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THE INFLUENCE OF SEASON AND SIRE ON THE RESULTS OF SUPEROVULATION AND EMBRYO TRANSFER

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Abstract

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The aim of the study was evaluate the influence of season and sires on profit and quality of embryos after superovulated treatment. Next we evaluated the conception rate after transfer of fresh and frozen embryos.
In 1991–2004 there were used the beef cattle.
Into the basic statistic evaluation it was involved 487 realised embryo recoveries and 2008 realised transfers in 1991–2004. Data for database were obtaining from ETprotocols – ET team Research Institute for Cattle Breeding, Ltd., Rapotin, prof. Říha. The data processing was carried out by means of the common variation-statistical methods.
The best results were achieved in summer (suitable 3.68 ± 3.65; the ratio of the suitable and total: 59.3%) and in autumn (suitable 3.54 ± 3.80; the ratio: 54.48%) and the good results, little different from the summer and autumn results, were achieved in spring.
The average number of the recovered ova of the chosen breeds sires were variable (from 6.60 ± 6.17 in Blonde d´Aquitaine to 17.16 ± 6.66 in Charolais). The most of the suitable embryos was recovered in the donors inseminated by the Hereford breed sires (7.15 ± 6.42). It was evaluated the above-average conception in the Simmental breed (63.43 %).

beef cattle breeds, donors, recipients, superovulation, embryo transfer, conception rate, sire, season

The embryo transfer in cattle and the following pregnancy ability of the dams is still the subject of the interest of the research sphere, especially of the breeders. With respect to the ascendant number of the transfers in the world-wide scale the attention is focused on the ET quality and on the aspects that have an influence on ET. We have paid our attention on the study of the influence of the year and the season on the embryo transfer efficiency in the chosen beef cattle breeds.

The aim of this work was to evaluate the influence of the year, the season on the embryos gain and their quality after the superovulatory treatment. Furthermore, it was evaluated the conception rate after the transfer of the fresh and the thawed embryos in the monitored years and the influence of the season on the conception of the recipients.

The utilisation of the embryo transfer method in the beef cattle breeding has its restrictions by reason of the seasonal character of the reproduction. The basic reproduction functions (the pregnancy and the birth, checking of the accessing of the first sexual activity and its functions, the synchronizing and superovulatory treatment, the recovery of embryos and the embryo transfer) is necessary to master in the short time during 60 and 90 days, the best including the next donors gravidity (ŘÍHA, 1995,1996). Better knowledge about the season influence on

the superovulation is for the dairy cows breeding than for the beef cattle breeding; in case of the beef cattle breeding the season is valuated foremost from the viewpoint of the breeding technology.

KNEISSL (1990) mentions that the influence of the year on the embryo transfer was statistically significant; between particular years there were differences above all in the average numbers of the transferred embryos. In major part of the studies about the embryo transfer the influence of the year is not considered – KNEISSL (1990).

ŘÍHA *et al.* (1998, 1999) were engaged in the evaluation of the influences on the embryos survival or on the donors conception, respectively, and of the influences affecting the gain and the quality of embryos in the beef cattle. It concerned mainly season influences on the embryos gain and its quality. The donors were divided into three groups according to the body skeleton character. The obtained data were analysed in relation to the season of the year. The satisfactory results were obtained for all groups in spring, summer and autumn season.

On the basis of the results published in the authors works (ŘÍHA *et al.*, 1988; ŘÍHA *et al.*, 1990) it is possible to carry out the superovulation, the recovery of embryos and the embryo transfer during the whole year. The opinions on the season influence on the superovulation efficiency are various.

VANĚK (1997) studied the influence on the gain and the embryos quality in the beef cattle. He ascertained the highest number of the suitable embryos in summer and in autumn.

The most of the authors was engaged in the monitoring of the season influence on the gain and the embryos quality after the superovulatory treatment in the dairy cattle breeds. Only few literary resources is concerned with this issue in the beef cattle breeds.

ŘÍHA (1990) ascertained the statistically significant differences in the conception rate of the donors according to the sire utilized for the insemination, i. e. according to the sires. After 12 sires it was obtained the conception rate more than 70%, on the contrary after 5 sires it was lower than 20%. In the other work of ŘÍHA (1999) there were ascertained only insignificant differences in the average number of the obtained ova and also of the suitable embryos. It was probably by reason of the high variability of the results. By means of the multifactor analysis it was in this work ascertained the influence of the dam and the sire on the gain of the ova and the suitable embryos.

Also KNEISSL (1990) ascertained the highly significant influence of the sires on the embryos survival after the transfer in the range from 37.7% (REA 75) to 65.1% (ME 84).

ŘÍHA *et al.* (1996) ascertained the significant influence of the sires on the conception rate in the heifers after the transfer of the in vitro thawed embryos from the gravid dams in the range from 14.3% to 51.5%.

MATERIALS AND METHODS

Animals

In the study there were monitored the beef cattle breeds – Charolais, Blonde d´Aquitaine, Aberdeen Angus, Limousine, Simmental, Piemontese, Hereford; during 1991–2004.

