

Management, health, and veterinary care of donkeys in Switzerland: A cross-sectional study

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Haltung, Gesundheit und tierärztliche Versorgung von Eseln in der Schweiz: Eine Querschnittsstudie

Gegenwärtig liegen nur begrenzte Informationen zur Eselhaltung und -gesundheit in der Schweiz vor. Im Rahmen dieser Studie wurden Schweizer Eselbesitzer, Tierärzte und kantonale Veterinärämter online befragt, um Informationen zu aktuellen Haltungs- und Fütterungspraktiken, zur Gesundheitsvorsorge und zum Gesundheitszustand von Schweizer Eseln zu erhalten und den Bedarf an Weiterbildung in diesem Bereich abzuklären. Insgesamt wurden 705 Besitzer mit 1463 Eseln, 141 Tierärzte und 19 kantonale Veterinärämter in die Studie einbezogen.

Die meisten Besitzer hielten ihre Esel in einem Offenstall (73,9%) mit Zugang zur Weide (98,3%). Von allen Eselbesitzern hielten 42,7% ihren Esel ohne direkten Kontakt zu einem Artgenossen. Bei einem von drei Eseln (32,8%) wurde berichtet, dass er übergewichtig sei, wobei Alter, Rasse und bestimmte Haltungsbedingungen einen signifikanten Zusammenhang mit diesem Zustand haben. Nur 15,9% aller Esel erhielten eine regelmässige Gesundheitsvorsorge (einschliesslich Tetanusimpfung, Entwurmung, routinemässige Zahnbehandlung und Hufpflege). Hufrehe und Hufabszesse gehörten zu den am häufigsten beobachteten Erkrankungen durch Besitzer (7,3% bzw. 12,1%, basierend auf Einzeltierbeobachtungen), Tierärzten (76,6% bzw. 68,1%, basierend auf einer Schätzung der Häufigkeit der Erkrankung in der Patientenpopulation) und amtliche Veterinärämter (63,2% bzw. 15,8%, basierend auf einer Schätzung der Krankheitshäufigkeit in den kontrollierten Betrieben). Im Gegensatz dazu wurden Zahnerkrankungen und das Asine Metabolische Syndrom von den Besitzern seltener gemeldet (2,5% bzw. 0,7%) im Vergleich zu Tierärzten (56,7% bzw. 34,8%) und kantonale Veterinärämter (26,3% bzw. 26,3%), möglicherweise aufgrund des mangelnden Wissens über diese Erkrankungen seitens der Besitzer.

Summary

Limited information currently exists concerning donkey husbandry and health in Switzerland. Within the framework of this study, Swiss donkey owners, veterinarians, and official veterinary offices were surveyed online to obtain information on current husbandry and feeding practices, health care, and status of Swiss donkeys and to clarify the need for further education in this area. A total of 705 owners with 1463 donkeys, 141 veterinarians, and 19 official veterinary offices were included in the study.

Most owners kept their donkeys in run-in shelters (73,9%) with access to pasture (98,3%). Of all donkey owners, 42,7% kept their donkey without direct contact with a conspecific. One in three donkeys (32,8%) were reported to be overweight with age, breed, and certain husbandry conditions significantly associated to this condition. Only 15,9% of all donkeys received regular preventive healthcare (including tetanus vaccination, deworming, routine preventive dental maintenance, and hoof trimming). Laminitis and hoof abscesses were among the most frequently observed diseases by owners (7,3% and 12,1%, respectively, based on individual animal observations), veterinarians (76,6% and 68,1%, respectively, based on an estimate of the frequency of the disease in the patient population) and official veterinary offices (63,2% and 15,8%, respectively, based on an estimate of the frequency of the disease on the farms inspected). In contrast, dental disease and asinine metabolic syndrome were less often reported by owners (2,5% and 0,7%, respectively) compared to veterinarians (56,7% and 34,8%, respectively) and official veterinary offices (26,3% and 26,3%, respectively), possibly due to underrecognition of these conditions by owners.

Most donkey owners (54,0%), veterinarians (85,1%), and official veterinary offices (79,0%) were interested in more education opportunities relating to donkey husbandry and medicine. Targeted education will be the most efficient way

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Die meisten Eselbesitzer (54,0%), Tierärzte (85,1%) und Veterinärämter (79,0%) waren an mehr Bildungsangeboten rund um die Eselhaltung und -medizin interessiert. Gezielte Aufklärung ist der effizienteste Weg, das Bewusstsein für eine an diese Spezies angepasste Haltung und medizinische Versorgung zu schärfen, und sollte in der Schweiz stärker gefördert werden.

Schlüsselwörter: Asines Metabolisches Syndrom (AMS), Hufrehe, Übergewicht, Tierschutz

to raise awareness of species-appropriate husbandry and medical care and should be encouraged more in Switzerland.

Keywords: Asinine Metabolic Syndrome, laminitis, overweight, welfare

Introduction

A total of 11'167 donkeys are registered in Switzerland (as of December 2023).⁶⁰ Although the popularity and thus the number of donkeys is constantly increasing, there is only limited published data on the health status and husbandry conditions of this population. A previously published study has described the management and use of equids in Switzerland, but donkeys comprised only a small part of the sampled population.⁴

The most common health and welfare problems of donkeys differ substantially by geographical region. Working donkeys in Asia, Africa, and South America suffer most commonly from wounds associated with ill-fitting harnesses, high endo- and ectoparasite burdens, underweight, lameness of various causes, and hoof overgrowth.^{1,3,11,13,37,39,61,65} In Western and Central Europe, donkeys are mainly kept as companion animals, livestock guardians, for mule breeding, landscape maintenance, or meat and milk production.^{14,24}

The digestive efficiency of donkeys is adapted to their natural habitat, a semi-arid environment with only sparse vegetation of poor nutritional quality.⁶⁴ This evolutionary advantage in their natural habitat is unfortunately a disadvantage in regions like Switzerland. Donkeys are often over-supplied with nutrients, which can have serious consequences, such as being overweight in conjunction with the development of asinine metabolic syndrome (AMS) and laminitis.^{24,43,47,51} The most common health problems in European donkeys are overweight, dental diseases, hoof problems such as laminitis and hoof abscesses, skin disorders, and hyperlipemia.^{10,18,21,26} Donkeys often do not get appropriate preventive healthcare such as vaccination, deworming, routine preventive dental maintenance, and hoof trimming.^{7,32,33,56}

Management such as housing, feeding, exercise, and preventive healthcare may have a direct effect on the health and welfare of the donkeys. An improved understanding of these factors is essential to define approaches on how to optimize them according to the special needs of donkeys.

