

**THE CAUSES OF CULLING IN BOHEMIAN PIED CATTLE AND CROSSES WITH THE RED HOLSTEIN AND AYRSHIRE BREEDS**

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**Abstract**

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In the present study, complete culling was investigated up to the 3rd lactation. The lowest percentage of culling was found in the CR crosses (Bohemian Pied X Red Holstein), in the CA (Bohemian Pied X Ayrshire) crosses it was slightly higher, while the percentage of culling was the highest in group C (Bohemian Pied cattle). That culling was markedly lower in the CR and CA crosses than in group C could be due to the heterose effect in the crosses.

In the individual breeding groups the dairy cows with the lowest efficiency were culled according to the sequence of lactation; the percentage of culling was the highest in dairy cows on the 3rd lactation, the percentage of CR crosses being lower (i.e. 53.57%) than of the CA crosses (i.e. 60.00%) and group C (i.e. 57.89%). Culling in the 3rd lactation due to disorders in reproduction was much lower, the lowest percentage being that of CR crosses (i.e. 3.57%). On the contrary, the highest percentage of culling in the 3rd lactation was found to be among the CR crosses and was due to diseases, functional disorders and morphological changes of the mammary gland (i.e. 25%). In the CR crosses the highest percentage of culling due to diseases of the locomotor organs occurred in the 2nd lactation (i.e. 33.33%) at the time when the cows were transferred to a cow shed with short stanchions and grated dunging pits.

*Culling, Bohemian Pied cattle, crosses of the Bohemian Pied with the Red Holstein and Ayrshire cattle*

In 1971, improvement crossing of the domestic cattle with the Red Holstein cattle of American-Canadian origin was begun in Czechoslovakia. The reason for selecting the Red Holstein breed was its high milk efficiency acquired abroad.

The aim of the present study was to carry out an evaluation of the commercially important indices of efficiency of the dairy cows and the degree and reasons for culling of crosses of Bohemian Pied cattle with Red

Holstein and Ayrshire breeds. Comparisons were then to be carried out with the Bohemian Pied cattle under conditions of the School Agricultural Enterprise of the University of Veterinary Science in Nový Jičín.

Studies of the reasons for culling are important from the aspect of health, production and rentability of the herd.

As concerns the complete culling of dams in the herd, Suchánek et al. (1972) found that culling of CA crosses during the 1st to 3rd lactation was by 2.3 - 37.3% lower as compared with the C group. Suchánek and Ulrych (1975) found that the percentage of culling in the Bohemian Pied X Ayrshire crosses in the 1st lactation was by 5.2 - 15.8% lower than in group C. According to Suchánek and Ulrych (1976) the degree of culling of CA crosses from the original number of cows was half of that of the herd mates of group C. Ulrych and Suchánek (1977) report that culling in CA crosses was by 10% lower as compared with group C. Suchánek et al. (1980) investigated culling in CA crosses and found that it was by 4.4 - 21.8% lower than in the group C herd mates. Suchánek and Golda (1983) found that the total degree of culling of CR crosses was by 5.5 - 16.7% lower as compared with dams of group C. Suchánek (1982) reported that the degree of culling in CR crosses was by 8.5% lower than in the herd mates of group C. Jurčo (1985) observed a high percentage of culling, i.e. 38%, and in large-scale technologies even 41%. He confirmed the fact that high-efficiency dairy cows are culled especially due to disorders in fertility, diseases of the locomotor organs and diseases of the mammary gland. In the German Democratic Republic, Kirst (1979) investigated the culling of cows in large-scale cow houses. The most frequent reason was selection according to efficiency, disorders in reproduction and diseases of the udder (i.e. 11.9, 10.2 and 7.1%, respectively). In Holland, Renkema and Stelwagen (1979) studied the reasons of culling in the Dutch Friesian cattle where disorders in reproduction, diseases of the udder and low efficiency were 25, 20 and 15%, respectively. Slipka and Hajič (1981) evaluated culling in the Bohemian Pied breed in the 2nd and following lactations. Due to low efficiency, infertility and diseases of the udder, 33.54, 27.34 and 8.45% of the total number of cows were culled, respectively. Suchánek and Božovský (1982) found that the degree of culling of CA crosses due to zootechnical reasons and/or due to low efficiency was low; the degree of culling due to zootechnical reasons and/or low efficiency was the highest in dairy cows of group C. Wolf (1982) reported that in the GDR the reasons for culling were low efficiency (38.7%), disorders in fertility (15.5%) and diseases of the udder (12.5%). Váchal (1983) stated that the percentage of culling of the CR crosses in the 1st lactation due to various disorders of health was 7.6 - 11.7%, that in increased with the sequence of lactations and that it reached 14.6 - 19.1% in the 3rd lactation. Lotthammer (1984) studied the culling of cows in the period from 1978 to 1982 and he found that 29.3 to 30.9% of cows were culled due to disorders in fertility. According to Kadečka (1985) the basis for good reproduction is such a situation when culling due to disorders in reproduction is not higher than 10%. He reported that more than 25% of dairy cows are now being culled due to disorders of fertility. Král et al. (1977) reported that 10, 20% or even more of the culling is due to diseases of the locomotive organs. Greenough et al. (1981) found that diseases of the limbs in cattle are on the 3rd and 4th place in causes of culling of dairy cows. The percentage of culling due to this disorder has reached as much as 40% in New Zealand, 1.5% in Great Britain, 3% in the FRG and in some countries as much as 13.9%. Wolf (1982) reported that the percentage of culling due to disorders of the locomotor organs of dairy cows