Superovulatory treatment of animals

The superovulatory treatment was carried out mostly in the season of the reproductive breeding period. The sterile cows from the previous reproductive period of the Limousine breed and from two previous reproductive periods of the Hereford breed were superovulated during the end of the winter before beginning of the next reproductive season. Furthermore, there were as the donors utilised the heifers (in the period before relegation to the reproductive cycle) of these breeds: Charolais, Blonde d´Aquitaine, Aberdeen Angus, Limousine, Simmental, Piemontese. The superovulatory treatment of these breeds was carried out mostly in summer, in autumn and in spring, or heifers of the Piemontese breed were utilised during the whole year, respectively.

The superovulatory treatment in clinically ascertained animals with normal sex cycles included the synchronization of the reproductive cycles with one or two applications of the prostaglandin (Oestrophan, Léčiva Praha) in the dose of 0,5 µg PGF2alfa (Cloprostenol) F2alfa in 11-days intervals. The following estrus was classified as the 0. day. After the checking of the corpus luteum (Cl) development the donors were treated between 9^{th} and 11^{th} day of the sexual cycle with the follicular-stimulating hormone p-FSH Folicotropin, Spofa Praha during 4 days in the morning and in the evening in dose of 2.3; 3.2; 1.1; 1.1 by means of the ampule for cows (total 14 ampules, i. e. 560 mj. FSH) and 1.2; 2.1; 1.1; 1.1 by means of the ampules for heifers (total 10 ampules, i. e. 400 mj. FSH). The third day of the superovulatory treatment in the morning, i. e. with the fifth dose of FSH it was applied to the donors the analogue of the prostaglandin F2alfa (Oestrophan, Léčiva Praha) in the dose of 0,5 µg cloprostenol. The fifth and the sixth day the donors were inseminated totally with three doses of the frozen semen from the certain sires.

Recovery and evaluation of embryos

The non-chirurgical recovery of embryos was conducted every seventh day after the first insemination by means of the standard method (ŘÍHA *et al.,* 1988; PETELÍKOVÁ, 2004) i. e. the flush of the both

cranial horns of the uterus through the use of 300 ml of the Krebs-Ringer phosphate with 1% inactivated bovine serum (BOS, Bioveta, Ivanovice na Hané, ČR). There were utilised the two-way foley catheters no. 18 (Optimit, Odry, ČR). The embryos were after the half-hour sedimentation isolated from the flashed fluid through by means of the stereomicroscope and they were morphologically evaluated according to the criteria cited in the work (ŘÍHA, LANDA; 1986) that corresponds with the manual IETS, 1990, 2001.

Transfer of fresh embryos

The fresh embryos were transferred into the recipients – milking populations, beef breeds and cows WMDP synchronized by the prostaglandin application (Oestrophan, Léčiva Praha, ČR). The breeding distance was from 20 minutes to 6 hours. The embryos for the transport were inserted individually into the straw (conditioned medium H-MEMD with 20% of the fetal serum). After the transport the embryos were transferred into the ipsilateral uterine horn near the ovary with the sufficiently developed CL.

Transfer of frozen embryos

Transfer of embryos imported from abroad

Thawing was conducted according the recommendations described in the attendant documentation. The embryo transfer was carried out the seventh day of the reproductive cycle into the ipsilateral uterine horn by means of the apparatus Wörrlein. The diagnostic of the gravidity was conducted during the third month after the transfer completion.

Transfer of thawed embryos obtained from Czech Republic breeding

Before insertion into the liquid nitrogen the embryos were equilibrated for 10 minutes in the medium with 10% glycerol and the freezing regime was 0.3 °C/min up to –35 °C. The straws with the embryos were thawed by means of the slow swinging in the 35 °C warm water bath until the all ice crystals got thawed. The straw was opened and the embryos were collocated in the Petri's saucer. The kryoprotectivum was rinsed in PBS + 0.25 M sucrose + 5% glycerol(5 min) and in PBS + 0.25 M sucrose (5 min). Than the embryos were rinsed twice in the fresh medium PBS and collocated into the twice washed straws. The transfer was realized into the synchronized recipients of the domestic milking population the seventh day after the estrus into the ipsilateral uterine horn near the ovary with the sufficiently developed CL – ŘÍHA et al. (1989), ŘÍHA (1990).

Influence of season on embryos gain and quality after superovulatory treatment and on embryos survival after transfer into recipients

It was evaluated the level of the gain of the embryos, their quality after the superovulatory treatment and their survival in the particular seasons (division of the animals according to the insemination date during the estrus for the superovulatory treatment on the particular quarters). The particular quarters included these months:

I. quarter: January–March
II. quarter: April–June
III. quarter: July–September
IV. quarter October–December

Conception rate and superovulation results in particular years 1991–2004 and conception rate after fresh and frozen embryos transfer

It was observed the development and the results of the superovulation in 1991–2004, i.e. during 14 years. Furthermore, it was monitored the conception development after the transfer of the fresh and the frozen embryos. Consequent database was not modified for statistical processing.

Influence of sires on results of superovulation and embryo transfer

Into the basic statistic evaluation it was involved 487 realised embryo recoveries (stimulations) and 2008 realised transfers in 1991–2004. For the processing of the results it was utilised program Excel 1997 and 2000. Was utilised method of least squares (LSM). The statistical data processing was carried out by means of the statistical package in the program Unistat 4.53.

