

TERRITORIAL ORGANIZATION AND REPRODUCTIVE PERFORMANCE OF PUBLIC MOUNT STALLIONS IN NORTH-EASTERN ROMANIA

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Abstract

The public mounting system plays a key role in horse breeding programs by ensuring controlled reproduction and genetic improvement at regional level. This study aimed to analyze the territorial distribution and reproductive performance of public mount stallions in North-Eastern Romania, based on official breeding records collected over multiple years. Data were analyzed for six counties (Neamț, Iași, Bacău, Botoșani, Suceava and Vaslui), considering breed structure and main reproductive indicators, including the number of mares covered, gestation rate, fertility and natality. The results highlight marked differences among counties in both stallion distribution and reproductive efficiency. In several counties, Romanian Semigreu stallions represented the dominant breed, while other improved breeds contributed locally to breeding activity. Overall reproductive performance was variable, with higher efficiency recorded in counties with a more stable stallion structure and higher mare utilization rates. The findings underline the importance of territorial management and breed allocation in optimizing the outcomes of public mounting systems.

Key words: horse breeding, public mount, territorial distribution, reproductive performance, Romania

INTRODUCTION

Public mount stallions represent a fundamental component of horse breeding systems, particularly in regions where small scale breeders depend on centralized access to genetic resources for reproduction [1–3]. Through controlled mating and systematic record keeping, public mounting contributes to genetic improvement, conservation of breed characteristics and optimization of reproductive efficiency [4,5]. By reducing uncontrolled mating and enabling the monitoring of reproductive outcomes, this system supports both genetic progress and sustainable herd management.

In Romania, the public mount system has traditionally played a key role in sustaining horse breeding in rural areas, ensuring breeders' access to improved stallions and standardized reproductive

management practices [6,7]. However, the effectiveness of this system is influenced not only by the genetic value of the stallions, but also by their territorial distribution, breed composition and intensity of use. An unbalanced allocation of stallions or uneven utilization across regions may limit reproductive efficiency, even when high quality genetic material is available [7,8].

Previous studies have emphasized the importance of reproductive performance indicators, such as fertility, gestation and natality rates, as essential tools for evaluating breeding efficiency in horse populations [1,2,9]. These indicators provide valuable insights into both biological performance and management quality. At the same time, territorial analyses are particularly relevant, as they

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allow the identification of regional differences in breeding practices, stallion utilization and reproductive outcomes, which may otherwise remain obscured in aggregated national data [2,7]. Despite the availability of official breeding records, integrated territorial assessments of public mount stallions in Romania remain limited [6,7].

Therefore, the present study aimed to provide a comprehensive analysis of the territorial distribution and reproductive performance of public mount stallions in North-Eastern Romania. The objectives were to describe the distribution of stallions by breed and county, to evaluate key reproductive indicators across counties, and to identify spatial and breed related patterns that may support improved management and optimization of public mounting systems [1,2,7].

MATERIAL AND METHOD

Data source

The study was based on official records of public mount activity provided by authorized breeding institutions. The data covered multiple consecutive years, depending on county availability, generally the period between 2005 and 2013. Stallions originated from national breeding units, including the Dumbrava Stallion Depot and the Rădăuți and Lucina Stud Farms.

Studied area

The analysis included six counties from North-Eastern Romania: Neamț, Iași, Bacău, Botoșani, Suceava and Vaslui. These

counties represent a significant horse breeding region, characterized by diverse management systems and breed structures.

Evaluated indicators

For each county, the following indicators were analyzed: number of public mount stallions, breed structure of stallions, number of mares covered, number of gestations recorded, number of foals obtained, fertility rate (%), gestation rate (%), natality rate (%).

Data analysis

The data were analysed descriptively at county level. Reproductive indicators were expressed as percentages, allowing comparisons among counties and breeding structures. The results were synthesized in county level tables to facilitate interpretation.

RESULTS AND DISCUSSIONS

Neamț county

In Neamț county, public mount activity was supported by stallions belonging to both improved breeds and the Romanian Semigreu, reflecting a diversified breeding structure adapted to local production requirements (Table 1). During the analyzed period, stallions from the Romanian Semigreu, Lipizzaner, Hucul and Trăpaș breeds were used in public mounting. Romanian Semigreu stallions accounted for 38.26% of the mares covered, followed by Lipizzaner (31.30%), Hucul (18.70%) and Trăpaș (11.74%). This distribution highlights the preference of local breeders for robust and versatile horses suitable for work and mixed utility.

