UNIVERSIDADE ESTADUAL
VALE DO ACARAÚ

UNIVERSIDADE ESTADUAL VALE DO ACARAÚ
PROGRAMA DE MESTRADO EM ZOOTECNIA

AVALIAÇÃO DO ESTRESSE MATERNO-FILIAL EM REBANHOS LEITEIROS PORTADORES DE LENTIVÍRUS DE PEQUENOS RUMINANTES NA REGIÃO SEMIÁRIDA DO NORDESTE BRASILEIRO

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SOBRAL - CE
MARÇO – 2020

Dados Internacionais de Catalogação na Publicação

Universidade Estadual Vale do Acaraú

Sistema de Bibliotecas

Lopes, Ana Kelry Carneiro
AVALIAÇÃO DO ESTRESSE MATERNO-FILIAL EM REBANHOS LEITEIROS PORTADORES DE LENTIVÍRUS DE PEQUENOS RUMINANTES NA REGIÃO SEMIÁRIDA DO NORDESTE BRASILEIRO [recurso eletrônico] / Ana Kelry Carneiro Lopes. -- Sobral, 2020.
1 CD-ROM: 4 $^{3}/_{4}$ pol.

CD-ROM contendo o arquivo no formato pdf do trabalho acadêmico com 95 folhas.
Orientação: Prof.ª Dr.ª Alice Andrioli Pinheiro.
Co-Orientação: Prof.ª Dr.ª Angela Maria de Vasconcelos.

Dissertação (Programa de Mestrado em Zootecnia da Universidade Estadual Vale do Acaraú) - Universidade Estadual Vale do Acaraú / Centro de Ciências Agrárias e Biológicas

1. bem-estar animal. 2. caprinos leiteiros. 3. comportamento. 4. mensuração de cortisol. 5. lentiviroses. I. Título.

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Dissertação apresentada ao Programa de Mestrado em Zootecnia, da Universidade Estadual Vale do Acaraú, como requisito parcial para obtenção do Título de Mestre em Zootecnia.
Orientador (a): Prof.ª Dr.ª Alice Andrioli Pinheiro
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Esta Dissertação foi julgada adequada como requisito parcial para obtenção do título de "Mestre em Zootecnia" e aprovada em sua forma final pelo Programa de Pós-Graduação em Zootecnia da Universidade Estadual Vale do Acaraú

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Honro o fechamento deste ciclo dedicando à minha irmã, Karen Hellen Carneiro Souza e aos meus pais, Helena Maria Carneiro Lopes e José Euclides Neto, meus grandes incentivadores da realização dos meus sonhos. Muito obrigada!

AGRADECIMENTOS

Primeiramente, agradeço a DEUS, por toda fortaleza e perseverança que tem me dado para enfrentar com otimismo as batalhas do dia-a-dia e buscar com determinação a realização dos meus sonhos.

Aos meus pais, Helena e Neto pelo apoio, pela paciência e pelos conselhos, os quais foram propulsores para que eu alcançasse êxito nessa trajetória da vida. À minha irmã Karen, por me despertar o cuidado e o amor fraterno.

Ao meu avô, João Moacir (*in memoriam*) por transmitir reflexos de admiração e identificação pelo curso de Zootecnia.

Às minhas madrinhas Marlene e Luzia, pelos conselhos e por todo carinho que me dedicaram desde a infância.

À minha orientadora, Dr.ª Alice, um agradecimento carinhoso por todas as oportunidades, pelos ensinamentos, por estar sempre disponível e por acreditar na minha capacidade. A ela também agradeço pelos estímulos e por compartilhar junto a ela a missão em contribuir para o progresso e o equilíbrio na vida dos animais.

Ao Renato Peixoto pela atenção e pela disponibilidade em sempre me repassar suas experiências práticas e teóricas com muita eficiência.

Aos funcionários e laboratoristas da Embrapa Caprinos e Ovinos pelo auxílio ao longo do desenvolvimento desse projeto, em especial, João Ricardo e Lidiane, pela realização dos testes laboratoriais, ao estatístico Adriano, Othon, Lino, Zequinha, Fábio, Edilson e Antônio.

Aos amigos embrapianos pelos plantões compartilhados, pelas horas de descontração, por todo apoio e ensinamentos: Ana Milena, Ana Lídia, Laninha e Edgar.

Aos bolsistas de iniciação científica que acompanharam e contribuíram com a realização desse trabalho com bastante desempenho: Carolina, Gabriel, Dalila, Mariana e Beatriz.

Aos meus amigos e companheiros de mestrado, os quais muitos estão comigo desde a graduação, Jéssica, Rogervânia, André, Shirley, Rodrigo, Samires, Evilene, Geysi, Igor, Valderlândia, Valcicleide e Bárbara.

Aos meus amigos de longas datas Maiara, Brena, Edleuda, Danisvânia, e Thiago, obrigada por tornarem meus dias mais felizes e menos dolorosos.

À Empresa Brasileira de Pesquisa Agropecuária, Embrapa Caprinos e Ovinos, pelo apoio técnico e estrutural para a concretização dessa pesquisa.

À Universidade Estadual Vale do Acaraú (UVA) e à coordenação do Programa de Pós-Graduação pela oportunidade de realização do Mestrado Acadêmico em Zootecnia.

Ao Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) pelo apoio financeiro do projeto.

Tudo se renova, as estações, as flores, as emoções, a vida é um ciclo, precisamos recomeçar a todo tempo, a essência de ser humano é isso, o novo!

