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Department of Horse Breeding
University of Life Sciences in Poznań, Wołyńska 33
e-mail: aposlusz1@wp.pl

ANNA NOWICKA-POSŁUSZNA, KLAUDIA ZIOMKO

Stereotypies and undesirable behaviours in horses used for sports and leisure activities

Występowanie stereotypii i zachowań niepożądanych u koni użytkowanych w sporcie i rekreacji

Summary. The paper presents the results of observations of stereotypies and undesirable behaviors in 128 horses from the following training facilities: Stud State in Gniezno (37 horses), Racot Stad Farm (33 horses) and Poznań-Wola Horse Ride Training Center (58 horses). Different types of horse uses were included into the analysis: sports (jumping), eventing, driving and leisure activities, also their influence on the undesirable behaviors and stereotypies in horses was taken into account. The latter were divided into the following groups: vacuum activities, motoric stereotypies and oral stereotypies. Intensity of those behaviors was also determined. Statistical analyses did not confirm that the occurrence of stereotypies was determined by particular type of use. The highest number of undesirable behaviors in total was observed in jumping horses (41.06%).In this group, the highest number of horses displayed motor stereotypies (48.85 %) and vacuum activities (43.06 %). The highest number of individuals with the most intensive reaction (3 pts) was observed among driving horses (46.15%).

Key words: stereotypies, vacuum activities, types of use

INTRODUCTION

Stereotypies are repetitive, seemingly purposeless movements performed according to a given pattern, which deviate from the behavioral scheme adopted for a given species and may be autodestructive [Walendowska *et al.* 1991]. According to Górecka *et al.* [2006] adverse environmental factors are always present in the life of animals. However, in the course of evolution they developed behaviors that allow them to deal with stress.

According to Mason *et al*. [2006], these behaviors include: object biting, malice manifested by biting or bucking, crib biting, wall hitting, head and neck swinging as well as weaving. Vices are behaviors resulting from inappropriate handling of horses, espe-

cially young ones. They are adverse conditioned reflexes. They are not present in foals but appear in horses that start being used for work. These include: bucking, biting, rearing, refusal to pull, reluctance to give limbs, resistance to mounting. The author also suggests that such behaviors may have a genetic background as they were observed within certain families or individuals bred of given reproductors. Minero *et al.* [2009] present a list of behavioral stereotypies in horses. These include: wood chewing, playing with tongue, object licking, crib biting, aerophagy, box walking, weaving, pawing, tail-waving, door-kicking, wall-kicking, rubbing, biting other horses, head jerking, head swinging, head shaking head nodding, head stretching and pinning ears back. According to Bochman *et al.* [2003], horses may display behaviors as a response to unfavorable living conditions. Physical or emotional limitations depend on the type of the work done by the horse. Also, inconsistent signals from riders may cause frustration and neuroses in horses, and this in turn may result in stereotypies. However, it is suggested that these behaviors are a way of dealing with stress [Hausberger *et al.* 2007]. Stereotypies are detrimental to the health of the animals and decrease their efficiency. Some researchers propose that behaviors such as crate grasping, crib biting, weaving and box walking are displayed by 0.4–5% of horses, whereas wood chewing by 20–30%. In the population of domesticated horses, stereotypies occur in 26% of the animals. In wild horses, in turn, the frequency of stereotypies is considerably higher reaching approx. 40% [Luescher *et al.* 1998, Nagy *et al.* 2008].

MATERIALS AND METHODS

Test material comprised 128 horses of different breeds, sexes and age, used both in sports and leisure activities. The analyzed horses were kept in the following facilities: Stud State in Gniezno (37 horses), Racot Stud Farm (33 horses) and Poznań-Wola Horse Ride Training Center (58 horses). Occurrence of stereotypies was determined using the nomenclature and division by Dietz *et al.* [2008]. Stereotypies were divided into the following groups: vacuum activities, motoric stereotypies and oral stereotypies. The following terms referring to stereotypy and undesirable behaviors of horses were observed and used in the study: Vacuum activities: kicking doors/box walls (hitting the door or wall of the box with forelegs or hind legs), jumping/rearing in the box (jumping nervously on 4 legs or standing on two forelegs with hind legs off the ground); attacking neighbors (showing aggression towards horses in neighboring boxes expressed by pinning ears back, biting, grasping box crate with teeth, wall kicking and other threatening movements). Motor stereotypies: pawing (hitting the ground or digging in bedding with the front hoof), circus movement (walking around box/paddock, nervous trotting or even galloping along the walls of box or paddock) head shaking (activity involving nervous, up and down or round head movements when riding, that can also be related to wresting the rein from the rider), weaving (swaying side to side accompanied by head and neck back and forth movements). Activities related to eating (oral stereotypies): spilling forage (activity involving shaking head when eating from the crib, nipping (grabbing metal or wooden elements of the box and grinding them with teeth up and down or sideways), sticking out tongue/playing with tongue/licking (when riding or resting in the stable, subconsciously sticking out tongue, most often sideways). The intensity of the stereotypic activities and other untypical activities was defined by a 3-point scale: 1 point – intense reaction, 2 pts – moderately intense reaction, 3 pts – very intense reaction.