was 4.3%.

## Materials and Methods

The present task was carried out as a comparative experiment with three groups of dams: Bohemian Pied cattle (C)  $n=46$ , Bohemian Pied X Red Holstein crosses with a 50% proportion of blood (CR)  $n=62$  and Bohemian Pied X Ayrshire cattle with a blood proportion ranging from 25 to 53.25% (CA)  $n=65$ . In order to ensure identical environmental conditions, these breeding groups were concentrated on one farm. The high-pregnant heifers were housed in the barn for primiparae and in the 2nd and 3rd lactations they were transferred to a large-scale cow-shed with short stanchions and grated dunging pit. Investigations were carried out under normal conditions of management of the School Agricultural Enterprise of the University of Veterinary Science in Nový Jičín; this enterprise had been selected for tests of the genetic pool of foreign breeds of dairy cows to be crossed with the Bohemian Pied cattle.

An overall survey of culling and its causes were continuously followed from veterinary documentation, primary zootechnical records and entries of the performance control separately for the first, second and third lactation. The differences of the individual breeding groups were calculated from these data and expressed in per cent.

## Results

Tab. 1 gives the number of culled animals within the breeding groups compared in the individual time periods since birth till the 3rd lactation. It can be seen that in the 1st lactation 37.00% of cows included in the experiment in group C were culled; in the CA and CR crosses the percentage was by 10.58 and 22.95% lower, respectively, than in group C. In the 2nd lactation it was 11.00% in group C; in CR and CA crosses it was by 1.08 and 3.45% lower, respectively, than in group C. In the 3rd lactation it was 19.00% of dairy cows; in the CA and CR crosses it was by 4.14 and 4.58% higher.

Tab. 2 gives the causes of culling within the individual breeding groups according to the sequence of lactations. The division of causes of culling of the experimental dairy cows given in per cent shows the differences among the groups in the individual lactations. In the 1st lactation, the highest percentage of culling due to low efficiency was found in the CR crosses (i.e. 41.18%), in the 2nd lactation the percentage of culled cows was the highest in group C (i.e. 27.27%) and in the 3rd lactation in the CA crosses (i.e. 60.00%). In the 1st lactation culling due to disorders in reproduction was the highest in the CR crosses (i.e. 35.29%), in the 2nd lactation in the CR and CA crosses (i.e. 50.00%) and in the 3rd lactation in the CA crosses (i.e. 20.00%). Diseases, functional disorders and morphological changes of the milk gland were the causes of culling of the CR crosses in the 1st lactation and the 3rd lactation (i.e. 17.65 and 25.00%, respectively). In the 2nd lactation, 18.18% of dams were culled in group C due to the same causes. As compared with the other groups, the post-parturition complications as a cause of culling were the lowest in CR crosses in all lactations. More post-parturition complications occurred in the 2nd lactation in dams of group C (i.e. 27.27%) and in the CA crosses (i.e. 25.00%). Other disorders of the sexual organs were recorded in the 1st lactation only in groups C and CA. The occurrence of diseases of the locomotor organs was marked in the 2nd lactation in CR crosses (i.e. 33.33%) while in the 3rd lactation it was only