The main aims of this study were to determine the most common husbandry and feeding practices, assess the prev-

alence of overweight, examine the correlation between overweight and certain types of husbandries and feeding practices, and evaluate the implementation of preventive healthcare measures in Swiss donkeys, by involving donkey owners, veterinarians, and official veterinary offices. Furthermore, we investigated whether the observations of owners and veterinarians regarding the frequency of diseases and syndromes in donkeys are consistent and finally, whether survey respondents wish for more educational opportunities in donkey husbandry and medicine.

Materials and Methods

Study design

This cross-sectional study was based on three surveys of Swiss donkey owners, veterinarians treating donkeys in private practice, private and university clinics, and official veterinary offices. Each survey was created using the online software Survey Monkey⁵³ and was available in German, French, and Italian. Anonymous participation was possible.

Data collection

The link to the survey was distributed via email and the sample size was determined using a convenience sample method. Details on how the individual groups of people were recruited for the survey can be found in *Supplementary Table 1* (<https://sat.gstsvs.ch/de/sat.html>). All registered Swiss donkey owners received the link to the online survey through an email from Tierstatistik Identitas AG,⁶⁰ which operates the animal traffic database on behalf of the Federal Office for Agriculture (Bundesamt für Landwirtschaft BLW, federal office of agriculture FOAG). Tierstatistik Identitas AG also provided anonymous data on the age and sex of the registered donkeys as well as the age and language spoken by their owners. Reminder emails were sent after two and four weeks, and six weeks after the first call, the survey link was closed.

The survey for owners included questions on demographic data, interest in more education concerning donkey husbandry and health, information about the population (origin, acquisition, purpose, husbandry), and information about the single animal (age, breed, sex, body condition

score, exercise, preventive health care, and medical history). The survey for veterinarians included questions on demographic data, experience of the veterinarian or the staff of an official veterinary office, interest in more specific education on donkey husbandry and health, and the most frequently observed diseases and syndromes in the Swiss donkey population. The veterinary offices were also asked specific questions about the frequency of inspections and animal welfare cases in donkey farms. In general, routine inspections (every 4 years) are carried out in Switzerland as soon as a farm has more than three livestock units, regardless of the animal species or whether they are used for agricultural purposes. Smaller farms are not routinely inspected, only in case of suspicion. In some cantons, even stricter rules apply.

The complete surveys can be found in *Supplementary Tables 2–4* (<https://sat.gstsvs.ch/de/sat.html>).

Data analysis

The data from all surveys on Survey Monkey was downloaded into Microsoft Excel and imported to NCSS statistical software (Kaysville, Utah, United States, version 2023) for further statistical analysis.

Donkeys were divided into age groups for further analysis as described previously:³² Foals (≤ 1 year), yearlings (> 1 to ≤ 3 years), young adults (> 3 to ≤ 5 years), adults (> 5 to ≤ 20 years) and geriatric donkeys (> 20 years).

To determine the influence of different factors on the body condition score of the donkeys, univariable and multivariable logistic regression models were used. As in previous studies investigating overweight prevalence in equids, foals and yearlings were excluded from this analysis.^{29,34,54,66} Variables from the owner survey to be tested in the univariable logistic regression model were selected according to the criteria listed in *Supplementary Table 5* (<https://sat.gstsvs.ch/de/sat.html>). Variables from single-choice questions (with multiple answer options) were converted into two binary groups, aiming for as much balance as possible in terms of the number of responses. Variables from the univariable model were assessed for inclusion in the multivariable model using a significance threshold of $p < 0,05$, except for sex, breed, and age. These three variables were included regardless of their p-values due to their recognized confounding nature. The modeling process followed a forward-selection approach, involving the stepwise addition of variables based on their statistical significance. In this study,

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Table 1: Feeding management: Roughage, concentrates and mineral supplements provided to the donkeys by their owners (n = 705)

Number of owners (percentage)		Number of owners (percentage)	
Type of roughage¹		Concentrates¹	
Hay	695/705 (98,6%)	None	567/705 (80,4%)
Straw	438/705 (62,1%)	Commercial Compound feed	81/705 (11,5%)
Branches	288/705 (40,9%)	Oat	14/705 (2%)
Grass	244/705 (34,6%)	Corn	9/705 (1,3%)
Hay pellets	30/705 (4,3%)	Barley	5/705 (0,7%)
Silage	15/705 (2,1%)	Other	40/705 (5,7%)
Haylage	10/705 (1,4%)	Amount of concentrates per day per donkey	
Other	16/705 (2,3%)	<0.5 litre	90/138 (65,2%)
Frequency of roughage feeding²		0.5–1 litre	8/138 (5,8%)
1x per day	101/705 (14,3%)	> 1 litre	3/138 (2,2%)
2x per day	294/705 (41,7%)	Unknown	37/138 (26,8%)
3x per day	114/705 (16,2%)	Mineral supplements¹	
>3x per day	77/705 (10,9%)	Salt/mineral block	625/705 (89%)
Unlimited access	119/705 (16,9%)	Commercial mineral feed	190/705 (27%)
Limitation of roughage intake²		None	31/705 (4,4%)
Yes	545/705 (77,3%)		
No	160/705 (22,7%)		
Not necessary ¹	98/160 (61,3%)		
Not feasible ¹	49/160 (30,6%)		
Other reasons ¹	14/160 (8,8%)		

¹Multiple answers were possible.