SAS v. 9.2 (2011) software was used for statistical analysis. In order to analyze the influence of the type of horse use on the occurrence of stereotypy and other untypical behaviors, the FREQ procedure was applied with precise Fisher test for r x c tables and V_{Cramer} coefficient.

RESULTS AND DISCUSSION

The highest total number of undesirable behaviors (Tab. 1) was observed in jumping horses (41.06%.) Motoric stereotypies (48.85%) and vacuum activities (43.06%) were predominant. The lowest number of such activities was observed in the group of eventing horses (2.03%). In the group of horses used for leisure activities, the majority (54.17%) was

Table 1. Stereotypies in horses used for sport and recreation
Tabela 1. Stereotypy u koni użytkowanych w sporcie i rekreacji

Stereotypies Stereotypy				Total Razem	Stereotypic behaviour Zachowania stereotypowe			Total Razem
Type of use Użytkowanie		no nie	yes tak		vacuum activities działanie upustowe	motoric motoryczne	oral oralne	
Eventing WKKW	n	1	5	6	2	1	2	5
	% whole % całości	0.41	2.03	2.44	0.90	0.45	0.90	2.25
	% verse % wiersza	16.67	83.33		40.00	20.00	40.00	
	% column % kolumny	4.17	2.25		2.78	1.03	3.77	
Recreation Rekreacja	n	13	91	104	27	39	25	91
	% whole % całości	5.28	36.99	42.28	12.16	17.57	11.26	40.99
	% verse % wiersza	12.50	87.50		29.67	42.86	27.47	
	% column % kolumny	54.17	40.99		37.50	40.21	47.17	
Jumping Skoki	n	9	101	110	31	47	23	101
	% whole % całości	3.66	41.06	44.72	13.96	21.17	10.36	45.50
	% verse % wiersza	8.18	91.82		30.69	46.53	22.77	
	% column % kolumny	37.50	45.50		43.06	48.45	43.40	
Driving Powożenie	n	1	25	26	12	10	3	25
	% whole % całości	0.41	10.16	10.57	5.41	4.50	1.35	11.26
	% verse % wiersza	3.85	96.15		48.00	40.00	12.00	
	% column % kolumny	4.17	11.26		16.67	10.31	5.66	
Total Razem	n	24	222	246	72	97	53	222
	% all % całości	9.76	90.24	100.00	32.43	43.69	23.87	100.00

Table 1a. Stereotypies
Tabela 1a. Stereotypy

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	2.5559	0.4653
V cramera		0.1019	

Test of Fisher Pr. <= P0.4008
Test Fishera

Table 1b. Stereotypic behaviour
Tabela 1b. Zachowania stereotypowe

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	6	5.7523	0.4515
V cramera		0.1138	

Test of Fisher pr. <= P0.4268
Test Fishera

Table 2. Vacuum activities in horses used for sport and recreation
Tabela 2. Działania upustowe u koni użytkowanych w sporcie i rekreacji