**Table 1**  
**Total culling of the investigated breeding groups from birth till the 3rd lactation**

<b>CR group</b>	<b>n = 120</b>	
up to 6 months of age	20 head	16.53%
up to 21 months of age	14 head	11.57%
up to the 1st lactation	17 head	14.05%
up to the 2nd lactation	12 head	9.92%
up to the 3rd lactation	28 head	23.14%
living	30 head	24.79%
<b>C group</b>	<b>n = 100</b>	
up to 6 months of age	16 head	16.00%
up to 21 months of age	4 head	4.00%
up to the 1st lactation	37 head	37.00%
up to the 2nd lactation	11 head	11.00%
up to the 3rd lactation	19 head	19.00%
living	13 head	13.00%
<b>CA group</b>	<b>n = 106</b>	
up to 6 months of age	6 head	5.66%
up to 21 months of age	14 head	13.21%
up to the 1st lactation	28 head	26.42%
up to the 2nd lactation	8 head	7.55%
up to the 3rd lactation	25 head	23.58%
living	25 head	23.58%

3.57%. Due to orthopedic disorders, 10.53 and 8.00% of cows of group C and CA crosses, respectively, were culled in the 3rd lactation. Attention should be paid to the highest percentage of culling (i.e. 14.2%) due to traumatic diseases of the digestive system in the 3rd lactation in the CR crosses. The percentage of culling due to acute diseases and emergency slaughter was the highest (i.e. 8.11%) in the 1st lactation in group C.

### Discussion

The total percentage of culling in the groups investigated in the present study in the 1st and 2nd lactations corresponds with the results of Suchánek et al. (1972), Suchánek and Ulrych (1975), Suchánek and Goida (1983) and Suchánek (1982). Contrary to the data given by the above authors, in our present study culling was by 4.14 and 4.58% higher in the CA and CR crosses, respectively, in the 3rd lactation than in group C.

Culling due to low efficiency as given by various authors reached 15% (Renkema and Stelwagen 1979), 11.9% (Kirst 1979), 33.54% (Slipka and Hajič 1981), 38.7% (Wolf 1982). According to Váchal (1983) culling in the CR crosses was by 2.8 to 13.2% lower in the CR crosses than in their herd mates of group C. In our present observations we found that the percentage of culling was the lowest

Table 2

Causes of culling within the individual breeding groups according to the sequence of lactations in per cent

Causes of culling	1st lactation			2nd lactation			3rd lactation		
	CR	C	CA	CR	C	CA	CR	C	CA
low efficiency	41.18	37.84	28.57	8.33	27.27	25.00	53.57	57.89	60.00
disorders of reproduction	35.29	21.62	32.14	50.00	27.27	50.00	3.57	15.78	20.00
diseases, functional disorders and morphological changes of the mammary gland	17.65	8.11	14.28	0	18.18	0	25.00	0	0
post-parturition complications	5.88	13.51	14.28	8.33	27.27	25.00	0	10.53	4.00
other diseases of the sexual organs	0	5.40	7.14	0	0	0	0	0	0
diseases of the locomotor organs	0	2.70	0	33.33	0	0	3.57	10.53	8.00
traumatic diseases of the digestive system	0	2.70	0	0	0	0	14.29	0	4.00
other acute diseases, including emergency slaughter	0	8.11	3.57	0	0	0	0	5.26	4.00

in the 1st lactation in the CR crosses; there was a marked decrease in the CR crosses in the 2nd lactation. The percentage of culling was nearly the same in group C and the CA crosses. Very interesting is the finding that more than 50.00% of all the groups investigated were culled in the 3rd lactation due to low efficiency. The percentage of culling of our crosses is in accordance with data given by other authors only as concerns the differences between the 1st and the 2nd lactation. While other authors reported that with continuing lactations the percentage of culling in the crosses continuously decreased, in our breeding groups the percentage of culling was found to be the highest in the 3rd lactation.

Many authors dealt with problems connected with culling due to disorders in reproduction. The values given were 10.2% (K i r s t 1979), 25% (R e n k e m a and S t e l w a g e n 1979), 27.34% (S l i p k a and H a j i č 1981), 15.5% (W o l f 1982), 29.3 - 30.9% (L o t t h a m m e r 1984) and 25% (K a d e č k a 1985). According to V á c h a l (1983), the percentage of culling of the CR crosses in the 1st lactation due to health disorders reached 7.6. - 11.7%. The percentage found in the present study in all the three breeding groups was nearly twice as high as the data of V á c h a l (1983). In the 2nd lactation, culling of the CR and CA crosses considerably increased due to disorders in reproduction, only the data of group C are in accordance with data of S l i p k a and H a j i č (1981). The percentage of culling in the 3rd lactation in the CR crosses due

to disorders in reproduction was relatively low, i.e. 3.57%. The lower percentage of culling in the 3rd lactation in all the groups compared can be explained by a stricter selection for reproduction reasons in the 1st and especially in the 2nd lactation.