Luana Barbosa

ABSTRACT

In programs for the control of small ruminant lentiviruses (SRLVs), artificial breastfeeding and early weaning focus on controlling the transmission of the virus, which can occur through ingestion of colostrum and / or milk from infected goats, in contrast, such practices cause consequences productive and impact on animal welfare. Therefore, the objective of this study was to evaluate maternal-filial stress in a positive herd for SRLVs in the Northeastern semi-arid region, through ethological analysis and quantification of cortisol in the blood plasma and the hair coat. Four subgroups were used according to the order of birth (primiparous or pluriparous) and to natural or artificial suckling: primiparous goats with natural suckling (PriN), primiparous goats with artificial suckling (PriA), pluriparous goats with natural suckling (PluN) and pluriparous goats with artificial suckling (PluA). The attentive posture was higher in goats from the PriA group (30.6%) compared to PriN (15.9%) and PluA (13.7%). The matrices of the PriN group showed lesser positioning behavior when compared to the PluN, (17.8%, 31.6%, respectively) ($p \leq 0.05$). As for the behavior of the kids, there was a difference ($p \leq 0.01$) for the vocalization parameter between those separated from pluriparous mothers (60.48%) and those kept with the mother (8.54%). The same occurred with the kids of the primiparous (43.20%; 6.99%) separated and those kept with their mothers, respectively. The separated kids of pluriparous mothers had a higher record for attempted escape ($p \leq 0.05$), attentive posture ($p \leq 0.01$), and restlessness ($p \leq 0.01$), concerning those kept with their mothers. Primiparous kids were more restless ($p \leq 0.01$) and attentive ($p \leq 0.01$). The plasma cortisol and hair values did not differ ($p > 0.05$), except at parturition. It is concluded that the postpartum separation exerts higher levels of stress in the kids, mothers already have a level of stress related to external factors, and the postpartum separation does not interfere in the maternal ability of the mothers in subsequent births.

Key words: Dairy goats. Behavior. Measurement of cortisol.

RESUMO

Em programas de controle das Lentiviroses de Pequenos Ruminantes (LVPRs) o aleitamento artificial e a desmama precoce têm foco no controle da transmissão do vírus, a qual pode ocorrer pela ingestão do colostro e/ou leite de cabras infectadas, em contrapartida, tais práticas ocasionam consequências produtivas e impacto no bem-estar animal. Portanto, objetivou-se avaliar o estresse materno-filial em rebanho positivo para LVPRs no semiárido nordestino, por análise etológica e quantificação de cortisol no plasma sanguíneo e no pelame. Utilizaram-se quatro subgrupos conforme a ordem de parto (primíparas e pluríparas) e aleitamento (natural ou artificial): cabras primíparas com amamentação natural as crias (PriN), cabras primíparas com aleitamento artificial as crias (PriA), cabras pluríparas com amamentação natural as crias (PluN) e cabras pluríparas com aleitamento artificial as crias (PluA). A postura vigilante foi maior em cabras do grupo PriA (30,6%) em relação as PriN (15,9%) e as PluA (13,7%). As matrizes do grupo PriN manifestaram menor comportamento de posição para mamada em relação as PluN, (17,8%, 31,6%, respectivamente) ($p \leq 0,05$). Quanto ao comportamento das crias, houve diferença ($p \leq 0,01$) para o parâmetro vocalização entre as separadas das mães pluríparas (60,48%) e às mantidas com a mãe (8,54%). O mesmo ocorreu com as crias das primíparas (43,20%; 6,99%) separadas e as mantidas com as progenitoras, respectivamente. As crias separadas de mães pluríparas apresentaram maior registro para tentativa de fuga ($p \leq 0,05$), postura vigilante ($p \leq 0,01$) e inquietação ($p \leq 0,01$), em relação às mantidas com suas progenitoras. As crias de primíparas se mostraram mais inquietas ($p \leq 0,01$) e vigilantes ($p \leq 0,01$). Os valores do cortisol plasmático e do pelo não diferiram ($p > 0,05$), exceto ao parto. Conclui-se que a separação pós-parto exerce maiores níveis de estresse nas crias, já matrizes apresentam nível de estresse relacionado a fatores externos, e a separação pós-parto não interfere na habilidade materna das matrizes nos partos subsequentes.

Palavras-chave: Caprinos leiteiros. Comportamento. Mensuração de cortisol.

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LISTA DE ABREVIATURAS, SIGLAS E SÍMBOLOS

%	Porcentagem
ACTH	Adrenocorticotropina
ANUALPEC	Anuário da Pecuária Brasileira
BEA	Bem-estar Animal
°C	Graus Celsius
CAE	Artrite Encefalite Caprina
CAEV	Vírus da Artrite Encefalite Caprina
CONCEA	Conselho Nacional de Controle de Experimentação Animal
DNA	Ácido Desoxirribonucleico
EDTA	Ácido Etilenodiamino Tetra-Acético
EIA	Ensaio Imunoenzimático
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuária
ELISA	Enzyme Linked Immunosorbent Assay
ELISA-i	ELISA Indireto
g	Força Centrífuga
GP	Ganho de Peso
HPA	Hipotálamo-Hipófise-Adrenal
IA	Inseminação Artificial
IDGA	Imunodifusão em gel de agarose
INMET	Instituto Nacional de Meteorologia
kg	Quilograma
LVPR	Lentiviroses de Pequenos Ruminantes
LVPRs	Lentiviroses de Pequenos Ruminantes
mg/kg	Miligrama por quilograma