Użytkowanie Type of use		Kicking Kopanie		Total Razem	Jumping – rearing Skoki – stawanie dęba		Total Razem	Attacking neighbors Atakowanie sąsiada		Total Razem
		no nie	Yes tak		no nie	yes tak		no nie	yes tak	
Eventing WKKW	n	4	1	5	5	-	5	4	1	5
	% whole % całości	3.13	0.78	3.91	3.91	-	3.91	3.13	0.78	3.91
	% verse % wiersza	80.00	20.00		100.00	-		80.00	20.00	
	% column % kolumny	4.65	2.38		4.24	-		3.51	7.14	
Recreation Rekreacja	n	40	16	56	53	3	56	51	5	56
	% whole % całości	31.25	12.50	43.75	41.41	2.34	43.75	39.84	3.91	43.75
	% verse % wiersza	71.43	28.57		94.64	5.36		91.07	8.93	
	% column % kolumny	46.51	38.10		44.92	30.00		44.74	35.71	
Jumping Skoki	n	37	18	55	50	5	55	50	5	55
	% whole % całości	28.91	14.06	42.97	39.06	3.91	42.97	39.06	3.91	42.97
	% verse % wiersza	67.27	32.73		90.91	9.09		90.91	9.09	
	% column % kolumny	43.02	42.86		42.37	50.00		43.86	35.71	
Driving Powożenie	n	5	7	12	10	2	12	9	3	12
	% whole % całości	3.91	5.47	9.38	7.81	1.56	9.38	7.03	2.34	9.38
	% verse % wiersza	41.67	58.33		83.33	16.67		75.00	25.00	
	% column % kolumny	5.81	16.67		8.47	20.00		7.89	21.43	
Total Razem	n	86	42	128	118	10	128	114	14	128
	% all % całość	67.19	32.81	100.00	92.19	7.81	100.00	89.06	10.94	100.00

Table 2a. Kicking
Tabela 2a. Kopanie

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	4.3746	0.2238
V cramera		0.1849	

Test of Fisher Pr. <= P 0.2434
Test Fishera

Table 2b. Jumping – rearing
Tabela 2b. Skoki – stawanie dęba

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	2.3235	0.5080
V cramera		0.1347	

Test of FisherPpr. <= P 0.4660
Test Fishera

Table 2c. Attacking neighbors
Tabela 2c. Atakowanie sąsiada

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	3.2822	0.3501
V cramera		0.1601	

Test of Fisher Pr. <= P 0.2699
Test Fishera

characterized by lack of undesirable behaviors. Oral (47.17%) and motoric (40.21%) stereotypies were observed in the remaining horses. Vacuum activities (Tab. 2) such as kicking, bucking and attacking neighbors most often occurred in jumping horses (42.86%); bucking or rearing (50.00%) and attacking neighbor (37.71%) are most commonly observed stereotypies in this group. Nagy *et al.* [2008] suggest that stereotypic behaviour can be inducted in a vulnerable individual in e stressful environment. Among the meteoric stereotypes (pawing, circus movement, head shaking, weaving), circus movement were observed in horses used for recreation (52.78%) and pawing in horses used for jumping (50.00%). Head shaking was also the most common stereotypy in this group (45.00%). Waving was observed only in two horses (Tab. 3). Oral stereotypies were significantly more common among the examined horses (spilling forage, nipping, licking/sticking out tongue), among which nippin was most frequent (56% in jumping horses) and licking (65% in recreation horses) (Tab. 4). Wickens *et al.* [2010] claimed that thoroughbred and warmbloods and the horse to be involved in high performance activities are more likely to crib-bite Diverse intensity of the stereotypic and undesirable reactions was observed in the study. Most animals with the most intense reactions (3 points) were observed in driving horses (46.15%) (Tab. 5, Tab. 5a). The V_{Cramer} coefficient presented in this study indicated low correlation between the examined factors. In all cases, Fishers exact test shows that the correlations between the type of use and occurrence of the above stereotypies is insignificant (Tab. 1a, Tab. 1b, Tab. 2a, Tab. 2b, Tab. 2c, Tab. 3c, Tab. 3b, Tab. 3c, Tab. 4a, Tab. 4b, Tab. 4c).

Table 3. Motor stereotypies in horses used for sport and recreation
Tabela 3. Stereotypie motoryczne u koni użytkowanych w sporcie i rekreacji