Due to disorders of the milk gland, Renkema and Stelwagena (1979), Kirst (1979), Slipka and Hajič (1981) and Wolf (1982) give the values of 20.00, 7.1, 8.45 and 12.5%, respectively. The percentage of culling due to disorders of the milk gland in the groups investigated is practically in accordance with data of these authors, only in the CR crosses in the 3rd lactation the percentage of culling was found to be the highest, i.e. 25.00%, what can be explained by a higher reaction and sensitivity of the CR crosses to the conditions of breeding and by their higher milk production.

Post-parturition complications were the lowest in the CR crosses in all the three lactations, whereas culling was the highest in group C and in the CR crosses in the 2nd lactation.

According to Král et al. (1977), Greenough et al. (1981) and Wolf (1982), culling due to disorders of the locomotor organs reached 10 - 20 or more, 1.5 - 40 and 4.3%, respectively. The percentage of culling in the groups investigated in the present study are virtually the same as data of these authors, only in the 2nd lactation this percentage increased to 33.33% in the CR crosses what can be explained by their higher sensitivity and bigger body framework as compared with the CA crosses and dams of group C and due to the transfer of dairy cows on the 2nd lactation to the large-scale cow-shed with short stanchions and grated dunging pit. This high percentage of culling in the 2nd lactation was very favourably reflected in the 3rd lactation when culling due to orthopedic disorders in the CR crosses decreased to 3.57%.

On the basis of analysis of the causes of culling it is necessary to carry out the required measures in nutrition, in the field of prevention, management and zoohygiene.

### **Příčiny vyřazování českého strakatého skotu a kříženek s červeným holštýnským a ayrshirským plemenem**

V rámci celkového vyřazování sledovaných plemenných skupin do III. laktace bylo nejnižší procento vyřazování zjištěno u kříženek CR (českého strakatého s červeným holštýnským), poněkud větší u kříženek CA (českého strakatého s ayrshirským), zatímco nejvyššího vyřazování dosáhla skupina C (český strakatý skot). U obou skupin kříženek CR a CA bylo vyřazování podstatně nižší ve srovnání s plemenicemi C, což lze přičíst heteroznímu efektu u kříženek.

Z příčin vyřazování dojníc jednotlivých plemenných skupin dle pořadí laktace bylo pro nízkou užitkovost vyřazeno nejvíce dojníc v rámci všech plemenných skupin na III. laktaci, přičemž kříženky CR (53,57%) měly toto vyřazování nižší než kříženky CA (60,00%) a skupina C (57,89%). Pro poruchy reprodukce bylo na III. laktaci vyřazení podstatně menší, z toho opět kříženky CR měly vyřazení nejnižší (3,57%). Naopak kříženky CR dosáhly nejvyššího vyřazování na III. laktaci z důvodů onemocnění, funkčních poruch a morfologických změn mléčné žlázy (25,00%). U kříženek CR bylo nejvyšší procento vyřazení pro onemocnění pohybového aparátu zaznamenáno na II. laktaci (33,33%), kdy byly převedeny do stáje s krátkým stáním se zaroštovaným kalištěm.

## Причины выбраковки чешской пестрой породы и помесей с красной гольштейнской и айширской породами

В рамках общей выбраковки исследуемых племенных групп до III лактации самый низкий процент выбраковки был установлен у помесей CR (чешская пестрая с красной гольштейнской породой), несколько больше у помесей SA (чешская пестрая порода с айширской породой), между тем как самая большая выбраковка встречалась у группы С (чешская пестрая порода). У обеих групп помесей CR и SA выбраковка была существенно ниже по сравнению с племенными матками С, что можно связать с гетерозным эффектом помесей.

Из причин выбраковки дойных коров отдельных племенных групп по порядку лактации из-за низкой продуктивности было самое большое количество дойных коров в рамках всех племенных групп отбраковано на стадии III лактации, при этом помесь CR (53,57%) отличалась по сравнению с помесью SA (60,00%) и группой С (57,89%) меньшей выбраковкой. Из-за нарушений репродукции на стадии III лактации выбраковка была существенно ниже, у помесей CR была опять-таки самая низкая (3,57%). Наоборот, помесь CR достигла самой высокой выбраковки во время III лактации по причинам заболевания, функциональных нарушений и морфологических изменений молочной железы (25,00%). У помесей CR причина самого большого процента выбраковки сводилась к заболеваниям двигательного аппарата на II лактации (33,33%), когда коровы были переведены в коровник с коротким стойлом и решеткой покрытым отводным каналом.

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