Ml	Mililitro
MVV	Vírus da Maedi-visna
n	Número de determinado comportamento manifestado pelo animal
N	Total de avaliações de comportamento realizadas durante o experimento
ng/mL	Nanograma por mililitro
nm	Nano metros
nmol/mL	Nano-mol por mililitro
NRC	National Research Council
P≥0,05	Probabilidade maior ou igual que 5%
P≤0,05	Probabilidade menor ou igual que 5%
P>0,05	Probabilidade maior que 5%
P<0,05	Probabilidade menor que 5%
P≤0,01	Probabilidade menor ou igual que 1%
***n*PCR**	*Nested*-PCR
PF	Peso Final
PI	Peso Inicial
PriA	Primíparas e Aleitamento Artificial
PriN	Primíparas e Amamentação Natural
PluA	Pluríparas e Aleitamento Artificial
PluN	Pluríparas e Amamentação Natural
QBA	Qualitative Behavioral Assessment
RIA	Radioimunoensaio
RNA	Ácido Ribonucleico
TE	Transferência de Embriões
µg	Micrograma

vs.	Versus
WB	Western Blot
χ^2	Qui-quadrado

SUMÁRIO

1. INTRODUÇÃO GERAL

A caprinocultura leiteira destaca-se pela notória atuação e evolução no cenário agropecuário brasileiro. Atualmente, a maior concentração de rebanhos caprinos encontra-se na região Nordeste, detentora do maior efetivo nacional.

Apesar do crescimento evidenciado no efetivo de animais nessa região, o baixo desempenho produtivo é característico na maioria dos rebanhos. Na busca por incrementar a lucratividade da atividade, diversa tecnologias têm sido implementadas. O emprego dos diferentes métodos de aleitamento artificial em raças caprinas produtoras de leite é uma prática que apresenta vantagens por permitir o comércio de um maior volume de leite, além de reduzir a transmissão de doenças causadas por patógenos que podem estar presentes no leite ou colostro, como os lentivírus de pequenos ruminantes (LVPRs). Como desvantagens**,** a redução do período de aleitamento pode estar associada a alterações no desempenho dos cabritos e das matrizes devido ao estresse proporcionado pelo manejo.

A adoção de práticas de manejo geral como a redução do período de aleitamento, suas consequências produtivas e impacto no bem-estar animal deve ser adequadamente estudadas a fim de validar e/ou recomendar sua implementação em sistemas de produção de leite caprino.

1.1 OBJETIVO GERAL

- Avaliar o estresse materno-filial em rebanho soropositivo para lentivírus de pequenos ruminantes no semiárido nordestino por análise etológica e quantificação de cortisol no plasma sanguíneo e pelo.

1.2 OBJETIVOS ESPECÍFICOS

- Analisar o comportamento de crias e matrizes quando submetidas à separação logo após o parto no semiárido nordestino;
- Mensurar os níveis de cortisol do sangue e do pelo de crias e matrizes quando submetidas à separação logo após o parto no semiárido nordestino;
- Contribuir para a eficácia dos programas de controle dos LVPR.

CAPÍTULO I

REFERENCIAL TEÓRICO

1. Introdução

A caprinocultura leiteira tem aumentado de forma bastante significativa sua participação no setor produtivo, tanto nacional quanto internacionalmente. No Brasil, essa atividade vem a cada dia conquistando mais espaço e superando o constante desafio de buscar e manter novos mercados para o leite e seus derivados, além de ser um grande atrativo com importante papel econômico-social dentro do agronegócio da região semiárida do Nordeste brasileiro (Da Silva et al., 2018).

A exploração desse sistema de produção no semiárido nordestino caracteriza-se, sobretudo pela alta adaptabilidade dos animais de aptidão leiteira às condições de temperatura, umidade relativa do ar, solo e vegetação da região (Vieira et al., 2017). Além da rusticidade das diferentes raças leiteiras, evidencia-se ainda, o emprego de diferentes tipos de manejo e o ajuste dessa prática à realidade de pequenas propriedades, o que justifica a cadeia produtiva leiteira ser a principal base de sustentação para o semiárido (Carneiro et al., 2017).

Por outro lado, em consequência à acentuada concentração de exemplares nessa região e à precariedade sanitária nas propriedades, denota-se na atividade uma baixa produtividade, a qual está correlacionada inclusive à ocorrência de doenças infecciosas como as Lentiviroses de Pequenos Ruminantes (LVPR), com grande potencial de disseminação e transmissibilidade em rebanhos caprinos principalmente de finalidade leiteira (Rizzo et al., 2016).

Contudo, em programas de controle das Lentiviroses de Pequenos Ruminantes (LVPR) são adotadas práticas zootécnicas como aleitamento artificial e desmama precoce com foco no controle da disseminação da doença, uma vez que a principal via de transmissão do vírus ocorre pela ingestão do colostro e/ou leite provindo de cabras

infectadas, além disso, tais procedimentos favorecem destinar maiores quantidades do produto para o comércio (Medeiros et al., 2010).

Ademais, a fim de evitar a transmissão viral pelo colostro e pelo leite, a separação das crias de suas respectivas mães imediatamente após o nascimento, também está inserida nesse contexto (Rodrigues et al., 2018). Porém, tal manejo influencia diretamente o bem-estar desses animais, pois, o estresse é evidenciado segundo as alterações comportamentais e fisiológicas, como o aumento na intensidade e na frequência de vocalizações e nas concentrações de cortisol, respectivamente (Pullin et al., 2017).