RESULTS AND DISCUSSION

The processing of the results was focused mainly on the evaluation of the donors superovulation quality and on the pregnancy ability of the recipients after the transfer of the fresh and the frozen embryos during 14 years (number of embryos in total, suitable embryos, degenerated embryos, unfertilised oocytes, percentage of the gravidity). Furthermore, it was aimed at the evaluation of the influence of the season and of the embryo sire on the superovulation efficiency and on the embryos survival after the transfer.

The influence of the year on the superovulation quality and on the embryos survival is mentioned in the table I and II; (graph 1).

I: *Results of superovulation of beef breed donors during 1991–2004*

Indicator		Flashed suitable embryos	Degenerated	Unfertilised	Flashed suitable embryos in total
1991[a, A]	n	225	57 [c]	167	449
	x	2.92	0.74	2.17	5.88
	s_x	2.85	1.29	2.90	4.63
Rate of suitable	%	50.11			
1992[b, B]	n	65 [n]	9	15	89
	x	5.91	0.82	1.36	8.09
	s_x	4.54	0.94	1.87	5.85
Rate of suitable	%	73.03			
1993[c, C]	n	17 [m]	39 [a e h j l n]	10	66
	x	1.70	3.90	1.00	6.60
	s_x	2.24	9.53	1.41	8.98
Rate of suitable	%	25.76			
1994[d, D]	n	26	5	39	70
	x	3.25	0.63	4.88	8.75
	s_x	2.22	0.99	8.10	8.01
Rate of suitable	%	37.15			
1995[e, E]	n	591 [m]	145 [c]	343	1079
	x	3.38	0.83	1.96	6.17
	s_x	3.41	1.39	2.75	4.53
Rate of suitable	%	54.77			
1996[f, F]	n	84	14	79	177
	x	3.00	0.50	2.82	6.32
	s_x	3.25	0.78	2.85	4.06
Rate of suitable	%	47.46			
1997[g, G]	n	17	9	34	60
	x	1.89	1.00	3.78	6.67
	s_x	2.02	2.16	4.80	4.62
Rate of suitable	%	28.33			
1998[h, H]	n	112	28 [c]	81	221
	x	3.29	0.82	2.38	6.50
	s_x	3.39	1.90	3.22	4.91
Rate of suitable	%	50.68			
1999[i, I]	n	96	33	13 [L]	142
	x	3.56	1.22	0.48	5.26
	s_x	4.17	2.85	1.03	5.88
Rate of suitable	%	67.61			
2000[j, J]	n	88 [m]	13 [c]	80	181
	x	2.67	0.39	2.42	5.48
	s_x	4.46	0.98	3.46	6.14
Rate of suitable	%	48.62			
2001[k, K]	n	14	6	50	70
	x	1.56	0.67	5.56	7.78
	s_x	2.50	1.56	6.17	6.53
Rate of suitable	%	20			
2002[l, L]	n	58	7 [c]	83 [I]	148
	x	2.90	0.35	4.15	7.40
	s_x	4.45	1.15	4.42	7.70
Rate of suitable	%	39.19			
2003[m, M]	n	85 [a c e j m]	16	33	134
	x	7.08	1.33	2.75	11.17
	s_x	4.01	2.56	2.65	6.88
Rate of suitable	%	63.43			
2004[n, N]	n	32 [m]	12 [c]	88	132
	x	1.68	0.63	4.63	6.95
	s_x	2.79	1.66	8.54	8.20
Rate of suitable	%	24.24			
Total 91-04	n	1510	393	1115	3018
	x	3.20	0.83	2.36	6.40
	s_x	3.57	2.12	3.70	5.54
	%	50.03			

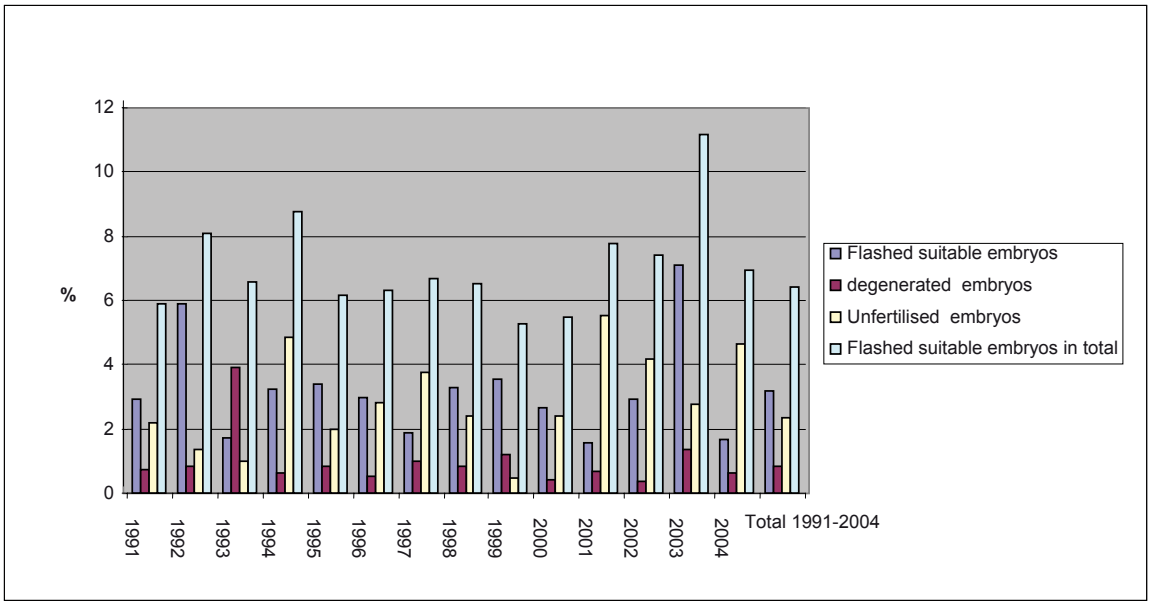
a, b, c, d, e, f, g, h, i, j, k, l, m, n $P < 0.01$