²Straw and branches excluded

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variables with $p \geq 0,05$ were excluded from the model in subsequent steps. To determine collinearity between statistically significant factors of the multivariable model, the Phi-Coefficient was analyzed, aiming to identify no association ($\Phi = 0$) or perfect association ($\Phi = -1/1$).

A chi-square test and a one-sample t-test were used to compare the demographic information of the study sample with that of a randomly selected sample from the population of registered donkeys and their owners.

Results

The most relevant data is listed under the respective sub-items; the complete data set can be found in *Supplementary Tables 6–9*.

Response rate

The response rate of the owners was 16,2% (799/4269). Incomplete surveys were excluded (84/799), leaving data from 705 owners included in this study, of which 65/705 did not fill out data for all donkeys owned, and 81/705 owners only filled out the first part of the survey and did

not provide information on individual donkeys. The response rate of the veterinarians cannot be calculated, as, for data protection reasons, contact details for all veterinarians practicing in Switzerland are not available and we were unable to reach all veterinarians with our recruitment. A total of 145 surveys were filled out, two were excluded because the veterinarians stated that they had never treated donkeys, and one was excluded due to incomplete answers, leaving 141 surveys that were included in this study. The response rate of the official veterinary offices was 19/21 (90,5%).

Demographic data

Of the participating owners, 456/705 (64,7%) were female, 247/705 (35%) were male, 2/705 (0,3%) diverse, and the mean age was 49,7 years \pm 13,9 (7–99 years) (\pm standard deviation (range)), compared to the age of the registered donkey owners in Switzerland with 51,5 years \pm 14,9 (2–95 years). The median number of donkeys owned per person was two for both the study sample and the registered donkey owners. Of the 11'515 registered donkeys, 1'463 are represented in this study (12,7%). The mean age was 14,7 years \pm 8,7 (0–41 years), compared to the age of the registered donkeys with 13,3 years \pm 8,5 (0–48 years). Mares made up 788/1463 (53,9%) of the study sample, geldings

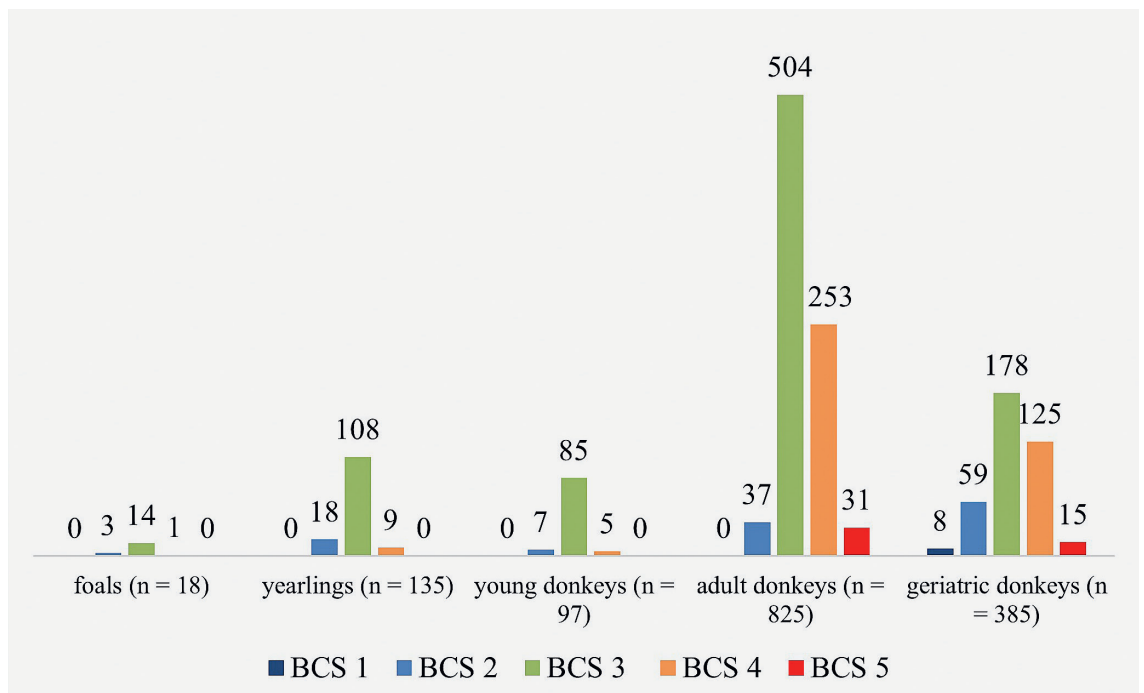


Figure 1: Owner-assessed body condition score (BCS) for 1'463 donkeys, categorized by age groups. BCS scale: 1 Poor (very thin), 2 Moderate (underweight), 3 Ideal, 4 Overweight (fat), 5 Obese (very fat) according to the donkey body condition score chart²⁸. Foals and yearlings were assessed, but not included into the analysis of influencing factors on overweight. Age definitions: Foals (≤ 1 year), yearlings (>1 to ≤ 3 years), young adults (>3 to ≤ 5 years), adults (>5 to ≤ 20 years) and geriatric donkeys (>20 years). Abbreviations: BCS = Body condition score

593/1463 (40,5%), and stallions 82/1463 (5,6%), compared to the gender distribution of the registered donkeys with 59% females and 41% males. Most of the donkeys were standard donkeys (1066/1463 (72,9%)), followed by large standard donkeys (143/1463 (9,8%)) and other breeds (254/1463 (17,4%)).