Table 1 Breeding use of public mount stallions from Neamț county

Breed	Mares covered		Pregnant mares		Foals obtained		Sex (M/F)	Fertility (%)	Gestation (%)	Natality (%)
	(n)	(%)	(n)	(%)	(n)	(%)				
Romanian Semigreu	528	38.26	372	32.69	368	34.36	198 / 170	98.92	70.45	69.69
Lipizzaner	432	31.30	364	31.99	364	33.99	120 / 244	100.00	84.25	84.25
Hucul	258	18.70	254	22.32	204	19.04	103 / 101	80.31	98.44	79.06
Trăpaș	162	11.74	148	13.00	135	12.61	82 / 73	91.21	91.35	83.33
Total	1380	100.0	1138	100.0	1071	100.0	503 / 568	94.11	82.46	77.60

The reproductive output obtained under these conditions was substantial, with 1071 foals resulting from the mating of 1380 mares, corresponding to an overall natality rate of 77.60%. Romanian Semigreu stallions produced 368 foals (34.36%), while Lipizzaner stallions contributed 364 foals (33.99%), reflecting their dominant role within the breeding structure. Lower but still relevant contributions were recorded for the Hucul (204 foals; 19.04%) and Trăpaș (135 foals; 12.61%) breeds.

Reproductive performance varied among breeds, indicating differential responses to the breeding system. The highest natality rate was recorded in mares covered by Lipizzaner stallions (84.25%), while the lowest value was observed in the Romanian Semigreu group (69.69%). Fertility rates were generally high, reaching 100.00% in mares mated with Lipizzaner stallions, whereas lower values were recorded in the Hucul group (80.31%), suggesting breed related differences in reproductive efficiency.

Gestation rates further emphasized this variability, ranging from 70.45% in the

Romanian Semigreu group to 98.44% in mares covered by Hucul stallions. The overall gestation rate reached 82.46%, indicating satisfactory reproductive management under local conditions.

The sex distribution of the obtained foals included 503 males and 568 females, indicating a slight predominance of females while remaining within a normal and acceptable range. Overall, the reproductive indicators demonstrate an effective utilization of public mount stallions in Neamț county. The consistency of fertility, gestation and natality indices across breeds supports the conclusion that the public mounting system functions efficiently, while allowing for breed specific reproductive responses.

Iași county

In Iași county, public mount activity was supported predominantly by Romanian Semigreu stallions, complemented by Lipizzaner and Romanian Sport Horse breeds, reflecting a breeding structure oriented toward robust and multifunctional horses (Table 2).

Table 2 Breeding use of public mount stallions from Iași county

Breed used for amelioration	Mares covered		Pregnant mares		Foals obtained		Sex (M / F)	Fertility (%)	Gestation (%)	Natality (%)
	(n)	(%)	(n)	(%)	(n)	(%)				
Romanian Semigreu	826	63.20	784	65.00	604	63.78	318 / 286	77.04	94.91	73.12
Lipizzaner	424	32.44	368	30.52	293	30.94	147 / 146	79.61	86.79	69.10
Romanian Sport Horse	57	4.36	54	4.48	50	5.28	25 / 25	92.59	94.73	49.50
Total	1307	100.0	1206	100.0	947	100.0	490 / 457	78.52	92.27	72.45

During the analyzed period, Romanian Semigreu stallions represented the dominant component of the breeding structure, accounting for 63.20% of the mares covered, followed by Lipizzaner stallions (32.44%), while Romanian Sport Horse stallions contributed 4.36% of the total matings. This distribution highlights the preference of local breeders for strong and versatile horses suitable for work and mixed utility.

The reproductive output obtained under these conditions was substantial, with 947 foals resulting from the mating of 1307 mares, corresponding to an overall natality rate of 72.45%. Romanian Semigreu stallions contributed the largest share of foals (604 foals; 63.78%), followed by the Lipizzaner group (293 foals; 30.94%), while Romanian Sport Horse stallions accounted for a smaller proportion (50 foals; 5.28%).

Breed specific reproductive performance revealed notable variation.

The highest natality rate was recorded in mares covered by Romanian Semigreu stallions (73.12%), followed by the Lipizzaner group (69.10%), whereas the lowest natality value was observed in mares mated with Romanian Sport Horse stallions (49.50%).