A, B, C, D, E, F, G, H, I, J, K, L, M, N $P < 0.05$

II: *Conception rate in particular years*

	1991[a]	1992[b]	1993[c]	1994[d]	1995[e]	1996[f]	1997[g]	1998[h]	1999[i]	2000[j]	2001[k]	2002[l]	2003[m]	2004[n]	91–04
Transfers n	n 68	ghijlmn 274	160	30	hij 370	214	b 181	be 188	b 104	be 125	34	52	b 107	abe 101	2008
Conception %	32.84	30.66	46.25	30.00	36.49	43.46	46.96	55.85	51.92	61.60	50.00	61.54	54.21	60.40	**45.17**
Standard deviation															10.49

a, b, c, d, e, f, g, h, i, j, k, l, m, n $P < 0{,}01$



1: *Results of superovulation of beef breed donors during 1991–2004*

In 1991–2004 it was carried out 487 of the superovulations in total. On average it was recovered the most of the embryos in 2003 (11.17 ± 6.88) and the least in 1999 (5.26 ± 5.88). The most of the suitable embryos was recovered in 2003 (7.08 ± 4.01), the least in 2001 (1.56 ± 2.50).

From the results we can conclude that the variability of the number of the obtained embryos and of the embryos quality is very high. KNEISSL (1990) also mentions that the variability of the superovulation results is high – this variability is probably induced by the individual donors sensibility to the superovulatory treatment.

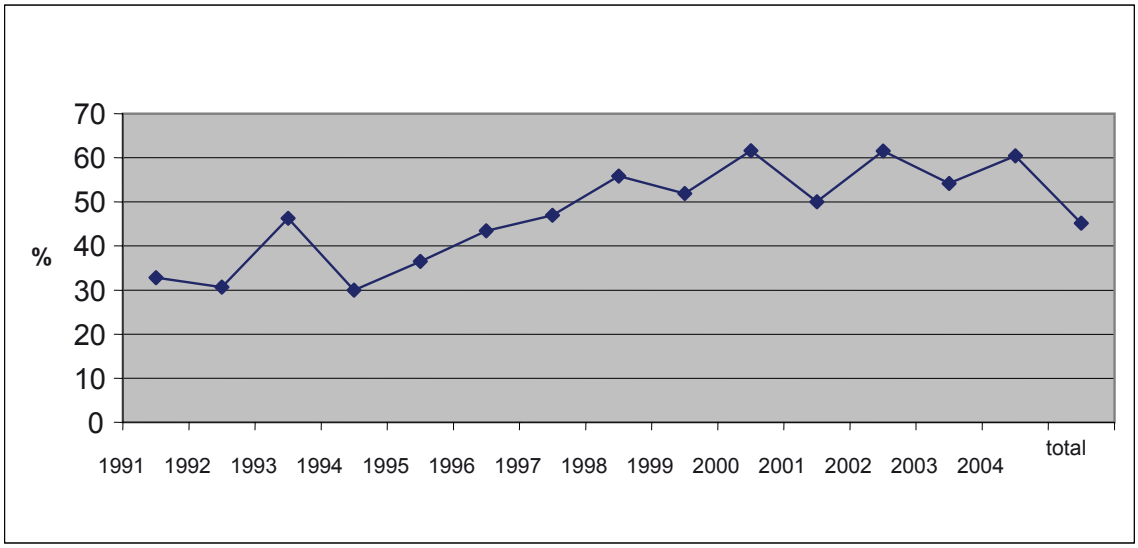
The influence of the year on the number of the flushed embryos was statistically insignificant; very significant was influence of the year on the number of the flushed suitable embryos in 2003 to 1991, 1993,1995, 2000, 2004 ($P < 0.01$).

It was also elicited the significant influence of the year on the number of the flashed degenerated embryos. The year 1993 was very statistically different from the years 1991, 1995, 1998, 2000, 2002, 2004 ($P < 0.01$).

The influence of the year on the number of the flushed unfertilised oocytes was statistically significant: 1999–2002, ($P < 0.05$).

In the table II there is mentioned the number of the transfers and the percentage of the conceptions in the particular years of the monitoring; there was 2008 of the transfers in total; during 1991–2004. The most of the transfers was carried out in 1995.

The highest percentage of the conception was in 2002 (31.54%), the least it was in 1994 (30.00%). It is obvious the improving of the pregnancy level in 1995–1999, in the other years was the pregnancy on the acceptable level from 50% to 61.54%; see graph 2.



