

A BREEDING PROGRAMME FOR GUIDE DOGS

Programme pour l'élevage et l'éducation de chiens guide destinés
aux aveugles

Ein Zuchtprogramm für Blindenführhunde

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INTRODUCTION

The Royald Guide Dogs for the Blind Association provides and trains dogs as guides for blind people. The public donates dogs to the association for this purpose. Only a small fraction of dogs donated as adults are suitable for training. For this reason the association has a puppy alking scheme where pups, either donated or bred by the association, are given to volunteers who raise the pups until they are old enough for training. Volunteers are supervised by the association.

Since 1967 the association has bred its own pups. In 1973 the association and the University of Melbourne started a research project to improve the breeding of guide-dogs. The aim of the project is to increase the proportion of dogs qualifying as guide-dogs and to improve the quality of the accepted dogs.

Many Guide Dog centres around the world have breeding programmes and some have claimed considerable success (PFAFFENBERGER, 1963) but none of these has been based on quantitative genetics. The challenge in applying quantitative genetics to the breeding of guide dogs arises because the criteria for success involve the behaviour of the dogs. Work on genetics of behaviour is not new and there have been successful selection experiments for behaviour traits in laboratory animals (FULLER and THOMPSON, 1960). Practical breeders have also changed behaviour by selection. Thus dogs have been developed as sheepdogs, gundogs, hounds, etc.

For any applied breeding programme to be successful the following steps must occur: 1) The aims must be clearly defined. 2) The traits to be improved

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must be defined so as to be measurable. 3) The genetic parameters of these traits (e.g. heritability, degree of heterosis) and their mutual correlations must be determined. 4) This information must be combined into an overall breeding programme. Our breeding programme is unusual in that it is not readily obvious which traits are important. We must first define these essential characteristics. Only then can we proceed to a normal genetic analysis.

We are analysing data already collected by the association on its dogs (mainly pure-bred labradors) to define essential traits and to estimate their heritabilities and mutual correlations. We have also started a cross-breeding programme with the breeds labrador, kelpie, german shepherd and boxer to estimate degree of heterosis. This paper presents our first analysis of records accumulated by the association and a brief discussion of the problems involved in working with behavioural traits.

MATERIALS

Dogs are available from 3 sources — pups bred by the association (A), donated pups (P) and donated adults (D). A and P dogs are raised on the puppy walking scheme (PWS) and brought in for training at 12-18 months. The trainers then spend about 3 weeks testing the dogs after which they accept them for training or reject them. At this stage trainers rate the dogs on a 6 point scale for 15 traits they believe to be important. Dogs are rejected at various stages — on the PWS, during testing and during training. Records kept are of 2 types. For all dogs raised on the PWS a record is kept of when they qualify or when and why they are rejected. Records for 115 A and 110 P dogs placed on the PWS in 1970 and 1971 were studied. The second type of record is the trainers' scores for all dogs tested. Records of 97 dogs from 1971 and 1972, from the 4 principle trainers, were analysed. The 2 sources of records overlap considerably but the trainers' scores include D dogs and do not include dogs which were rejected on the PWS. Most dogs involved are labradors but there are also a few golden retrievers.

TABLE 1

NUMBER OF DOGS REJECTED FOR BEHAVIOURAL REASONS AT ALL STAGES¹⁾

	P		A	
	No.	% of 110	No.	% of 115
Rearful ²⁾	62	56	35	30
Excitable	10	9	7	6
Dog distracted	3	3	5	4
Over sensitive	3	3	2	2
Others ³⁾	6	6	1	1
<i>Total</i>	76	66	43	37

¹⁾ Dogs rejected for 2 reasons are included under both.

²⁾ «Fearful» includes nervous, suspicious, anxious, «lacks confidence», «general worry», unsettled, unstable temperament.

³⁾ «Others» includes «under sensitive», «lacks concentration», «lacks willingness», «lacks initiative».

RESULTS

Puppy walking records

A and P dogs differed significantly in the percentage rejected on the PWS (P: 66 out of 110, A: 38 out of 115) and during testing (P: 22 out of 44, A: 10 out of 77). They did not differ significantly in the percentage rejected during training (P: 3 out of 14, A: 7 out of 36), for health reasons (P: 13 out of 110, A: 12 out of 115) or for hip dysplasia (P: 6 out of 24, A: 13 out of 67).

Most rejection were for behavioural reasons (P: 76 out of 95, A: 43 out of 68). Table 1 gives the reasons for behavioural rejections. Fearfulness was the most important reason for rejection and was the only one on which A and P dogs were significantly different.

Trainers' scores

It was found that trainers differed significantly in the scores they gave. Therefore to make the trainers comparable assuming equality of samples of dogs, the scores were transformed by adding the necessary amount to each score. The transformed scores were used for the rest of this work.

In an attempt to predict whether dogs were rejected or accepted in testing, a criterion was defined on which dogs are rejected (-) if they score 1 or more for nervousness or nervous aggression, 3.6 or more for dog distraction, 2.8 or more for suspicion, 4 or more for body sensitivity. Table 2 shows the comparison

TABLE 2
RELATIONSHIP BETWEEN CRITERION ¹⁾ AND ACCEPTANCES

	Criterion	
	+	-
Accepted	65	2
Rejected	2	28

¹⁾ Criterion defined in text.

of this criterion with the actual results of testing. It can be seen that this criterion predicts very well whether a dog will be accepted or rejected. Of the 30 rejections nervousness and nervous aggression explained 23, dog distraction 6, suspicion 1 and body sensitivity 1. These results agree with the results given in the puppy walking records except that excitability was not scored by the trainers and does not seem necessary to explain rejection.