Housing and feeding

Most owners (388/705 (55%)) kept the donkeys on their farm or in their private equine husbandry (218/705 (30,9%)), followed by boarding stables (52/705 (7,4%)) and other husbandry modalities (47/705 (6,7%)). Donkeys were kept together with other equids or farm animals by almost half of the owners (313/705 (44,4%)). A total of 301 of 705 owners (42,7%) did not provide their donkey with any contact to other donkeys. Run-in shelters were the most common housing systems (521/705 (73,9%)), followed by pasture only (48/705 (6,8%)), stall (46/705 (6,3%)), stall with individual run (34/705 (4,8%)) and other housing modalities (56/705 (7,9%)). Straw was the most common used bedding (449/705 (63,7%)), followed by rubber mats (230/705 (32,6%)), shavings (225/705 (31,9%)), forest floor litter (102/705 (14,5%)), straw pellets (31/705 (4,4%)), hemp litter (30/705 (4,3%)) and other materials (49/705 (6,6%)). Nearly half of the owners (351/705 (49,8%)) provided their donkeys with either unlimited pasture access or more than 12 hours per day in spring and summer. In autumn and winter, this applied to 212/705 (30,1%). If access to pasture was allowed, 366 of 693 owners (52,8%) further limited the grass intake by spatial restriction of the accessible grazing area and 32/693 (4,6%) with the aid of a grazing muzzle. The main reasons for not doing so were that it was deemed either not necessary (179/313 (57,2%)) or not feasible (41/313 (13,1%)). A total of 611 of 705 owners (86,7%) gave their donkeys access to a dry turnout area without grass, either permanently or for several hours a day. The feeding management of the donkeys is shown in *Table*

I. Feeding of concentrates and hay pellets was positively associated with geriatric donkeys (OR 1,57, 95% CI of OR 1,19–2,08, p-Value <0,01 for concentrates and OR 1,67, 95% CI of OR 1,01 – 2,78, p-Value <0,05 for hay pellets), and feeding of hay pellets was positively associated with underweight (BCS <3) (OR 2,92, 95% CI of OR 1,54 – 5,54, p-Value <0,01).

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Purpose and Exercise of the donkeys

The most frequent use was for landscape maintenance (247/705 (35%)), followed by pet for children (195/705 (27,7%)), and companion for other equids (104/705 (14,8%)). About a third of the owners did not keep the donkey for a specific purpose (211/705 (29,9%)). A total of 925/1463 (63,2%) donkeys got some form of exercise, consisting of riding (158/1463 (10,8%)), carriage rides (92/1463 (6,3%)), and groundwork or hand-walking (829/1463 (61%)).

Body condition score of the donkeys

A third (429/1307 (32,8%)) of all donkeys older than three years were assessed as overweight (body condition score $\geq 4/5$) by their owners. The prevalence of overweight was particularly high in adult and geriatric donkeys (*Figure 1*). Factors that are positively or negatively associated with overweight according to the multivariable model are shown in *Table 2*. The variables that were assessed in the univariable model, and subsequently chosen for inclusion in the multivariable model, can be found in *Supplementary Table 10*. Collinearity was found to be low with a phi-correlation coefficient <0,2 between all variables used in the multivariable model (*Supplementary Table 11*).

Preventive healthcare

A total of 669 of 1445 donkeys older than one year (46,3%) were not vaccinated at all or only irregularly (*Table 3*). Most of the donkeys were dewormed at least once a year (1293/1463

Table 2: Factors that are positively or negatively associated with owner-assessed overweight in 1307 donkeys older than three years, according to the multivariable logistic regression model. An odds ratio greater than one indicates that overweight is more likely to occur in donkeys to which the specified variable applies (positive association, labeled in dark grey). An odds ratio smaller than one indicates that overweight is less likely to occur (negative association, labeled in light gray). Apart from the sex of the donkeys, all variables are significantly associated with overweight ($p < 0.05$).

Variable	Odds Ratio	95% Confidence Interval of the Odds Ratio	Number of donkeys (percentage)	p-Value
Age of the donkeys: >15 years old	2,00	1,56 – 2,55	643/1307 (49,2%)	<0,01
Breed of the donkeys: Standard donkey	1,46	1,10 – 1,95	957/1307 (73,2%)	<0,05
Sex of the donkeys: Female	1,15	0,90 – 1,46	706/1307 (54,0%)	0,46
Number of donkeys per person >2	0,60	0,47 – 0,77	617/1307 (47,2%)	<0,01
Donkeys kept in a private equine husbandry	0,66	0,50 – 0,86	403/1307 (30,8%)	<0,01
Donkeys with contact to donkeys only	0,69	0,54 – 0,88	715/1307 (54,7%)	<0,01
Unlimited access to a dry turnout area in spring/summer	0,75	0,59 – 0,96	795/1307 (60,8%)	<0,05
Type of roughage fed to donkeys: Hay pellets	0,49	0,26 – 0,95	65/1307 (5,0%)	<0,05

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(88,4%) (Table 3). Routine preventive dental maintenance was performed by a veterinarian in 798/1463 (54,6%) of the donkeys. However, only 499 out of 1463 donkeys (34,1%) had routine preventive dental maintenance at least every two years (Table 3). Hoof care was irregularly carried out on most donkeys, with only 402/1463 (27,5%) donkeys receiving hoof trimming at least five times a year (Table 3).

Of all donkeys, only 233 of 1463 (15,9%) got regular preventive healthcare, including regular vaccination against tetanus with the last vaccination within the last two years, deworming at least once a year, routine preventive dental maintenance by a veterinarian at least every two years, and hoof trimming at least five times per year.

Most frequently observed diseases and syndromes in donkeys

The most commonly owner-reported diseases and syndromes in Swiss donkeys comprised: Hoof abscesses (177/1463 (12,1%)), infestations with ectoparasites (146/1463 (10%)), laminitis (107/1463 (7,3%)), sarcoids (74/1463 (5,1%)) and fecal water (70/1463 (4,8%)) (Figure 2). In 879/1463 (60,1%) donkeys, no disease or syndrome was reported to have occurred in the past.

The most frequent diseases and syndromes observed in donkeys by veterinarians were laminitis (108/141 (76,6%)), hoof abscesses (96/141 (68,1%)), dental disease (80/141 (56,7%)), hyperlipemia (67/141 (47,5%)), and infestations with ecto-

Table 3: Frequency of preventive healthcare in 1'463 donkeys in Switzerland. When assessing immunization, our main focus was on the tetanus vaccination. A booster at least every 2 years is considered a regular tetanus vaccination.