2: *Conception rate in particular years*

During the pregnancy observation in the particular years 1991–2004 the results were interesting from the viewpoint of the number of the transfers and the pregnancy development over a longer time period. It is obvious the downtrend of the number of transfers in 2000, stabilizing approximately on the same number of the transfers realized in 2003–2004 (107; 101).

There is the improving tendency in the results of the pregnancy development after the embryo transfer (from 32.84% in 1991 to 60.40% in 2004), though in some years happens temporarily the worse results (51.92% in 1999, 50% in 2001, 54.21 in 2003).

The influence of the year on the pregnancy ability was significant during 1991–2004; 1992–1997, 1998, 1999, 2000, 2002, 2003, 2004; 1995–1998, 2000, 2004.

KNEISSL (1990) mentions that the influence of the year of the embryo transfer implementation was significant. In his work he studied the influence of the year in the dairy cattle breeds; the majority of the works about the embryo transfer is not taking into account the influence of the year.

The table III shows the influence of the season on the embryos gain and their quality. The best results were achieved in summer (suitable 3.68 ± 3.65, degenerated 0.88 ± 3.18, unfertilised 1.74 ± 2.54; the ratio of the suitable and the flashed in total 59.3%) and in autumn (suitable 3.54 ± 3.80, degenerated 0.88 ± 3.18, unfertilised 2.08 ± 3.03; the ratio of the suitable and the flashed in total 54.48%). The good results little different from the summer results were achieved in spring (suitable 2.99 ± 3.56, degenerated 0.75 ± 1.57, unfertilised 2.65 ± 3.52; the ratio of the suitable and the flashed in total 46.81%). The worse results were in winter (suitable 2.53 ± 2.80, degenerated 0.98 ± 2.01, unfertilised 3.00 ± 5.45; the ratio of the suitable and the total flashed 38.59%).

III: *Influence of season on gain and quality of embryos of beef breeds*

Indicator		I winter	II spring	III summer	IV autumn
Obtained embryos					
ova in total	$x \pm s_x$	6.55 ± 6.13	6.39 ± 5.21	6.20 ± 4.76	6.50 ± 4.76
from that					
suitable embryos	$x \pm s_x$	2.53 ± 2.80	2.99 ± 3.65	3.68 ± 3.65	3.54 ± 3.80
	%	38.59	46.81	59.3	54.48
degenerated embryos	$x \pm s_x$	0.98 ± 2.01	0.75 ± 1.57	0.88 ± 3.18	0.88 ± 3.18
unfertilised embryos	$x \pm s_x$	3.00 ± 5.45	2.65 ± 3.52	1.74 ± 2.54	2.08 ± 3.03

$P > 0.05$

ŘÍHA et al. (1998), ŘÍHA (2000, 2004) were engaged in the issue of the season influence. They have found the best results for all donors groups in spring, in summer and in autumn, the worse results were in winter. VANĚK (1997) mentions that the highest number and the rate of the suitable embryos was obtained in summer and in autumn.

The opinions on the season influence on the superovulation efficiency are various and it probably depends on the level of the other effects – on the nutrition level and quality, on the welfare, on the breeding level etc. The season influence on the number of the total flashed embryos, of the suitable embryos, of the degenerated and unfertilised embryos was insignificant.

The table IV evaluates the conception rate according the season – here is apparent the low influence of the season on the embryos survival after the transfer into the recipients. The conception value moves from 42.61% in summer to 46.84% in autumn. The season influence on the embryo survival was insignificant.

IV: *Influence of season on survival of embryos of beef breeds*

Indicator		I winter	II spring	III summer	IV autumn
Realised transfers	n	295	1013	352	348
Conception	%	44.75	45.61	42.61	46.84

P > 0.05

In the table V (graph 3,4) there is the conception rate in the particular years divided into the conception after the transfer of the fresh and the frozen embryos. The higher conception rate is apparent after the transfer of the fresh embryos.

Though the conception rate after the transfer of the frozen embryos is since 1999 at least 50%, there is not the high difference between the conception rate of the fresh and frozen embryos as it was at the beginning of the nineties (for example in 1992 it was 66.67% in comparison with 27.66%; in 2003 it was 58.33% in comparison with 53.68%). It can have connection with the resolution of the majority of the problems with the long-term embryos conservation by means of the freezing (time of the equilibration, medium compound, thawing etc).