Contudo, a mensuração dos níveis de cortisol é um importante indicador associado à avaliação comportamental na determinação do grau de bem-estar de uma espécie, sendo eficaz no diagnóstico de estressores decorrentes do isolamento social de crias separadas de suas mães após o nascimento, e a partir das aferições hormonais torna-se possível identificar a relação entre a interação materna e o desenvolvimento do comportamento social das crias (Damián et al., 2018).

2. Caprinocultura leiteira

No Brasil, a caprinocultura leiteira é identificada como uma importante atividade pela geração de renda e emprego no campo, especialmente quando está veiculada ao fortalecimento de programas de agropecuária familiar (Santos et al., 2018). O rebanho caprino nacional é estimado em 9,3 milhões de cabeças distribuídas por diversas extensões do território brasileiro. Embora exista uma grande população de caprinos em todo o país, o Brasil está na 18ª posição na produção de leite de origem caprina (Sousa et al., 2019).

O Nordeste concentra 92,7% da totalidade do rebanho nacional, tornando-o responsável por mais de 70% da produção nacional de leite caprino (ANUALPEC,

2017). Pela sua distribuição e adaptação produtiva ao clima do semiárido**,** a exploração leiteira encontra-se mais restrita a atender as condições de pequenas propriedades, sendo um indicativo que a atividade é a principal base de sustentação para a região semiárida (Carneiro et al., 2017).

Mediante os dados estimados, e apesar de numericamente expressivos, os animais mantêm índices produtivos baixos, devido ao precário padrão tecnológico empregado e a ocorrência de doenças infecciosas. No caso da Artrite Encefalite Caprina (CAE), ela impacta diretamente a produção por reduzir a vida produtiva, proporcionar infecções nas glândulas mamárias, elevar a mortalidade de cabritos, bem como, ocasiona períodos mais curto de lactação e de produtividade, afetando inclusive a qualidade do leite, com decréscimos nos níveis de gordura e proteína (Sousa et al., 2019).

Portanto, em função das perdas produtivas e econômicas e da alta transmissibilidade e disseminação do lentivírus de pequenos ruminantes nos rebanhos, principalmente àqueles de aptidão leiteira, há uma grande demanda por medidas de controle da CAE.

Dentre as medidas de controle dessa enfermidade, tem sido preconizada a separação de crias ao nascer evitando qualquer contato com a mãe, porém é uma prática difícil e onerosa, além de haver a possibilidade transmissão do vírus da mãe ao feto durante a prenhez.

A desmama precoce e o aleitamento artificial são práticas zootécnicas comuns nos sistemas de produção de leite aumentando as vendas e a lucratividade da propriedade (Peixoto et al., 2014), sem haver prejuízo ao desenvolvimento ponderal das crias desmamadas com 56, 70 ou 84 dias de idade (Ramos et al., 2004). No entanto, o

desmame pode causar estresse nos animais e ter efeito negativo no bem-estar animal (Winblad von Walter, et al., 2010).

Contudo, foi observado em ovinos que a interrupção abrupta do vínculo materno-filial tem efeito negativo no comportamento, no nível de cortisol e na resposta imune humoral de cordeiros (Napolitano et al., 2008).

3. Lentiviroses de pequenos ruminantes

Lentiviroses de pequenos ruminantes (LVPR) é o termo genérico utilizado para designar os vírus da Artrite Encefalite Caprina (CAEV) e Maedi-visna (MVV), os quais acometem caprinos e ovinos independentemente da idade, raça, gênero e sistema de exploração. Os LVPRs pertencem à subfamília *Orthoretrovirinae* e família de *Retroviridae* (Thomann et al., 2017).

A CAE é uma enfermidade multisistêmica, infecciosa e incurável. As células alvo dos LVPRs são monócitos e macrófagos, sendo que a enzima transcriptase reversa transforma o ácido ribonucleico (RNA) viral em ácido desoxirribonucleico (DNA) o qual é inserido ao DNA da célula hospedeira pela integrase. A infecção causa lesões inflamatórias crônicas e degenerativas no cérebro, nos pulmões, nas articulações e nas glândulas mamárias (Azevedo et al., 2015).

Na região Nordeste é relatado inúmeros registros soroepidemiológicos da Artrite Encefalite Caprina, a qual é classificada como endêmica, com maior potencial de disseminação em rebanhos leiteiros, aliado à aquisição de animais pelo comércio e à precariedade sanitária nas propriedades (Rizzo et al., 2016).

A transmissão dos LVPRs pode ocorrer de maneira direta ou indireta, pela ingestão de leite ou colostro de fêmeas infectadas, mediante reutilização de material descartável e contaminado, pela saliva e secreções respiratórias, dissipadas pelo contato direto e prolongado entre os animais, como também, pelo sêmen ou oócitos utilizados

em práticas reprodutivas como monta, inseminação artificial (IA) e transferência de embriões (TE) (Hasegawa et al., 2017). Salienta-se ainda a possibilidade de transmissão no momento do parto pela ingestão acidental de líquidos biológicos (sangue, saliva ou secreções respiratórias) durante a higienização da cria pela mãe (Oliveira Bezerra et al., 2014).

Por tratar-se de uma enfermidade destituída de tratamento ou vacina, o controle da CAE consiste na tentativa de reduzir a infecção viral no rebanho, portanto, a separação das crias das mães ao nascer e com posterior fornecimento de colostro e leite pasteurizado, é a principal medida preventiva empregada em sistemas de exploração leiteira (Rodrigues et al., 2018).