	Number of donkeys (percentage)
Vaccination¹	
Never vaccinated	334/1445 (23,1%)
Not regularly vaccinated	335/1445 (23,2%)
Vaccinated against tetanus	211/1445 (14,6%)
Last vaccination within the last 2 years	159/211 (75,4%)
Last vaccination more than 2 years ago or date unknown	52/211 (24,6%)
Vaccinated against tetanus & influenza	548/1445 (37,9%)
Last vaccination within the last 2 years	513/548 (93,6%)
Last vaccination more than 2 years ago or date unknown	35/548 (6,4%)
Other	17/1445 (1,2%)
Deworming	
Not regularly dewormed (less than once a year and no selective deworming strategy)	170/1463 (11,6%)
1–2x/year	748/1463 (51,1%)
3–4x/year	133/1463 (9,1%)
Selective deworming strategy with one mandatory deworming per year in late fall/beginning of winter regardless of the results of the fecal egg count analysis	221/1463 (15,1%)
Selective deworming strategy without one mandatory deworming per year	191/1463 (13,1%)
Routine preventive dental maintenance	
None	474/1463 (32,4%)
Yes, by a veterinarian	798/1463 (54,6%)
Yes, but not by a veterinarian	191/1463 (13,1%)
Frequency of routine preventive dental maintenance	
Irregularly	178/989 (18%)
Only in case of special need	210/989 (21,2%)
Every 2 years	314/989 (31,8%)
1–2x/year	287/989 (29%)
Frequency of hoof trimming²	
Never	16/1463 (1,1%)
1–2x/year	518/1463 (35,4%)
3–4x/year	527/1463 (36%)
5–6x/year	268/1463 (18,3%)
>6x/year	134/1463 (9,2%)

parasites (60/141 (42,6%)). The most frequent diseases and syndromes observed in donkeys by official veterinary offices were laminitis (12/19 (63,2%)), dental disease (5/19 (26,3%)), AMS (5/19 (26,3%)), sarcoids (4/19 (21,1%)), and hoof abscesses (3/19 (15,8%)).

Training in donkey husbandry and medicine

In total, 605/705 (85,8%) owners, 136/141 (96,45%) veterinarians, and 17/19 (89,5%) official veterinary offices stated that they had actively acquired knowledge about donkey husbandry and medicine in some way in the past. The internet was the most popular source of information for all three groups surveyed (440/705 (62,4%), 100/141 (70,9%), 15/19 (79%)), followed by advice from a veterinarian for owners (416/705 (59%)) and theoretical training events for veterinarians (88/141 (62,4%)) and official veterinary offices (15/19 (79%)). A total of 381 of 705 donkey owners (54%), 120/141 veterinarians (85,1%), and 15/19 official veterinary offices (79%) expressed an interest in additional education opportunities related to donkey husbandry and medicine.

Owning more than two donkeys was positively associated with attending practical training courses (OR 1,43, 95% CI of OR 1,10–1,86, p-Value < 0,01). For owners, atten-

dance of practical training was positively associated with the feeding of rationed quantities of roughage (OR 3,49, 95% CI of OR 2,25 – 5,42, p-Value <0,01) and limitation of grass intake by spatial restriction of the accessible grazing area or putting on a muzzle (OR 3,03, 95% CI of OR 2,22 – 4,13, p-Value <0,01). Furthermore, owners who in some way acquired further knowledge about donkeys were more likely to provide their donkey direct contact with other donkeys (OR 2,16, 95% CI of OR 1,58–2,97, p-Value <0,01) and to perform regular preventive healthcare (definition see in the results section “preventive healthcare”) (OR 2,82, 95% CI of OR 1,61 – 4,96, p-Value <0,01).

Assessment of the health status of the Swiss donkey population by veterinarians and official veterinary offices

A total of 95 of 141 (67,4%) veterinarians and 9/19 (47,4%) of the official veterinary offices evaluated the health status of the Swiss donkey population as moderate/variable or poor (Table 4).

Welfare issues in donkeys

Of the official veterinary offices, a total of 17 out of 19 (89,5%) were confronted with animal welfare cases involving donkeys during the past five years. Welfare issues in-

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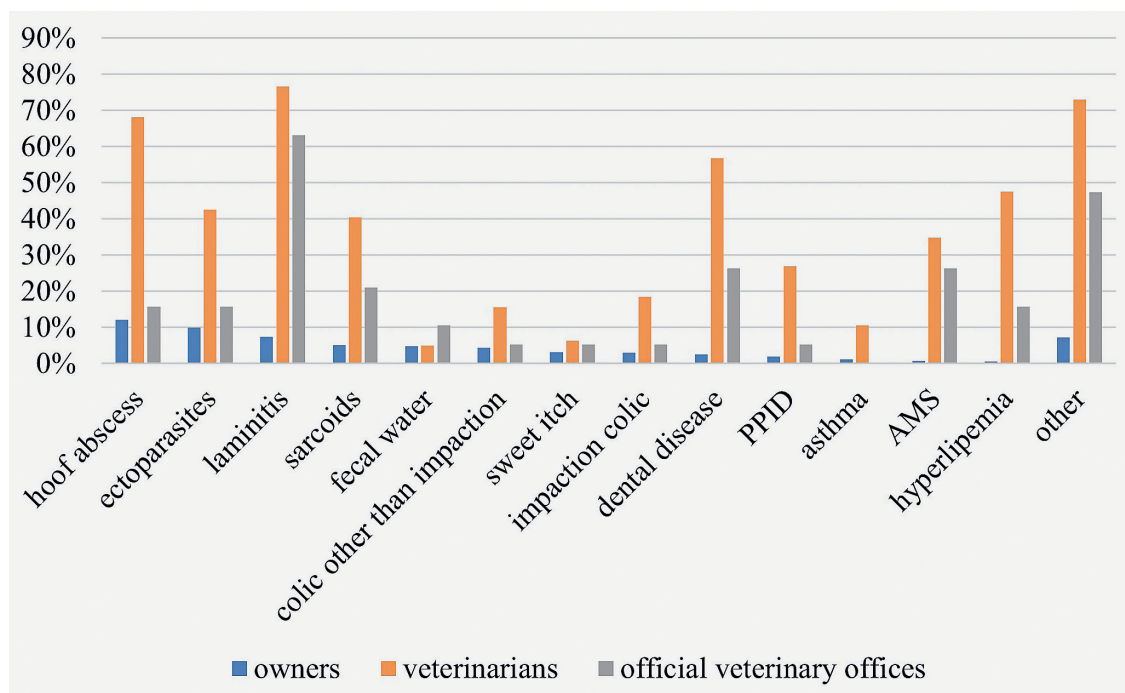


Figure 2: Diseases and syndromes most frequently observed in donkeys by owners (recorded for each individual donkey, n = 1463), veterinarians (n = 141), and official veterinary offices (n = 19).