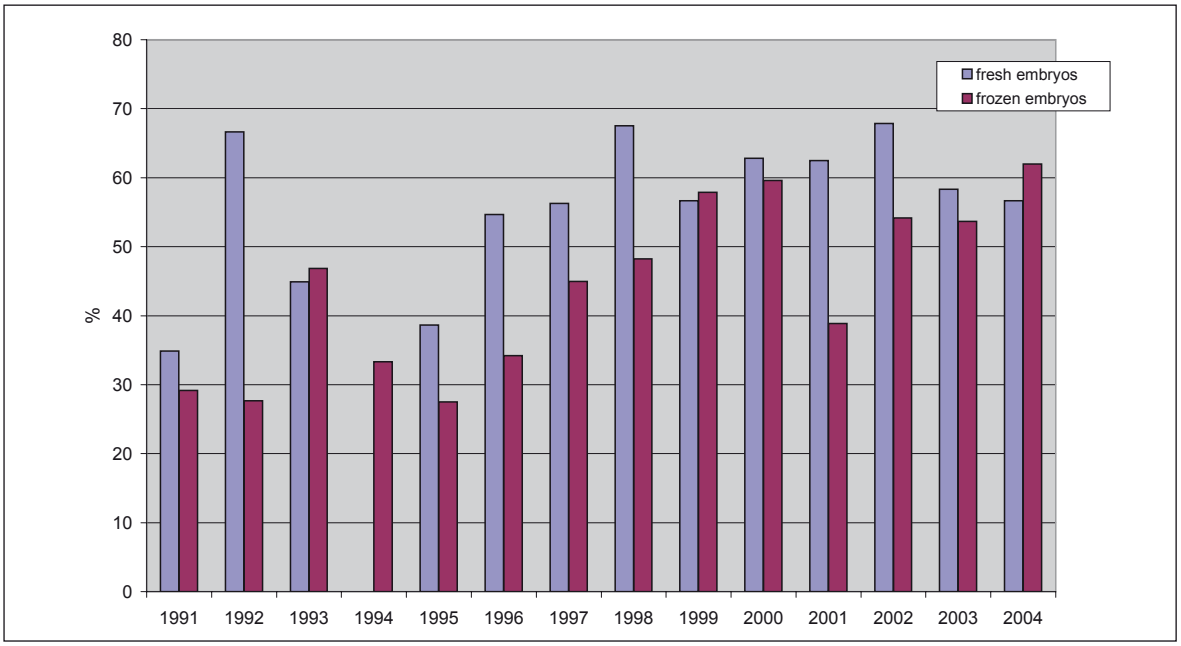
The difference in the conception rate after the transfer of the fresh embryos in comparison with the frozen embryos studied for example KNEISSL (1991) – he ascertained 51.5% of the conception rate after the transfer of the frozen embryos and 66.4% after the transfer of the fresh embryos. Also VANĚK (1997) mentions the higher conception of the donors after the transfer of the fresh embryos (66%) in comparison with the frozen embryos (38.7%).

It was found out the significant difference in the conception rate after the transfer of the fresh and the frozen embryos.

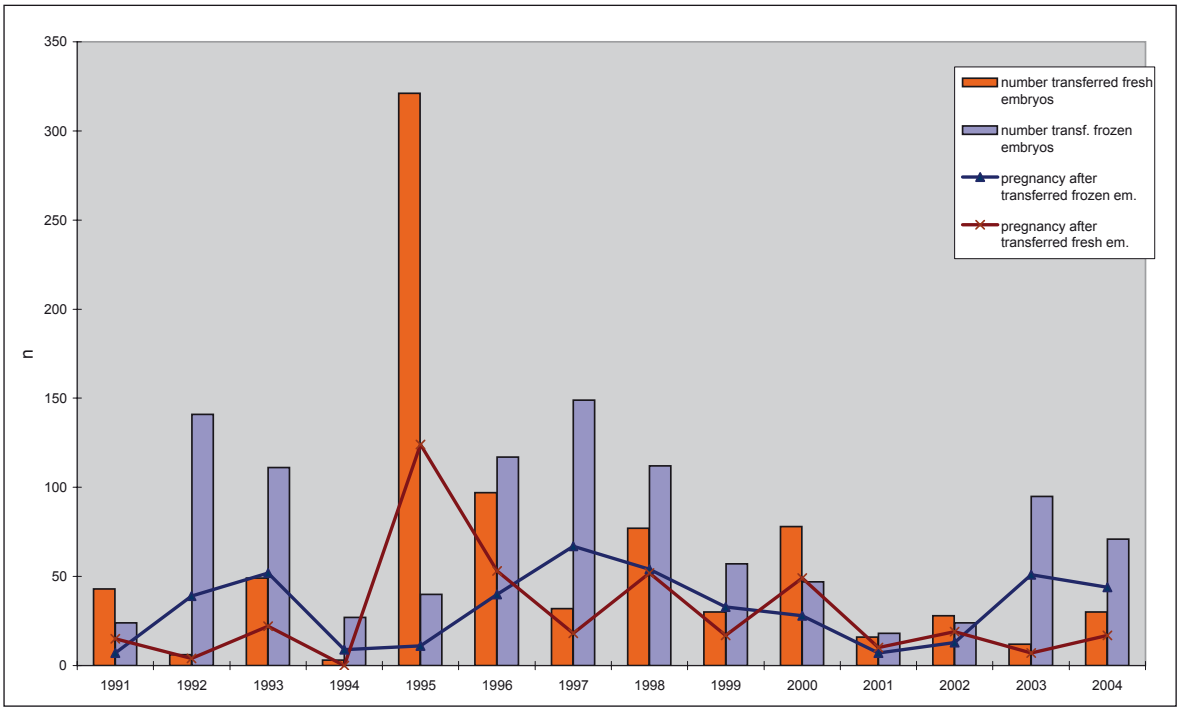
V: *Influence of season on transfer efficiency of fresh and frozen embryos*

