names every licensed stallion and orders them by:

- i their location Home or Overseas
- ii their own Mean Kinship band and
- iii the Kinship Coefficient of the progeny of mating with the named mare. (This is not the same as the Mean Kinship but is closely related. It is in-fact the inbreeding coefficient of any progeny of mating this mare and this stallion).

### SELECTION

Following discussions with breeders and with staff at the Rare Breeds Survival Trust, a new “Traffic Light” was introduced in 2018, making interpretation of the tables clear and straightforward. All possible matings are ranked into one of four tiers and colour coded (Tier 1 represents the best genetic pairings whilst Tier 4 is the worst for the genetic health of the whole population).

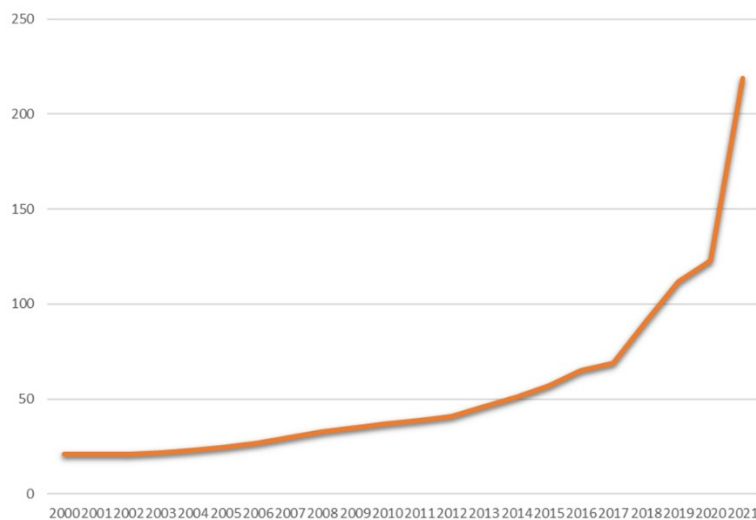
- **TIER 1:** Mare and Stallion from the same or an adjacent Kinship Band **AND** mating resulting in progeny of lower Kinship Coefficient than the Mean Kinship of the Mare. **MATINGS THAT MEET THE ABOVE REQUIREMENTS ARE SAID TO BE SPARKS COMPLIANT AND ARE HIGHLIGHTED IN GREEN ON THE DATA SHEETS. THESE MATINGS ARE ENCOURAGED.**
- **TIER 2:** Mare and Stallion from the same or an adjacent kinship band **BUT** mating resulting in progeny of higher Kinship Coefficient than the Mare but less than 0.24. These matings represent **“The Best of the Rest”** and are the preferred alternative if a SPARKS compliant mating does not exist or is not possible. They are highlighted in yellow on the sheets.
- **TIER 3:** Mare and Stallion with widely differing Mean Kinships and Kinship Coefficient less than 0.24. These matings bring together more common alleles (genes) with those that are less well represented in the population, in a way that makes it hard to separate, putting the less frequent allele at greater risk of loss in future generations. **THESE MATINGS ARE DISCOURAGED** and are highlighted in Orange on the sheets.
- **TIER 4:** Any matings producing progeny with **KINSHIP COEFFICIENTS OF 0.24 OR GREATER SHOULD BE AVOIDED.** They are Highly Inbred and increase the probability of deleterious traits being expressed in future generations. (A Kinship Coefficient of 0.25 IS EQUIVALENT TO A FULL SIBLING BROTHER / SISTER MATING!) These matings are highlighted in Red on the sheets.

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**It should be noted that the “tiering” is an assessment of the merit of pairing of two animals and is not an endorsement or criticism of the genetic makeup or quality of either of the individuals.**

### **THE AIMS AND SUCCESS OF THE PROJECT**

- The retention and maximising of genetic diversity of the whole population
- The reduction of the rate of increase in inbreeding and maintaining it at a minimum (zero is not possible)
- The avoidance of mixing more common alleles with less common ones (mixing of rare bloodlines with more common ones)
- The direct effect of achieving the above will be maximising the Effective Population Size, which is a well-accepted measure of the genetic health of any population.
- Information will be freely distributed on an annual basis to enable breeders to work towards these goals.
- By adopting these strategies, we hope to prevent the loss of genetic diversity and increasing levels of inbreeding that are inherent problems in rare breeds. This in turn should help avoid future problems of increasing infertility, foal mortality, deformity and other genetically linked phenomena.
- The graph below shows the improvement in Effective Population Size over the period 2000 to 2022 with current Effective Population Size measured from rate of increase in inbreeding in excess of 200 for the first time in over 100 years.



*Figure 1- Cleveland Bay Effective Population Size 2000 - 2022*

### **ARTIFICIAL INSEMINATION**

Feedback from breeders has highlighted the need for information on the availability of stallions by artificial insemination. We have tried to indicate whether a stallion is available by fresh or frozen semen, and which countries frozen semen is available for export to. Contact details for stallion owners can be found in current Society publications or on the CBHS website <http://www.clevelandbay.com/stallions> .

The datasheets contain Kinship data relating to some stallions that are now deceased, that are known to or may have frozen semen still available. This information is provided so breeders have the broadest possible picture of mating choices. Please note that appearance of the existence of stored semen on the sheets is no guarantee of availability.

### **MEAN KINSHIP OF PROGENY**

The use of datasheets since 2004 has highlighted the subtle difference between Mean Kinship of parents and Kinship Coefficient of progeny. Until new animals are registered and entered onto the system, we cannot calculate their Mean Kinship or Kinship Band. This highlights the importance of prompt registration of pure-bred foals. Owners are advised to follow the above guidelines in making breeding choices, as they continue to



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be the most robust and scientifically validated method of ensuring the genetic wellbeing of the global Cleveland Bay population.

### **ANOMALIES**

If when studying the datasheets for your mares you recognize information that is not or might not be correct, please let the Society know. In past years a small number of cases have come to light which revealed inconsistencies in the SPARKS data, which have since been corrected. The programme can only be as good as the data it contains, so please let us know if, for example, mares with identical breeding do not have identical datasheets.

### **GRADING REGISTER MARES**

In previous years issues of SPARKS sheets breeders have commented that they provide little help to owners wishing to breed from low banded Grading Register mares. This is because these mares are very low mean kinship to the rest of the population because of the small percentage of non-Cleveland Bay genetics in their pedigrees. As such they are few available stallions of similar mean kinship, and we would not want a heavy foal crop in any one year focussed on those stallions.

In view of this SPARKS Band A and B Grading Register mares no longer appear in the main set of SPARKS sheets. Breed Committee has approved a separate set of guidance sheets for SPARKS Band A and B Grading Register mares to provide more appropriate guidance. These sheets will not be published on the Society website but individual sheets will be made available to the registered mare owners on request.

## **NB NO HBLB GRANTS WILL BE PAID FOR TIER 4 (RED) HIGHLY INBRED MATINGS**

**The data provided in this set of sheets is highly filtered from the SPARKS database and should not be taken as a true representation of the current Cleveland Bay population. As such it is not suitable for research purposes.**

*Andy Dell. Endmoor. Jan 2023*