Using the scores to predict which dogs would fail during training was not as successful. A multiple regression using all 15 scores achieved a multiple correlation co-efficient of 0.57.

Although 5 traits explain acceptance-rejection during testing well, 12 of the 15 traits were correlated with it. This seems to be a result of the many correlations

among traits. Factor analysis revealed 5 significant factors. We called these factors fearfulness (which had high loading for nervousness, sound shyness, suspicion and nervous aggression), general trainer assessment, distraction, sensitivity and aggression.

Because some dogs were rejected on the PWS the test scores come from a selected sample of dogs. This may have influenced the correlations among traits and it certainly makes comparisons between sexes and sources difficult to interpret.

Because of this selection and because males were castrated just as they reached sexual maturity (7-12 months) it is not surprising that males and females differed little in test scores. Females showed significantly more suspicion and males had significantly more initiative. They also differed in the relationship between nervousness and aggression. Dogs can be confidently aggressive or they can attack out of fear (nervous aggressive). Amongst dogs that were not nervous only 3% were aggressive. Amongst nervous dogs 6 out of 9 males were nervous aggressive compared with 2 out of 12 females. It appears that nervousness (fearfulness) increases the likelihood of attack and this is especially so in males.

The A dogs were significantly superior to the P dogs in suspicion, dog distraction, cat distraction and temperament stability. Since at least as many P dogs as A dogs were rejected on the PWS for these reasons, the differences are presumably real and probably genetic since A and P dogs were raised similarly.

DISCUSSION

We have identified, at least in a general way, the traits that are important in a guide-dog. The fact that nearly all behavioural rejections were explained by 5 traits does not necessarily mean that other traits are unimportant but merely that in this population dogs below the cut-off lines in other traits were rare. In another breed this might not be the case. Using independent culling levels in predicting acceptance/rejection is probably much more useful than developing prediction equations based on multiple regression because the latter can vary greatly between populations even though the cut-off lines remain the same.

We now have to define these traits so that they are reliably measurable. The trainers' score are not satisfactory because they are poorly defined, subjective and only given after some selection has occurred. Experience in human psychological testing suggests that tests closely approximating the actual work situation have the greatest validity (ANASTASI, 1961). For guide-dogs this would mean walking the dogs in a busy city street but there it is impossible to control the test situation as required for high repeatability.

The final phase of our work will involve designing a breeding programme. A problem arises in this because on the most important trait «nervousness» 70% of A dogs score 0. In order to achieve a good selection differential we must be able to discriminate amongst these dogs. Psychological tests consist essentially of recording an animal's response to a certain stimulus. A dog which responds

fearfully to a high level of stimulation may show no fear to a lower level of stimulation. A more severe test than is currently used may provide the required discrimination. But this would involve 2 problems. Firstly we would have to establish that there was a genetic correlation between this test and guide-dog success. This is always a problem when selecting on the basis of a predictive test — the correlation between it and performance might be largely environmental. Secondly such a severe test might be harmful to the dogs which failed it and thus decrease their chances of qualifying as guide-dogs.

CONCLUSION

The most important reasons for rejecting dogs as potential guide-dogs are fearfulness, excitability, dog distraction, over-sensitivity, aggression and hip dysplasia. There is evidence from comparison of A and P dogs that fearfulness and probably dog distraction are heritable.

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RESUME

Etant donné que les caractéristiques qui déterminent de la réussite ou de l'insuccès des chiens-guides dans la conduite des aveugles, sont basées sur les différents aspects du comportement des chiens, la définition ainsi que l'évaluation desdites caractéristiques jouent un rôle prépondérant dans le Programme d'élevage d'éducation des chiens.

Les résultats d'une étude préliminaire d'observations faites sur le comportement des chiens-guides en Australie, ont démontré que les causes principales conduisant à l'inabilité de certains chiens à être dressés comme guides pour aveugles, étaient la crainte, la prompte excitabilité, la distraction causée par d'autres chiens d'entourage ou étrangers, un excès de sensibilité, un tempérament agressif et la dysplasie des hanches.

Une comparaison faite entre les chiens dits Labrador de pure lignée, élevés et dressés pour guider les aveugles, et d'autres chiens Labrador, laisse à supposer que tout au moins, la crainte et la facilité de distraction (causée par d'autres chiens) sont des défauts héréditaires.

ZUSAMMENFASSUNG

Da viele der Eigenschaften die auf die Leistung des Führhundes wirken Verhaltensmerkmale sind, werden die Definition und das Messen der wichtigen Merkmale Hauptprobleme in einem Zuchtprogramm. Ergebnis einer ersten Analyse von Führhundprotokollen in Australien war die Feststellung der Haupt-

gründe der Untauglichkeit: Angstlichkeit, Erregbarkeit, Ablenkung durch andere Hunde, Überempfindlichkeit, Aggression und Hüftendysplasie. Ein Vergleich von Labradorhunden aus einer Führhundzucht mit anderen Zuchten deutet auf Vererblichkeit wenigstens der Angstlichkeit und Ablenkung durch Hunde.

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