	year	transfers	fertilised	conception		year	transfers	fertilised	conception
		n	n	%			n	n	%
Transfer of fresh embryos	1991	43	15	34.88	Transfer of frozen embryos	1991	24	7	29.17
	1992	6	4	66.67		1992	141	39	27.66
	1993	49	22	44.90		1993	111	52	46.85
	1994	3	0	0.00		1994	27	9	33.33
	1995	321	124	38.63		1995	40	11	27.50
	1996	97	53	54.64		1996	117	40	34.19
	1997	32	18	56.25		1997	149	67	44.97
	1998	77	52	67.53		1998	112	54	48.21
	1999	30	17	56.67		1999	57	33	57.89
	2000	78	49	62.82		2000	47	28	59.57
	2001	16	10	62.50		2001	18	7	38.89
	2002	28	19	67.86		2002	24	13	54.17
	2003	12	7	58.33		2003	95	51	53.68
	2004	30	17	56.67		2004	71	44	61.97

P > 0.05



3: *Influence of season on transfer efficiency of fresh and frozen embryos*



4: *Number transferred fresh embryos and influence of season on transfer efficiency of fresh and frozen embryos*

The influence of the sires breed on the embryos gain and quality shows the table VI. The average total number of the flashed embryos obtained from the donors inseminated by the chosen sires were variable (from 6.60 ± 6.17 by the Blonde d'Aquitaine breed to 17.16 ± 6.66 by the Charolais breed). The most of the suitable embryos were obtained from the donors inseminated by the sires of the Hereford breed (7.15 ± 6.42).

There were ascertained the statistically significant differences in the influence of the sire on the average number of the total obtained ova; there was the conclusive difference between the sires of the Hereford breed

and the sires of the Blonde d'Aquitaine and the Charolais breed ($P < 0.05$).

The significant differences in the sires influence were ascertained also in the average number of the obtained suitable embryos; there was the conclusive difference between the sires of the Hereford breed and the sires of the Simmental and the Charolais breed ($P < 0.05$), furthermore, between the sires of the Simmental breed and the sires of the Blonde d'Aquitaine, Aberdeen Angus and Piemontese breed and between the sires of the Charolais and Blonde d'Aquitaine breed.

VI: *Influence of utilised genitors of chosen beef breeds on quality of produced embryos on transfer efficiency of fresh and frozen embryos*

Breed		obtained			
		suitable	degenerated	unfertilised	total
Hereford $^{a\,A}$	x	7.15 $^{d\,g}$	3.22	6.70	12.65 $^{c\,d}$
	s_x	6.42	3.51	4.89	7.50
	%				49.14
Aberdeen $^{b\,B}$ Angus	x	5.05	1.29	5.55	8.78
	s_x	4.16	0.70	3.70	6.52
	%				44.73
Blonde d´ Aquitaine ^{cC}	x	4.06	4.56 $^{F\,d}$	3.12	6.60
	s_x	2.91	7.28	2.50	6.17
	%				49.16
Charolaise $^{d\,D}$	x	5.47 ^{c}	2.52	5.13	17.16
	s_x	4.30	1.62	6.78	6.66
	%				48.65
Limousine $^{e\,E}$	x	3.33	2.25	4.50	6.71
	s_x	3.59	0.83	3.28	4.83
	%				42.55
Piemontese $^{f\,F}$	x	4.47	2.25	3.67	6.61
	s_x	3.37	1.70	3.08	4.22
	%				53.36
Simmental ^{gG}	x	6.42 ^{b,c,f}	2.00	4.67	7.52
	s_x	5.18	0.82	3.35	5.96
	%				55.96

a, b, c, d, e, f, g $P < 0.01$
A, B, C, D, E, F, G $P < 0.05$

VII: *Influence of particular breeds of utilised sires on survival of embryos (donors conception)*

Breed	Realised transfers	Number of conceptions	%
Hereford $^{a\,A}$	112	66	58.93 $^{D\,F}$
Aberdeen $^{b\,B}$ Angus	103	53	51.46 $^{c\,f}$
Blonde d´ Aquitaine $^{c\,C}$	342	111	32.46 $^{d\,f}$
Charolaise $^{d\,D}$	203	90	44.33
Limousine $^{e\,E}$	36	15	41.67
Piemontese $^{f\,F}$	811	360	44.39
Simmental $^{g\,G}$	134	85	63.43 ^{f}

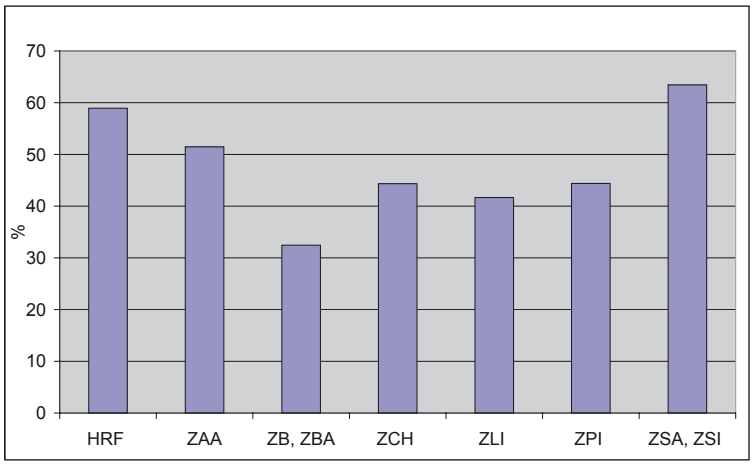
a, b, c, d, e, f, g, $P < 0.01$

There was also ascertained the conclusive influence of the sires breed on the number of the flashed degenerated embryos; the difference in the influence was highly conclusive between the sires of the Blonde d'Aquitaine and Piemontese breed ($P < 0.01$) and the conclusive difference was between the sires of the Blonde d'Aquitaine and Charolais breed ($P < 0.05$).