Multiple answers were possible. Diseases and syndromes observed by less than 1% of the owners are summarized in the category "other".

Abbreviations: PPID = Pituitary pars intermedia dysfunction, AMS = Asinine metabolic syndrome

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cluded deficiencies in housing systems (14/16 (87,5 %)), hygienic deficiencies (8/16 (50 %)), lack of visual, auditory, and olfactory contact with other equids (5/16 (31,3 %)), abuse (3/16 (18,8 %)) and others (9/16 (56,3 %)).

Discussion

There is a high prevalence of owner-assessed overweight animals in the Swiss donkey population, and this overweight condition appears to be significantly correlated with the daily management practices of the donkeys. Preventive healthcare including vaccination, routine preventive dental maintenance, and hoof trimming is carried out negligently on most donkeys. The majority of veterinarians and official veterinary offices rate the health status of Swiss donkeys as moderate, variable, or poor, and wish for more training on the subject of donkey husbandry and medicine. Education has demonstrated a notable impact, as donkey owners who undergo training are more likely to ration roughage and grass intake, allow their donkey contact with other donkeys, and carry out health prevention measures regularly.

Keeping donkeys in private equine husbandry was negatively associated with being overweight, possibly because feeding management practices can be better adapted to an individual situation. Keeping donkeys separate from other animal species was also negatively associated with overweight. This probably allows a better response to donkey-specific needs, especially the lower calorie requirements compared to other species, in particular horses.⁵ Furthermore, social behavior differs between donkeys and other equids, as donkeys usually prefer to socialize with other donkeys more than with other equids.^{46,48} In this study,

nearly half of the owners did not allow their donkey direct or indirect contact with other donkeys, supporting the assumption that many owners are not aware of the importance of contact with other donkeys.

Run-in shelters with straw bedding were the most common housing system in this study, which is in accordance with the results of previous studies on donkey husbandry in Europe.^{18,23} The majority of donkeys had access to a dry turnout area all year round, which was negatively associated with overweight in spring and summer. The use of dry turnout areas should be encouraged as they provide space for movement and social interaction without increasing energy intake as opposed to pasture turnout only.⁴² The time spent on pasture had no significant influence on the occurrence of being overweight. Other studies have shown that donkeys can eat the same amount of grass in eight hours as they would if given access to pasture all day,^{52,63} it is therefore recommended to restrict pasture access by strip grazing rather than limiting the turnout time.^{7,51} Additionally, pasture mass and quality have to be taken into account when adapting pasture management. Nonetheless, a strong recommendation is made to investigate pasture quality, pasture time, and overweight in future studies.

More than half of the donkeys in this study were offered straw as roughage. Feeding of high-fiber forage such as straw is recommended in donkeys, which are adapted to feed on sparse vegetation of poor nutritional quality in their original semi-arid habitat. This is a disadvantage in the Central European climate zone with lush, calorie-rich vegetation, predisposing donkeys to overweight and related disorders.^{5,6,9,31,63} Straw helps to increase the feed mass without exceeding the calorie requirement, which impro-

Table 4: Assessment of the health status of the Swiss donkey population by veterinarians (n = 120), and official veterinary offices (n = 15) in Switzerland.

Assessment of the health status	Number of participants (percentage)	
	Veterinarians	Official veterinary offices
Good	41/141 (29,1 %)	2/19 (10,5 %)
Moderate/variable	93/141 (66 %)	8/19 (41,1 %)
Bad	2/141 (1,4 %)	1/19 (5,3 %)
Difficult to assess	5/141 (3,6 %)	8/19 (42,1 %)
Reasons for the assessment of the health status as bad or moderate/variable ¹		
Lack of knowledge (on the part of the owner)	82/95 (86,3 %)	9/9 (100 %)
Unsuitable housing conditions	75/95 (79 %)	7/9 (77,8 %)
Inadequate preventive healthcare	60/95 (63,2 %)	5/9 (55,6 %)
Financial aspects	40/95 (42,1 %)	3/9 (33,3 %)
Lack of knowledge (on the part of the veterinarian)	30/95 (31,6 %)	2/9 (22,2 %)
Other	0	1/19 (11,1 %)

¹Multiple answers were possible.

ves both the physical and mental health of donkeys.^{6,9,51} Donkeys fed straw are not at increased risk of impaction colic or gastric ulcers,^{10,12,17} however, old donkeys with dental disease can be an exception. Approximately a fifth of the owners did not limit the amount of high-caloric roughage such as hay, which, however, would be recommended for the majority of donkeys to prevent them becoming overweight.^{6,51} Feeding of hay pellets was negatively associated with overweight and positively associated with underweight animals. This does not mean that feeding hay pellets prevents obesity, but rather that underweight donkeys are increasingly fed hay pellets, presumably due to dental disease that makes it difficult for them to masticate hay. A fifth of the owners fed their donkeys, particularly geriatric animals, with concentrates. Grain-based feed is not recommended for donkeys, as it increases the risk of gastric ulcers,¹² laminitis, obesity and colic.¹⁷ While certain donkeys might have higher energy needs (e.g. lactating or pregnant mares), fiber- or oil-based feeds such as alfalfa, unmolassed beet pulp or rice bran are more suitable for underweight donkeys in comparison to grain-based feed.^{6,9}