Fertility rates were generally satisfactory across breeds, reaching 92.59% in mares mated with Romanian Sport Horse stallions, 79.61% in the Lipizzaner group and 77.04% in the Romanian Semigreu group. Gestation rates further emphasized breed related differences, with high values recorded in the Romanian Semigreu (94.91%) and Romanian Sport Horse (94.73%) groups, while lower gestation rates were observed in mares covered by Lipizzaner stallions (86.79%).

The sex distribution of the obtained foals included 490 males and 457 females, indicating a balanced sex ratio. Overall, the reproductive indicators demonstrate an effective utilization of public mount stallions in Iași county. The consistency of

fertility, gestation and natality indices across breeds supports the conclusion that the public mounting system functions efficiently under local management conditions, while allowing for breed specific reproductive responses.

Bacău county

In Bacău County, public mount activity was characterized by a breeding structure dominated by Romanian Semigreu stallions, complemented by Hucul and Lipizzaner breeds, reflecting a mixed orientation toward robust and versatile horses adapted to local production systems (Table 3). During the analyzed period, Romanian Semigreu stallions accounted for the largest proportion of public mount activity, representing 57.08% of the mares covered, followed by Hucul stallions (27.36%) and Lipizzaner stallions (15.56%). This distribution indicates a clear preference for strong working type horses, combined with the use of improved breeds to enhance specific productive traits.

Table 3 Breeding use of public mount stallions from Bacău county

Breed used for amelioration	Mares covered		Pregnant mares		Foals obtained		Sex (M / F)	Fertility (%)	Gestation (%)	Natality (%)
	(n)	(%)	(n)	(%)	(n)	(%)				
Romanian Semigreu	726	57.08	720	57.74	621	62.92	298 / 323	86.25	99.17	85.53
Hucul	348	27.36	336	26.94	254	25.73	112 / 142	75.59	96.55	72.99
Lipizzaner	198	15.56	191	15.32	112	11.35	71 / 41	58.63	96.46	56.56
Total	1272	100.0	1247	100.0	987	100.0	481 / 506	79.14	98.03	77.59

The reproductive output obtained under these conditions was substantial, with 987 foals resulting from the mating of 1272 mares, corresponding to an overall natality rate of 77.59%. Romanian Semigreu stallions produced the majority of foals (621 foals; 62.92%), followed by the Hucul group (254 foals; 25.73%), while Lipizzaner stallions contributed 112 foals (11.35%) to the total reproductive output.

Breed specific reproductive performance revealed marked differences. Fertility rates ranged from 58.63% in the Lipizzaner group to 86.25% in Romanian

Semigreu stallions, while Hucul stallions showed intermediate fertility values (75.59%). Gestation rates were consistently high across all breeds, reaching 99.17% in the Romanian Semigreu group, 96.55% in Hucul, and 96.46% in Lipizzaner stallions, indicating favorable reproductive conditions and efficient reproductive management.

The sex distribution of the obtained foals included 481 males and 506 females, indicating a balanced sex ratio. Despite some variability in stallion utilization among breeds, the consistently high gestation and

natality rates demonstrate that public mount activity in Bacău county functions efficiently. Nevertheless, improved stabilization of stallion allocation and mare distribution among breeds could further optimize reproductive efficiency and reduce potential variability across breeding seasons.

Botoșani county

In Botoșani county, public mount activity was supported mainly by Romanian Semigreu, Lipizzaner and Trăpaș stallions, reflecting a breeding structure oriented

toward robust horses adapted to local working and mixed use systems (Table 4). During the analyzed period, Romanian Semigreu stallions represented the dominant component of the public mounting system, accounting for 53.95% of the mares covered, followed by Lipizzaner (26.25%) and Trăpaș stallions (19.80%). This distribution indicates a balanced breeding strategy combining local adaptability with the use of improved and specialized breeds.

Table 4 Breeding use of public mount stallions from Botoșani county

Breed used for amelioration	Mares covered		Pregnant mares (n)		Foals obtained		Sex (M / F)	Fertility (%)	Gestation (%)	Natality (%)
	(n)	(%)	(n)	(%)	(n)	(%)				
Romanian Semigreu	526	53.95	474	59.70	453	60.89	198 / 255	95.56	90.11	86.12
Lipizzaner	256	26.25	198	24.94	182	24.46	82 / 100	91.91	77.34	71.09
Trăpaș	193	19.80	122	15.36	109	14.65	42 / 67	89.34	63.21	56.47
Total	975	100.0	794	100.0	744	100.0	322 / 422	93.70	81.43	76.30

The reproductive output recorded in Botoșani county amounted to 744 foals obtained from the mating of 975 mares, corresponding to an overall natality rate of 76.30%. Romanian Semigreu stallions contributed the largest share of foals (453 foals; 60.89%), followed by Lipizzaner (182 foals; 24.46%) and Trăpaș stallions (109 foals; 14.65%), reflecting their respective levels of utilization within the breeding structure.