Type of use Użytkowanie		Pawing Grzebanie nogą		Total Razem	Circus moveme Ruchy manežowe		Total Razem	Head shaking Potrząsanie głową		Total Razem	Weaving Tkanie		Total Razem
		no nie	yes tak		no nie	yes tak		no nie	yes tak		no nie	yes tak	
Eventing WKKW	n	4	1	5	5	-	5	5	-	5	5	-	5
	% whole % całości	3.13	0.78	3.91	3.91	-	3.91	3.91	-	3.91	3.91	-	3.91
	% verse % wiersza	80.00	20.00		100.00	-		100.00	-		100.00	-	
	% column % kolumny	4.35	2.78		5.43	-		4.63	-		3.97	-	
Recreation Rekreacja	n	41	15	56	37	19	56	50	6	56	56	-	56
	% whole % całości	32.03	11.72	43.75	28.91	14.84	43.75	39.06	4.69	43.75	43.75	-	43.75
	% verse % wiersza	73.21	26.79		66.07	33.93		89.29	10.71		100.00	-	
	% column % kolumny	44.57	41.67		40.22	52.78		46.30	30.00		44.44	-	
Jumping Skoki	n	37	18	55	41	14	55	46	9	55	53	2	55
	% whole % całości	28.91	14.06	42.97	32.03	10.94	42.97	35.94	7.03	42.97	41.41	1.56	42.97
	% verse % wiersza	67.27	32.73		74.55	25.45		83.64	16.36		96.36	3.64	
	% column % kolumny	40.22	50.00		44.57	38.89		42.59	45.00		42.06	100.00	
Driving Powożenie	n	10	2	12	9	3	12	7	5	12	12	-	12
	% whole % całości	7.81	1.56	9.38	7.03	2.34	9.38	5.47	3.91	9.38	9.38	-	9.38
	% verse % wiersza	83.33	16.67		75.00	25.00		58.33	41.67		100.00	-	
	% column % kolumny	10.87	5.56		9.78	8.33		6.48	25.00		9.52	-	
Total Razem	n	92	36	128	92	36	128	108	20	128	126	2	128
	% all % całość	71.88	28.13	100.00	71.88	28.13	100.00	84.38	15.63	100.00	98.44	1.56	100.00

Table 3a. Pawing
Tabela 3a. Grzebanie nogą

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	1.5686	0.6665
V cramera		0.1107	

Test of Fisher Pr. <= P 0.7542
Test Fishera

Table 3b. Cirrus movement
Tabela 3b. Ruchy manežowe

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	3.1416	0.3703
V cramera		0.1567	

Test of Fisher Pr. <= P 0.4813
Test Fishera

Table 3c. Head shaking
Tabela 3c. Potrząsanie głową

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	8.1459	0.0431
V cramera		0.2523	

Test of Fisher Pr. <= P 0.0667
Test Fishera

Table 3d. Weaving
Tabela 3d. Tkanie

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	2.6967	0.4408
V cramera		0.1451	

Test of Fisher Pr. <= P 0.4316
Test Fishera

Table 4. Oral sterotypies in horses used for sport and recreation
Tabela 4. Stereotypie oralne u koni użytkowanych w sporcie i rekreacji

Użytkowanie Type of use		Spilling forage Wysypywanie obroku		Total Razem	Nipping Heblowanie		Total Razem	Licking Lizawość		Total Razem
		no nie	yes tak		no nie	yes tak		no nie	yes tak	
Eventing WKKW	n	5	-	5	4	1	5	4	1	5
	% whole % całości	3.94	-	3.94	3.13	0.78	3.91	3.13	0.78	3.91
	% verse % wiersza	100.00	-		80.00	20.00		80.00	20.00	
	% column % kolumny	4.13	-		3.88	4.00		3.70	5.00	
Recreation Rekreacja	n	53	3	56	47	9	56	43	13	56
	% whole % całości	41.73	2.36	44.09	36.72	7.03	43.75	33.59	10.16	43.75
	% verse % wiersza	94.64	5.36		83.93	16.07		76.79	23.21	
	% column % kolumny	43.80	50.00		45.63	36.00		39.81	65.00	
Jumping Skoki	n	52	3	55	41	14	55	51	4	55
	% whole % całości	40.94	2.36	43.31	32.03	10.94	42.97	39.84	3.13	42.97
	% verse % wiersza	94.55	5.45		74.55	25.45		92.73	7.27	
	% column % kolumny	42.98	50.00		39.81	56.00		47.22	20.00	
Driving Powożenie	n	11	-	11	11	1	12	10	2	12
	% whole % całości	8.66	-	8.66	8.59	0.78	9.38	7.81	1.56	9.38
	% verse % wiersza	100.00	-		91.67	8.33		83.33	16.67	
	% column % kolumny	9.09	-		10.68	4.00		9.26	10.00	
Total Razem	n	121	6	127	103	25	128	108	20	128
	% all % całość	95.28	4.72	100.00	80.47	19.53	100.00	84.38	15.63	100.00

Table 4a. Spillig forage
Tabela 4a. Wysypywanie obroku

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	0.9083	0.8234
V cramera		0.0846	

Test of Fisher Pr. <= P 0.9224
Test Fishera

Table 4b. Nipping
Tabela 4b. Heblowanie

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	2.6124	0.4553
V cramera		0.1429	