Aliado às medidas de controle, são utilizadas diferentes técnicas diagnósticas como imunodifusão em gel de agarose (IDGA) e *Nested*-PCR (*n*PCR), para a detecção da infecção dos LVPRs em rebanhos. Além disso, outros testes sorológicos (Elisa indireto – *Elisa-i* e *Western Blot*) podem ser realizados no diagnóstico inicial para lentiviroses em animais doadores de sêmen. Paralelamente à realização de tais exames, o manejo sanitário adequado, a higienização correta durante a ordenha, a segregação e o descarte de animais enfermos antes da introdução dos mesmos no plantel, também são mencionados como medidas de controle da doença, que consequentemente minimiza os impactos negativos à produção e ao bem-estar animal (Rizzo et al., 2016; Rodrigues et al., 2018).

4. Etologia e bem-estar animal

A espécie caprina foi provavelmente a primeira a ser domesticada, fato ocorrido há cerca de 10.000 anos atrás. Durante a domesticação, muitos dos traços comportamentais selvagens foram substituídos por outros comportamentos, possibilitando que os caprinos desenvolvessem características que os permitissem viver

e se reproduzir em cativeiro. Dessa maneira, as cabras domesticadas atualmente são resultados das adaptações e seleção artificial por criadores para obtenção de características específicas para carne, leite e pele (Miranda-de La Lama e Mattiello, 2010).

O termo Etologia vem do grego *ethos* que significa "hábito" ou "comportamento", portanto, é a ciência que estuda o comportamento dos animais domésticos, a qual tem por finalidade analisar fatores que influenciam as manifestações comportamentais particulares de cada espécie em determinadas situações, sejam elas naturais ou propositais, bem como investigar suas origens. A compreensão dessa ciência é essencial, para avaliação do bem-estar animal e otimização das condições de manejo nos diversos sistemas de produção (Andrioli e Brito, 2009).

Segundo Hempstead et al. (2018), medidas comportamentais foram relevantes na avaliação do bem-estar de cabritos leiteiros quando submetidos a práticas estressantes como a descorna. Os parâmetros comportamentais em vacas lactantes como: a frequência de acesso ao comedouro/bebedouro e o tempo de ruminação foram utilizados para indicar o estresse térmico e o bem-estar animal (Almeida et al., 2013).

Outro estudo recente, utilizando medidas quantitativas e qualitativas de bem-estar animal na espécie caprina, mostrou que a análise do desempenho produtivo em associação à observação de mudanças comportamentais, foi importante para obtenção de respostas quanto à adaptação de cabras às condições de manejo intensivo e quando expostas a diferentes graus de interação humana (Miller et al., 2018).

Pullin et al. (2017), estudando o efeito de fatores sociais e ambientais na adoção de desmama precoce em cordeiros observou comportamentos diferentes para os mesmos quando destinados a dois sistemas de produção (confinamento e pastejo), e

evidenciaram que crias mantidas com ovelhas adultas no pasto não tiveram seu hábito alimentar influenciado.

Averós et al. (2015) constataram que o estresse pré-natal em ovelhas exacerba os efeitos deletérios da separação materna precoce, afetando as habilidades de enfrentamento dos cordeiros, sendo estes mais temerosos, com níveis mais altos de imobilidade e maior número de vocalizações, além de serem socialmente dependentes do que crias de matrizes que não passaram pelo mesmo estresse pré-natal. Desta forma, quando está prevista a separação materna-filial é importante que as fêmeas prenhes sejam o máximo possível protegidas de fatores estressantes.

Desse modo, a Avaliação Comportamental Qualitativa (Qualitative Behavioral Assessment - QBA) apresenta-se como uma estratégia metodológica capaz de analisar a adaptabilidade, que pode ser identificada a partir da interação entre o animal e o ambiente. Portanto, o comportamento é importante indicador de estresse de um indivíduo (Napolitano et al., 2008; Miller et al., 2018), podendo ser até mais sensível que outros indicadores de Bem-Estar Animal (BEA) como a mensuração hormonal ou de alteração no sistema imunológico (Napolitano et al., 2008).

O emprego dos diferentes métodos de aleitamento artificial e desmama precoce em raças caprinas produtoras de leite são práticas que visam reduzir a transmissão de doenças causadas por patógenos que podem estar presentes no leite ou colostro, como os LVPRs. Em contrapartida, a separação mãe da cria ao nascer e a adaptação à nova dieta desafiam o bem-estar, uma vez que, são observadas mudanças comportamentais e fisiológicas, como o aumento na frequência de vocalizações e nos níveis de cortisol, respectivamente, tanto para a mãe quanto para as crias, causando impactos à produção (Pullin et al., 2017).

5. Cortisol

O cortisol é o principal glicocorticoide pertencente à família dos esteroides, sintetizado e secretado pelo córtex das glândulas adrenais (Saidu et al., 2016). Existe um vínculo entre o hormônio e os processos imunológicos e metabólicos, cujas funções estão atreladas à redução da captação de glicose pela maioria dos tecidos, aumentando a gliconeogênese, ou ainda atuando como anti-inflamatório e imunossupressor. Contudo, a mensuração das concentrações dos níveis de cortisol é amplamente utilizada como um importante indicador da presença de estressores (Yadav et al., 2013).

Esses estressores podem ter origem externa ou interna, os quais são estabelecidos e encaminhados para o sistema nervoso por meio de neurotransmissores até o hipotálamo. Posteriormente, o mesmo secreta o hormônio liberador de corticotropina (CRH), chegando até hipófise, ocasionando a liberação da adrenocorticotropina (ACTH), que por sua vez, ativa a secreção dos glicocorticoides, como o cortisol e as catecolaminas, adrenalina e noradrenalina, oriundos das glândulas adrenais (Saidu et al., 2016).