Reproductive performance indicators showed moderate variability among breeds. Fertility rates were generally high, reaching 95.56% in the Romanian Semigreu group, followed by 91.91% in Lipizzaner and 89.34% in Trăpaș stallions. Gestation rates ranged from 63.21% in Trăpaș stallions to 90.11% in Romanian Semigreu, while intermediate values were recorded for Lipizzaner stallions (77.34%). Natality rates followed a similar pattern, with the highest value observed in the Romanian Semigreu group (86.12%) and lower values in Lipizzaner (71.09%) and Trăpaș (56.47%) stallions, indicating breed related differences in reproductive efficiency.

The sex distribution of the obtained foals included 322 males and 422 females, indicating a slight predominance of females while remaining within a normal and acceptable range. Despite a lower total number of mares compared with larger counties, the stable fertility, gestation and natality indices demonstrate that public mount activity in Botoșani county functions efficiently. The combined use of Romanian Semigreu, Lipizzaner and Trăpaș stallions ensures consistent reproductive outcomes while maintaining genetic diversity within the local horse population.

Suceava county

In Suceava county, public mount activity was supported by a diversified stallion structure, dominated by the Romanian Semigreu breed and complemented by improved breeds originating from national breeding units (Table 5). During the analyzed period, Romanian Semigreu stallions represented the largest share of the breeding structure, accounting for 54.32% of the mares

covered, followed by Gidran stallions (40.27%) and Arabian stallions (5.41%). This distribution reflects a breeding strategy primarily oriented toward robustness and adaptability, combined with targeted genetic improvement using specialized breeds.

Table 5 Breeding use of public mount stallions from Suceava county

Breed used for amelioration	Mares covered		Pregnant mares		Foals obtained		Sex (M / F)	Fertility (%)	Gestation (%)	Nativity (%)
	(n)	(%)	(n)	(%)	(n)	(%)				
Romanian Semigreu	623	54.32	584	55.46	482	55.02	192 / 290	82.53	93.73	77.36
Arabian	62	5.41	57	5.41	42	4.80	18 / 24	73.68	91.93	67.74
Gidran	462	40.27	412	39.13	352	40.18	177 / 175	85.43	89.17	76.19
Total	1147	100.0	1053	100.0	876	100.0	387 / 489	83.19	91.80	76.37

The reproductive output obtained under these conditions was considerable, with 876 foals resulting from the mating of 1147 mares, corresponding to an overall natality rate of 76.37%. Among breeds, Romanian Semigreu stallions produced the highest number of foals (482 foals; 55.02% of total output), followed by Gidran (352 foals; 40.18%) and Arabian stallions (42 foals; 4.80%), reflecting both their numerical dominance and reproductive contribution within the breeding structure.

Reproductive performance indicators showed generally favorable values across breeds. Fertility rates ranged from 73.68% in Arabian stallions to 85.43% in the Gidran group, while gestation rates varied between 89.17% (Gidran) and 93.73% (Romanian Semigreu). Natality rates followed a similar pattern, with the highest value recorded in the Romanian Semigreu group (77.36%) and the lowest in Arabian stallions (67.74%), indicating moderate breed related variation in reproductive efficiency.

The sex distribution of the obtained foals included 387 males and 489 females, indicating a slight predominance of females while remaining within a normal and acceptable range. Overall, the reproductive indicators demonstrate that the public mounting system in Suceava county operates efficiently. The combination of a large breeding population, a diversified stallion structure and consistently satisfactory reproductive indices highlight Suceava county as an important area for public mount activity within the region.

Vaslui county

In Vaslui county, public mount activity was supported primarily by Romanian Semigreu stallions, complemented by a smaller proportion of stallions from improved breeds, including Lipizzaner, Arabian and Gidran (Table 6). This breeding structure reflects a system largely oriented toward robust horses adapted to local working conditions, with selective use of improved genetic resources.