The prevalence of overweight donkeys over three years old was 32,8%, similar to other studies.^{18,63,21,32,44} Horse owners often have difficulty recognizing obesity, and this likely applies to donkey owners as well.³⁵ For this reason, a standardized body condition scoring system was used. Although the assessment of the body condition score by owners may not always be entirely reliable,¹⁶ we have made efforts to enhance its accuracy by supplying pictograms and descriptive texts for each score.⁵⁵ Donkeys older than 15 years were positively associated with overweight, possibly due to the lower energy expenditure when compared to younger donkeys.⁴¹ The breed standard donkey was positively associated with overweight as opposed to the large standard breed donkey or other breeds, most likely for similar reasons as pony breeds were found to have higher body condition scores compared to horses.¹⁵ The donkey breeds could only be roughly categorized in this study, and the classification is further complicated by the limited number of genetic studies on donkeys.⁶²

Despite a high prevalence of owner-reported overweight animals in the Swiss donkey population, AMS was only reported in 0,7% of all donkeys. In contrast, veterinarians and official veterinary offices consider AMS as a common disease in donkeys. AMS is likely not investigated in most overweight donkeys, either because veterinarians do not specifically suggest it or because the owners do not want or consider it important. Similar to equine metabolic syndrome (EMS), the key symptoms of AMS are overweight, insulin dysregulation, and laminitis.^{36,58} Laminitis was considered as the most common donkey disease by veterinarians and reported by owners in 7,3% of all donkeys. This is higher compared to the prevalence of less than 1%

in Swiss Warmblood horses.² In a large UK donkey population owned by a single charity, the prevalence of laminitis in donkeys over a 42-months period was even substantially higher at 48,5%.⁴⁴ In this study, the information on laminitis was based on data collected from veterinarians and not owners, as in our study. Owners might easily overlook signs of laminitis in donkeys, because of the stoical behavior of donkeys which results in less obvious signs of pain even in cases of advanced disease.^{8,58,59} AMS and the risk for the development of laminitis should be recognized as a serious condition owners need to be made more aware of.

With almost half of all donkeys either unvaccinated or only irregularly vaccinated against tetanus, this study confirms a poor vaccination status in donkeys.^{5,32} Studies on horse vaccination reveal that the primary reason cited by owners for not vaccinating their horses is the absence of contact with horses from other farms and no traveling. This suggests that many owners are still unaware that tetanus is not transmitted through direct contact.^{5,38} In this study, we did not ask donkey owners about the specific reasons for the lack of tetanus vaccination, but we suspect similar motivations. The prevalence of donkeys with a history of tetanus in this study is low (n = 2). However, given that tetanus is often fatal and data could only be collected from animals alive at the time of the survey, the authors strongly recommend vaccination. Despite the low prevalence, tetanus is a frequently fatal yet fully preventable disease.

In contrast to vaccination, the deworming of donkeys was taken more seriously with 88% of donkeys being regularly dewormed. This is in agreement with previous studies where 79–91% of the donkeys were regularly treated with an anthelmintic drug.^{18,32} Nevertheless, there is still a need for optimization, particularly concerning selective deworming strategies.⁴⁰

In this study, almost a third of all donkeys had never received routine preventive dental maintenance, which is in line with the results of other studies on donkeys kept in Europe.^{5,32,33} Only 2,5% of all owners reported dental disease in their donkeys, whereas veterinarians listed them as one of the most common diseases in donkeys. In previous studies, dental disease was among the most important and prevalent conditions in donkeys with overall prevalences of up to 73%.^{5,19,28,45} Taking all these factors into account, we suspect that donkey owners often do not notice dental disease in their animals. The absence of clinical signs such as weight loss or dysphagia does not guarantee the absence of dental disease.^{7,25,50,56} Therefore, routine preventive dental maintenance is necessary for donkeys of all ages.^{5,27,30,33,50} Untreated dental disease is an important welfare issue in donkeys, resulting in pain, impaction colic, oesophageal obstruction, weight loss, and hyperlipemia.^{5,7,19,50}

Management, health, and veterinary care of donkeys in Switzerland: A cross-sectional study

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Of all donkeys included in this study, more than one in ten donkeys had already had a hoof abscess, confirming the previously described high prevalence of this disease in donkeys.^{18,32,59} Donkeys' hooves are used to a dry environment and are predisposed to hoof abscesses and white line disease if they are exposed to moisture, as in our latitudes.^{5,8,20,25,59} Even if donkeys are kept on dry surfaces, hoof trimming should be carried out every six to ten weeks.^{5,25,32} In this study, 72,5 % of all donkeys did not receive hoof trimming as frequently as recommended, which is even worse than previously reported.^{5,32} Lack of regular hoof trimming can lead to overgrown hooves, discomfort, hoof abscesses and other diseases of the musculoskeletal system.^{5,20,25}

The suboptimal implementation of preventive healthcare in Swiss donkeys is alarming and was confirmed by veterinarians and official veterinary offices, who considered it as one of the most common reasons when assessing the donkey's health status as poor or moderate. Another important reason was suspected to be a lack of knowledge on the part of donkey owners, which is in accordance with previous studies.^{17–19,21–23} In our study, we showed that owners who attended practical courses were more likely to adapt the housing and feeding management according to the species-specific needs of donkeys. Also, veterinarians might lack training and experience in donkey management and healthcare, as veterinary schools commonly offer few lectures on this subject.^{21,49,57} In collaboration with the Swiss Animal Protection SAP, several online training sessions on donkey husbandry and health have already been offered, with numerous donkey owners and veterinarians participating. Our goal is to continue providing regular education opportunities. Targeted education of donkey owners and veterinarians is the only way to improve the welfare of donkeys.

Limitations

Regarding the study participants, a selection bias is very likely. We assume that owners who are interested in and committed to donkey husbandry and health were more likely to participate. Thus, the results of this study may have been presented more positively than they would have been if the complete population of Swiss donkey owners had been surveyed. Furthermore, we could not verify the information provided by the participants. Finally, as with any analytical cross-sectional study, there is a risk of confounding, which was controlled as far as possible by the multivariable model and additional analysis of collinearity using the phi-coefficient.