O cortisol pode ser quantificado por meio da utilização de *kits* comerciais, tendo como principais técnicas, o radioimunoensaio (RIA) e o ensaio imunoenzimático (EIA). Nos últimos anos, o EIA tornou-se mais comumente utilizado para determinar as concentrações hormonais de esteroides. Além de não ser radioativo, o EIA também é mais econômico, menos laborioso e pode ser mais sensível do que RIA na mensuração do cortisol sérico e plasmático em inúmeras espécies animais (Yadav et al., 2013), com fins de quantificar o grau de estresse causado por algumas práticas de manejo.

Em uma pesquisa visando a investigação do perfil adaptativo e o bem-estar de cabras lactantes em duas diferentes épocas (primavera e verão), mostrou que a concentração de cortisol foi positivamente correlacionada com fatores climáticos, sendo

que os níveis foram mais elevados durante o verão, quando a temperatura do ar foi maior, confirmando que o desencadeamento de alterações hormonais facilitam os parâmetros fisiológicos envolvidos no processo de adaptação e que colaboram também na inspeção de agentes estressores (Ribeiro et al., 2016).

A mensuração dos níveis de cortisol foi também um forte indicador aliado à análise comportamental na determinação do grau de bem-estar de um estudo com espécie ovina, cujo intuito era comparar a resposta do estresse ao isolamento social de cordeiros criados por suas mães ou criados separadamente, e a partir das aferições hormonais propuseram que o vínculo materno desempenha um papel fundamental no desenvolvimento do comportamento social das crias (Damián et al., 2018).

Portanto, os glicocorticoides são tipicamente designados como “hormônios do estresse”, cujas, alterações nos níveis estão associadas a eventos relacionados à dor e desconforto (Alvarez et al., 2015). Dessa maneira, a avaliação das concentrações de cortisol torna-se uma importante ferramenta para quantificar o grau de estresse, podendo ser determinado a partir de materiais biológicos como sangue (Saidu et al., 2016), leite (Romero et al., 2015), saliva (Green-Wood e Shutt, 1992; Negrão et al., 2004), urina (Higashiyama et al., 2007), além de outros, como fezes (Palme e Mostl, 1997) e pelo (Battini et al., 2015).

O cortisol do plasma sanguíneo desde então, é extensamente utilizado como índice de estresse agudo, já a aferição dos níveis de cortisol do pelo, vem sendo recentemente usada como método não invasivo. Dentre as vantagens da mensuração de cortisol no pelo está a praticidade de coleta e armazenagem, para analisar a atividade hipotálamo-hipofisária e o estresse crônico estimado por meses, em humanos, bem como, animais selvagens e domésticos (Endo et al., 2018).

Os referidos autores comprovaram tal benefício em sua pesquisa, cujo objetivo foi examinar a reação do hormônio de adrenocorticotrópico (ACTH) na função reprodutiva durante o ciclo estral e nas concentrações de cortisol do pelo em cabras, portanto, notaram que a administração exógena repetida de ACTH afetou o desenvolvimento e o processo ovulatório dos folículos ovarianos. Por outro lado, certificaram que a análise da concentração de cortisol do pelo pode ser usada para avaliar mudanças hormonais, relativamente, em longo prazo na circulação sanguínea.

Corroborando com Stubsjøen et al, (2018), os quais constataram que as concentrações de cortisol do pelo em ovinos apresentaram-se elevadas quando os mesmos desenvolveram sinais clínicos de febre transmitida por carrapatos, o que fortaleceu a investigação para o uso do hormônio como um biomarcador de estresse crônico.

6. Considerações finais

Observa-se que a exploração de leite de cabras no Nordeste brasileiro apresenta grande expansão devido ao grande contingente de animais nesta região. Por outro lado, os animais mantêm índices produtivos baixos, devido, inclusive à ocorrência de doenças infecciosas causadas pelos lentivírus, afetando a qualidade do leite.

No tocante às medidas de controle das LVPR, a separação de crias ao nascer sem contato com a mãe, tem sido empregada, porém é uma prática difícil e onerosa. Paralelamente, a desmama precoce e o aleitamento artificial são mencionados como procedimentos rotineiros nos sistemas de produção de leite visando aumentar as vendas do leite, bem como, prevenir a transmissão do vírus pelo colostro/leite.

Todavia, tais práticas podem causar estresse nos animais e ter efeito negativo no bem-estar animal, bem por isso, deve ser adequadamente estudadas a fim de validar e/ou recomendar sua implementação em sistemas de produção de leite caprino.

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ANEXO A

Revista Brasileira de Zootecnia

https://www.rbz.org.br/wp-content/uploads/2018/08/Instructions-to-authors.pdf

1. Scope

Revista Brasileira de Zootecnia-Brazilian Journal of Animal Science (RBZ) encompasses all fields of Animal Science Research. The RBZ publishes original scientific articles in the areas of Aquaculture; Biometeorology and Animal Welfare; Forage; Animal Genetics and Breeding; Animal Reproduction; Ruminant and Non-Ruminant Nutrition; Animal Production Systems and Agribusiness

2. Editorial policies

2.1. Open access and peer review

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1.1. Assurance of contents and assignment of copyright

When submitting a manuscript for review, authors should make sure that the results of the work are original, and that the total or partial content of the manuscript, regardless of the language, has not been/ is not being considered for publication in any other scientific journal. Additionally, the authors assure that if they have used the work and/or words of others this has been appropriately cited or quoted warranting absence of plagiarism, which constitutes unethical publishing behavior. Papers already published or that have been submitted to any other journal will not be accepted. Fractioned or subdivided studies should be submitted together because they will be assigned to the same reviewers.The content of the articles published by Revista Brasileira de Zootecnia is of sole responsibility of their authors.Authors who have a manuscript approved by

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Language

Submissions will only be accepted in the English language (either American or British spelling). The editorial board of RBZ reserves the right to demand that authors revise the translation or to cancel the processing of the manuscript if the English version submitted contains errors of spelling, punctuation, grammar, terminology, jargons or semantics that can either compromise good understanding or not follow the Journal's standards. It is strongly recommended that the translation process be performed by a professional experienced in scienti□ic writing familiar with Animal Science, preferably a native speaker of English.