Table 6 Breeding use of public mount stallions from Vaslui county

Breed used for amelioration	Mares covered		Pregnant mares		Foals obtained		Sex (M / F)	Fertility (%)	Gestation (%)	Nativity (%)
	(n)	(%)	(n)	(%)	(n)	(%)				
Arabian	196	14.85	121	11.66	112	11.52	62 / 50	92.56	61.73	57.14
Romanian Semigreu	780	59.09	654	63.01	624	64.20	318 / 306	95.41	83.84	80.00
Lipizzaner	246	18.64	182	17.53	168	17.28	69 / 99	92.30	73.98	68.29
Gidran	98	7.42	81	7.80	68	7.00	31 / 37	83.95	82.65	69.38
Total	1320	100.0	1038	100.0	972	100.0	480 / 492	93.64	78.63	73.63



During the analyzed period, Romanian Semigreu stallions accounted for 59.09% of the mares covered, while improved breeds together contributed 40.91% of total matings, with Lipizzaner (18.64%), Arabian (14.85%) and Gidran (7.42%) stallions represented.

The reproductive output obtained under these conditions included 972 foals resulting from the mating of 1320 mares, corresponding to an overall natality rate of 73.63%. Romanian Semigreu stallions produced the largest share of foals (624 foals; 64.20%), followed by Lipizzaner (168 foals; 17.28%), Arabian (112 foals; 11.52%) and Gidran stallions (68 foals; 7.00%), reflecting their relative contribution to the breeding structure.

Reproductive performance indicators showed moderate variability among breeds. Fertility rates were generally high, reaching 95.41% in the Romanian Semigreu group, followed by Arabian (92.56%), Lipizzaner (92.30%) and Gidran stallions (83.95%). Gestation rates ranged from 61.73% in Arabian stallions to 83.84% in Romanian Semigreu, while intermediate values were observed for Lipizzaner (73.98%) and Gidran (82.65%). Natality rates followed a similar pattern, with the highest value recorded in the Romanian Semigreu group (80.00%) and lower values in Arabian (57.14%), Lipizzaner (68.29%) and Gidran stallions (69.38%).

The sex distribution of the obtained foals included 480 males and 492 females, indicating a balanced sex ratio. Despite lower natality and gestation values in some improved breeds, the overall reproductive indicators demonstrate that the public mounting system in Vaslui county remains functional. Nevertheless, improved stabilization of stallion allocation and increased utilization of public mount services could further enhance reproductive efficiency and overall performance in this county.

Comparative overview

Across the six counties, differences in reproductive performance were evident, reflecting variations in stallion distribution, breed structure and mare utilization. Counties with a more stable stallion presence and higher mating intensity generally achieved better reproductive outcomes. The Romanian Semigreu breed emerged as a key component of the public mounting system, contributing consistently to reproductive performance across the region.

CONCLUSIONS

The analysis of public mount activity across the six counties of North-Eastern Romania demonstrates that the system plays a substantial role in sustaining regional horse reproduction and genetic improvement. In all counties, breeding structures were dominated by Romanian Semigreu stallions, complemented by improved breeds such as Lipizzaner, Hucul, Romanian Sport Horse and other specialized lines, reflecting adaptive strategies tailored to local production requirements and breeder preferences.

Reproductive performance indicators revealed generally satisfactory efficiency of the public mounting system. Natality rates ranged from moderate to high values, with the highest reproductive output recorded in counties characterized by both a high number of mares covered and a diversified stallion structure, such as Suceava and Neamț. In contrast, lower natality rates observed in counties with reduced activity intensity, such as Vaslui, indicate the influence of mare utilization and stallion availability on reproductive outcomes.

Breed specific analyses highlighted measurable differences in reproductive efficiency. Improved breeds, particularly Lipizzaner stallions, frequently exhibited higher natality and fertility rates, whereas Romanian Semigreu stallions contributed most substantially to overall foal production

due to their numerical dominance and widespread use. Gestation rates were consistently high across counties, indicating favorable pregnancy maintenance once conception occurred and suggesting adequate management and environmental conditions.

Territorial comparisons further revealed that counties with stable stallion allocation and consistent public mount utilization achieved more homogeneous and predictable reproductive results. Balanced sex ratios of foals across all counties support the biological stability of the system and confirm the absence of major reproductive imbalances.

Overall, the findings indicate that the public mounting system in North-Eastern Romania functions effectively under current organizational conditions, ensuring both quantitative reproductive output and the maintenance of genetic diversity. Nevertheless, the results also suggest that improved stabilization of stallion distribution, increased accessibility of public mount services and targeted use of high-performing stallions could further enhance reproductive efficiency, particularly in counties with lower activity levels. These measures would contribute to the long-term sustainability and competitiveness of regional horse breeding systems.

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