Test of Fisher Pr. <= P 0.4278
Test Fishera

Table 4c. Licking
Tabela 4c. Lizawość

Statistic Statystyka	St. Sw.	Value Wartość	Probability Prawdopodobieństwo
Chi-kwadrat	3	5.4393	0.1423
V cramera		0.2061	

Test of Fisher Pr. <= P 0.0922
Test Fishera

Table 5. The intensity of the stereotypic in horses used for sport and recreation
Tabela 5. Natężenie występowania stereotypii u koni użytkowanych w sporcie i rekreacji

Użytkowanie Type of use		Intensity of the stereotypic Natężenie stereotypii				Total Razem
		0	1	2	3	
Eventing WKKW	n	1	3	-	2	6
	% whole % całości	0.41	1.22	-	0.81	2.44
	% verse % wiersza	16.67	50.00	-	33.33	
	% column % kolumny	4.17	4.69	-	3.03	
Recreation Rekreacja	n	13	35	38	18	104
	% whole % całości	5.28	14.23	15.45	7.32	42.28
	% verse % wiersza	12.50	33.65	36.54	17.31	
	% column % kolumny	54.17	54.69	41.30	27.27	
Jumping Skoki	n	9	23	44	34	110
	% whole % całości	3.66	9.35	17.89	13.82	44.72
	% verse % wiersza	8.18	20.91	40.00	30.91	
	% column % kolumny	37.50	35.94	47.83	51.52	
Driving Powożenie	n	1	3	10	12	26
	% whole % całości	0.41	1.22	4.07	4.88	10.57
	% verse % wiersza	3.85	11.54	38.46	46.15	
	% column % kolumny	4.17	4.69	10.87	18.18	
Total Razem	n	24	64	92	66	246
	% all % całość	9.76	26.02	37.40	26.83	100.00

Table 5a. Intensity of the stereotypic
Tabela 5a. Natężenie stereotypii

Statistic Statystyka	St. Sw.	Value War-tość	Probability Prawdopodobieństwo
Chi-kwadrat	9	19.5443	0.0209
V cramera		0.1627	

Test of Fisher Pr. <= P 0.0097
Test Fishera

CONCLUSION

Statistical analysis did not confirm the influence of the type of use of the horse on the occurrence of stereotypic activities. However, the type of use affects the behavior of horses. It is believed that stereotypic activities are most common in horses taking part in high-class dressage competition. Horses used for leisure activities also show numerous undesirable behaviors, which is related to the fact that they work with numerous different riders some of whom are not ready for contact with horses. It is not conducive to the psychic condition of the animals [Walendowska *et al.* 1991] and hence may result in the occurrence of undesirable activities. The presented study showed that jumping horses were observed to show the highest number of undesirable behaviors of various forms. The study of [Normando *et al*. 2002] shows that jumping horses have more than one behavioral problem and are more aggressive towards other horses. According to the authors, optimum maintenance conditions are of significant importance in fighting stereotypies and untypical forms of behavior.

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Streszczenie. W pracy przedstawiono wyniki obserwacji stereotypii i niepożądanych zachowań 128 koni znajdujących się w ośrodkach hodowlanych: w Stadzie Ogierów w Gnieźnie (37 szt.) i Stadninie Koni Racot (33 szt.) oraz ośrodku jeździeckim Centrum Wyszkolenia Jeździeckiego Poznań-Wola (58 szt.). Uwzględniono różne formy użytkowania badanych koni – w sporcie (skoki przez przeszkody, wszechstronny konkurs konia wierzchowego, powożene zaprzęgami) oraz w rekreacji – a także ich wpływ na zachowania niepożądane i stereotypie, które podzielono na następujące grupy: działania upustowe, stereotypie motoryczne i stereotypie oralne. Określono również intensywność występowania tych zachowań. Badania statystyczne nie potwierdziły wpływu sposobów użytkowania na występowanie stereotypii. Najwięcej niepożądanych zachowań ogółem zaobserwowano u koni użytkowanych skokowo (41,06%). Wśród nich najwięcej było koni odznaczających się stereotypiami motorycznymi (48,85%) i działaniami upustowymi (43,06%). Najwięcej osobników z najintensywniejszą reakcją (3 pkt) zanotowano u koni użytkowanych zaprzęgowo (46,15%).

Słowa kluczowe: stereotypie, działania upustowe, formy użytkowania