Publication costs

The payment of the processing fee is a prerequisite for submitting manuscripts to referees. The processing fee is of R$ 53.00 (Fifty-three reals and no cents) for both members and non-members of the Brazilian Society of Animal Science (BSAS). Payment must be done according to guidance available on the SBZ website (www.sbz.org.br).

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Care and use of animals

The Revista Brasileira de Zootecnia is committed to the highest ethical standards of animal care and use. Research presented in manuscripts reporting the use of animals must guarantee to have been conducted in accordance with applicable federal, state, and

local laws, regulations, and policies governing the care and use of animals. The author should ensure that the manuscript contains a statement that all procedures were performed in compliance with relevant laws Board-invited reviews

An approach that represents state-of-the-art or critical view of issues of interest and relevance to the scientific community. It can only be submitted by invitation of the editorial board of RBZ. The invited reviews will be subjected to the peer-review process.and institutional

guidelines and, whenever pertinent, that the appropriate institutional committee(s) has approved them before commencement of the study.

1.1. Types of articles

Full-length research article

A full-length research paper provides a complete account of the experimental work. The text should represent the research process and foster its cohesive understanding and a coherent explanation regarding all the experimental procedures and results and must provide the minimal information necessary for an independent reproduction of the research.

Short communication

A succinct account of the final results of an experimental work, which has full justification for publication, although with a volume of information which is not sufficient to be considered a full-length research article. The results used as the basis to prepare the short communication cannot be used subsequently, neither partially nor wholly, for the presentation of a full-length article.

Technical note

An evaluation report or proposition of a method, procedure or technique that correlates with the scope of RBZ. Whenever possible, one should show the advantages and disadvantages of the new method, procedure or technique proposed, as well as its comparison with those previously or currently employed, presenting the proper scientific rigor in analysis, comparison, and discussion of results.

Board-invitedreviews

guidelines and, whenever pertinent, that the appropriate institutional committee(s) has approved them before commencement of the study.

Editorial

Notes to clarify and establish technical guidelines and/ or philosophy for designing and making of articles to be submitted and evaluated by RBZ. The editorials will be drafted by or at the invitation of the editorial board of RBZ.

1. Guidelines to prepare the manuscript

1.1. Structure of a full-length research article

Figures, Tables, and Acknowledgments should be sent as separated files and not as part of the body of the manuscript.The article is divided into sections with centered headings, in bold, in the following order: Abstract, Introduction, Material and Methods, Results, Discussion, Conclusions, Acknowledgments (optional) and References. The heading is not followed by punctuation.

3.1.1. Manuscript format

The text should be typed by using Times New Roman font at 12 points, double-space (except for Abstract and Tables, which should be set at 1.5 space), and top, bottom, left and right margins of 2.5, 2.5, 3.5, and 2.5 cm, respectively.The text should contain up to 25 pages, sequentially numbered in arabic numbers at the bottom. The file must be edited by using Microsoft Word® software.

3.1.2. Title

The title should be precise and informative, with no more than 20 words. It should be typed in bold and centered as the example: Nutritional value of sugar cane for ruminants. Names of sponsor of grants for the research should always be presented in the Acknowledgments section.

3**.1.3. Authors**

The name and institutions of authors will be requested at the submission process; therefore they should not be presented in the body of the manuscript. Please see the topic 4. Guidelines to submit the manuscript for details.The listed authors should be no more than eight. The list of authors must contain all authors` full name with no initials, current email address, and complete information about their affiliation. This list must follow the same authorship order presented in the Assurance of Contents and Copyright. Spurious and "ghost" authorships constitute an unethical behavior. Collaborative inputs, hand labor, and other types of work that do not imply intellectual contribution may be mentioned in the Acknowledgments section.

3.1.1. Abstract

The abstract should contain no more than 1,800 characters including spaces in a single paragraph. The information in the abstract must be precise. Extensive abstracts will be returned to be adequate with the guidelines.The abstract should summarize the objective, material and methods, results and conclusions. It should not contain any introduction. References are never cited in the abstract.The text should be justified and typed at 1.5 space and come at the beginning of the manuscript with the word ABSTRACT capitalized, and initiated at 1.0 cm from the left margin. To avoid redundancy the presentation of signficance levels of probability is not allowed in this section.

3.1.1. Key Words

At the end of the abstract list at least three and no more than six key words, set off by commas and presented in alphabetical order. They should be elaborated so that the article is quickly found in bibliographical research. The key words should be justified and typed in lowercase. There must be no period mark after key words.

3.1.1. Introduction

The introduction should not exceed 2,500 characters with spaces, briefly summarizing the context of the subject, the justifications for the research and its objectives; otherwise it will be rerouted for adaptation. Discussion based on references to support a specific concept should be avoided in the introduction. Inferences on results obtained should be presented in the Discussion section.