The influence of the sires breed on the number of the flushed unfertilised oocytes was insignificant.

Říha (1990, 1999), Kneissl (1990), Kadečková (1997) and Vaněk (1997) were studied on the smaller animal group the sire's influence on the embryos gain and their quality.

The influence of the sires (sires for insemination) on the embryos survival after the transfer was evaluated in seven breeds, totally in 1741 realised transfers (table VII, graph 5).



5: *Influence of particular breeds of utilised sires on survival of embryos (donors conception)*

It was evaluated the above-average conception rate – 63.43% in the Simmental breed. The lowest value of the conception was ascertained in recipients inseminated by the sire of the Blonde d'Aquitaine breed – 32.46%.

The highly significant differences in the sires influence on the conception rate of the donors were ascertained between the sires of the Hereford breed and the sires of the Charolais and Piemontese breed, furthermore, between the sires of the Aberdeen Angus breed and the sires of the Blonde d'Aquitaine breed ($P < 0.01$). The significant differences were also between the sires of the Aberdeen Angus and Piemontese breed; and between sires of the Blonde d'Aquitaine and sires of the Charolais and Piemontese breed; and between the sires of the Simmental and Piemontese breed.

The significant influences of the used sires on the embryos survival ascertained also Říha (1990, 1996, 1999), Kadečková (1997) and Vaněk (1997). Kneissl (1990) ascertained the highly significant influence of the embryo's sire on the survival of the embryos after the transfer in the range from 37.7% (REA 75) to 65.1% (ME 84). In the literature dominates the monitoring of the influence of the utilised sires in the milking population. The influence of the beef sires (Piemontese breed) studied Vaněk (1997), Říha (1999) on the less collection – 395 realised transfers.

SUMMARY

The aim of the study was evaluate the influence of season and sires (fathers) on profit and quality of embryos after superovulated treatment. Next we evaluated the conception rate after transfer of fresh and frozen embryos.

In 1991–2004 there were used the beef cattle.

Into the basic statistic evaluation it was involved 487 realised embryo recoveries (stimulations) and 2008 realised transfers in 1991–2004.

In the study there were monitored the beef cattle breeds – Charolais, Blonde d´Aquitaine, Aberdeen Angus, Limousine, Simmental, Piemontese, Hereford.

The superovulatory treatment was carried out mostly in the season of the reproductive breeding period. The non-chirurgical recovery of embryos was conducted every seventh day after the first insemination by means of the standard method.

The processing of the results was focused mainly on the evaluation of the donors superovulation quality and on the pregnancy ability of the recipients after the transfer of the fresh and the frozen embryos during 14 years (number of embryos in total, suitable embryos, degenerated embryos, unfertilised oocytes, percentage of the gravidity). Furthermore, it was aimed at the evaluation of the influence of the season and of the embryo sire on the superovulation efficiency and on the embryos survival after the transfer.

SOUHRN

Vliv sezony a otců na výsledky superovulace a přenosů embryí

Cílem práce bylo vyhodnotit vliv sezony a otce embrya na zisk a kvalitu embryí po superovulačním ošetření a zabřezávání po přenosu čerstvých a rozmrazených embryí ve sledovaných letech.
Byla sledována masná plemena skotu v průběhu let 1991–2004.
Do základního statistického vyhodnocení bylo zahrnuto 487 odběrů embryí a 2008 přenosů. Podklady pro výchozí databázi byly získány z protokolů o přenosech embryí přenosového týmu Výzkumného ústavu pro chov skotu, s. r. o. Rapotín, pod vedením prof. J. Říhy. Pro statistické hodnocení byla použita metoda nejmenších čtverců (LSM), pro statistické zpracování byl použit statistický balík programu Unistat 4.53.
Nejlepší výsledky byly dosahovány v létě (vhodných 3,68 ± 3,65; podíl vhodných z celkem vypláchnutých 59,3 %) a na podzim (vhodných 3,54 ± 3,80; podíl 54,48 %) a dobré výsledky, málo se lišící od výsledků v létě a na podzim byly dosaženy na jaře.
Průměrné počty celkem získaných vajíček od dárkyň připařovaných plemeníky vybraných plemen byly variabilní (od 6,60 ± 6,17 u plemene Blonde d´Aquitaine do 17,16 ± 6,66 u plemene Charolais). Nejvíce vhodných embryí bylo získáno od dárkyň připařovaných plemeníky plemene Hereford (7,15 ± 6,42). U plemeníků plemene Simmental bylo vyhodnoceno nadprůměrné zabřezávání – 63,43 %.

masná plemena skotu, dárkyně, příjemkyně, superovulace, přenos embryí, zabřezávání, plemeník, sezona

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