Conclusion

This study is the first to provide a deeper insight into the management and health of donkeys in Switzerland. Targeted and sustained action is required to improve husbandry and feeding practices according to donkey-specific needs, to avoid overweight and related disorders such as AMS and laminitis and to create more awareness for the importance of preventive health care.

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Abbreviations

AMS =	Asinine metabolic syndrome
BCS =	Body condition score
BLW =	Bundesamt für Landwirtschaft
CI =	Confidence interval
EMS =	Equine metabolic syndrome
OR =	Odds ratio
PPID =	Pituitary pars intermedia dysfunction

Détention, santé et soins vétérinaires des ânes en Suisse: une étude transversale

Actuellement, peu d'information sur la détention et la santé des ânes en Suisse est disponible. Dans le cadre de cette étude, des propriétaires suisses d'ânes, des vétérinaires et des services vétérinaires officiels ont été interrogés en ligne afin d'obtenir des informations sur les pratiques actuelles de détention et d'alimentation, de la médecine préventive et du statut de santé des ânes en Suisse et de clarifier le besoin de formation continue dans ce domaine. Au total, 705 propriétaires possédant 1463 ânes, 141 vétérinaires et 19 services vétérinaires officiels ont été inclus dans l'étude.

La plupart des propriétaires détenaient leurs ânes dans des stabulations libres (73,9%) avec accès aux pâturages (98,3%). Sur l'ensemble des propriétaires d'ânes, 42,7% détenaient leur animal sans contact direct avec un congénère. Un âne sur trois (32,8%) était en surpoids, dont l'âge, la race et certaines conditions de détention étant significativement associés à cet état. Seuls 15,9% des ânes ont bénéficié de soins préventifs réguliers (vaccination antitétanique, vermifugation, soins dentaires préventifs de routine et parage des sabots). La fourbure et les abcès du sabot figuraient parmi les affections les plus fréquemment observées par les propriétaires (7,3% et 12,1%, respectivement, sur la base d'observations individuelles d'animaux), les vétérinaires (76,6% et 68,1%, respectivement, sur la base d'une estimation de la fréquence de la maladie dans la population de patients) et les services vétérinaires officiels (63,2% et 15,8%, respectivement, sur la base d'une estimation de la fréquence de la maladie dans les élevages inspectés). En revanche, les maladies dentaires et le syndrome métabolique de l'âne ont été moins souvent signalés par les propriétaires (2,5% et 0,7%, respectivement) que par les vétérinaires (56,7% et 34,8%, respectivement) et les services vétérinaires officiels (26,3% et 26,3%, respectivement), ce qui pourrait être dû à une méconnaissance de ces affections par les propriétaires.

La plupart des propriétaires d'ânes (54,0%), des vétérinaires (85,1%) et des services vétérinaires officiels (79,0%) étaient intéressés par davantage d'opportunités de formation sur la détention et la médecine des ânes. L'éducation ciblée est le moyen le plus efficace de sensibiliser les personnes concernées à la détention et aux soins médicaux adaptés à l'espèce et devrait être davantage encouragée en Suisse.

Mots clés: syndrome métabolique de l'âne (SMA), fourbure, surpoids, protection animale

Allevamento, salute e assistenza veterinaria degli asini in Svizzera: uno studio trasversale

Attualmente esistono poche informazioni sul allevamento e sulla salute degli asini in Svizzera. Nell'ambito di questo studio, sono stati intervistati tramite formulari online; proprietari di asini svizzeri, veterinari e uffici veterinari cantonali. Questo con lo scopo di raccogliere informazioni sulle pratiche attuali di allevamento e alimentazione, sull'assistenza sanitaria e sullo stato di salute degli asini in Svizzera; nonché per chiarire la necessità di una maggiore formazione in questo settore. Un totale di 705 proprietari con 1463 asini, 141 veterinari e 19 uffici veterinari ufficiali hanno partecipato allo studio.

La maggior parte dei proprietari teneva i propri asini in ripari aperti (73,9%) e con accesso al pascolo (98,3%). Tra tutti i proprietari, il 42,7% teneva il proprio asino senza contatti diretti con un altro asino. Un asino su tre (32,8%) è stato segnalato in sovrappeso, con età, razza e alcune condizioni di allevamento significativamente associate a questa condizione. Solo il 15,9% di tutti gli asini riceveva delle cure preventive regolari (inclusa la vaccinazione contro il tetano, la sverminazione, la manutenzione preventiva dentale di routine e la limatura degli zoccoli). La laminitite e gli ascessi agli zoccoli erano tra le malattie più frequentemente osservate dai proprietari (7,3% e 12,1%, rispettivamente, in base alle osservazioni di singoli animali), dai veterinari (76,6% e 68,1%, rispettivamente, in base alla stima della frequenza della malattia nella popolazione di pazienti) e dagli uffici veterinari cantonali (63,2% e 15,8%, rispettivamente, in base alla stima della frequenza della malattia nelle fattorie ispezionate). Al contrario, le malattie dentarie e la sindrome metabolica asinina sono state segnalate meno frequentemente dai proprietari (2,5% e 0,7%, rispettivamente) rispetto ai veterinari (56,7% e 34,8%, rispettivamente) e agli uffici veterinari cantonali (26,3% e 26,3%, rispettivamente). Una possibile spiegazione potrebbe essere la scarsa riconoscibilità di queste condizioni da parte dei proprietari.

La maggior parte dei proprietari di asini (54,0%), dei veterinari (85,1%) e degli uffici veterinari cantonali (79,0%) era interessata a maggiori opportunità educative relative al allevamento e alle cure degli asini. Un'educazione mirata sarà il modo più efficace per sensibilizzare sull'allevamento e sull'assistenza medica adeguata alla specie e dovrebbe essere incentivata maggiormente in Svizzera.

Parole chiave: Sindrome metabolica asinina (AMS), laminitide, sovrappeso, benessere

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