3.1.2. Material and Methods

Whenever applicable, describe at the beginning of the section that the work was conducted in accordance with ethical standards and approved by the Ethics and Biosafety Committee of the institution.

Please provide ethics comittee number as follows: “Research on animals was conducted according to the institutional committee on animal use (protocol number).As for the location of the experiment, it should contain city, state, country, and geographical coordinates (latitude, longitude, elevation). Names of universities, laboratories, farms or any other intitutions must not be mentioned.A clear description on the specific original reference is required for biological, analytical and statistical procedures. Any moifications in those procedures must be explained in detail.The presentation of the statistical model as a separate sentence from the text and as a numbered equation is mandatory whenever the research is about designed experiments, observational studies or survey studies. All terms, assumptions, and fitting procedures must be fully described to allow readers for a correct identification of the experimental unit.

3.1.3. Results

The author must write two sections by separating results and discussion. In the Results section, sufficient data, with means and some measure of uncertainty (standard error, coefficient of variation, confidence intervals, etc.) are mandatory, to provide the reader with the power to interpret the results of the experiment and make his own judgment. The additional guidelines for styles and units of RBZ should be checked for the correct understanding of the exposure of results in tables. The Results section cannot contain references.

3.1.4. Discussion

In the Discussion section, the author should discuss the results clearly and concisely and integrate the findings with the literature published to provide the reader with a broad base on which they will accept or reject the author’s hypothesis. Loose paragraphs and references presenting weak relationship with the problem being discussed must be avoided. Neither speculative ideas nor propositions about the hypothesis or hypotheses under study are encouraged.

3.1.5. Conclusions

Be absolutely certain that this section highlights what is new and the strongest and most important inferences that can be drawn from your observations. Include the broader implications of your results. The conclusions are stated by using the present tense.Do not present results in the conclusions, except when they are strictly important for the generalization.

3.1.6. Acknowledgments

This section is optional. It must come right after the conclusions.

The Acknowledgments section must NOT be included in the body of the manuscript; instead, a file named Acknowledgment should be prepared and then uploaded as “supplemental file NOT for review”. This procedure helps RBZ to conceal the identity of authors from the reviewers.

3.1.7. Use of abbreviations

Author-derived abbreviations should be defined at first use in the abstract, and again in the body of the manuscript, and in each table and figure in which they are used.The use

of author-defined abbreviations and acronyms should be avoided, as for instance: T3 was higher than T4, which did not differ from T5 and T6. This type of writing is appropriate for the author, but of complex understanding by the readers, and characterizes a verbose and imprecise writing.

3.1.8. Tables and Figures

It is essential that tables be built by option "Insert Table" in distinct cells, on Microsoft Word® menu (No tables with values separated by the ENTER key or pasted as figure will be accepted). Tables and figures prepared by other means will be rerouted to author for adequacy to the journal guidelines. Tables and figures should be numbered sequentially in Arabic numerals, presented in two separate editable files to be uploaded (one for the tables and one for the figures), and must not appear in the body of the manuscript. They may be uploaded separately and in a higher number of files if the size of the files hampers the upload. The title of the tables and figures should be short and informative, and the descriptions of the variables in the body of the table should be avoided.

In the graphs, designations of the variables on the X and Y axes should have their initials in capital letters and the units in parentheses. Non-original figures, i.e., figures published elsewhere, are only allowed to be published in RBZ with the express written consent of the publisher or copyright owner. It should contain, after the title, the source from where they were extracted, which must be cited. The units and font (Times New Roman) in the body of the figures should be standardized. The curves must be identified in the figure itself. Excessive information that compromises the understanding of the graph should be avoided. Use contrasting markers such as circles, crosses, squares, triangles or diamonds (full or empty) to represent points of curves in the graph. Figures should be built by using Microsoft Excel® to allow corrections during copyediting, and uploaded as a separate editable Microsoft Word® file, named "Figures" during submission. Use lines with at least 3/4 width. Figures should be used only in monochrome and without any 3-D or shade effects. Do not use bold in the figures The decimal numbers presented within the tables and figures must contain a point, not a comma mark. Mathematical formulas and equations must be inserted in the text as an object and by using Microsoft Equation or a similar tool.

3.1.1. References

Reference and citations should follow the Name and Year System (Author-date)

3.1.2. Citations in the text The author's citations in the text are in lowercase, followed by year of publication. In the case of two authors, use 'and'; in the case of three or more authors, cite only the surname of the first author, followed by the abbreviation et al. Examples: Single author: Silva (2009) or (Silva, 2009) Two authors: Silva and Queiroz (2002) or (Silva and Queiroz, 2002) Three or more authors: Lima et al. (2001) or (Lima et al., 2001) The references should be arranged chronologically and then alphabetically within a year, using a semicolon (;) to separate multiple citations within parentheses, e.g.: (Carvalho, 1985; Britto, 1998; Carvalho et al., 2001). Two or more publications by the same author or group of authors in the same year shall be differentiated by adding lowercase letters after the date, e.g., (Silva, 2004a,b). Personal communication can only be used if strictly necessary for the development or understanding of the study.

Therefore, it is not part of the reference list, so it is placed only as a footnote. The author's last name and first and middle initials, followed by the phrase "personal communication", the date of notification, name, state and country of the institution to which the author is bound.

3.1.3. References section

References should be written on a separate page, and by alphabetical order of surname of author(s), and then chronologically. Type them single-spaced, justified, and indented to the third letter of the first word from the second line of reference. All authors' names must appear in the References section. The author is indicated by their last name followed by initials. Initials should be followed by period (.) and space; and the authors should be separated by semicolons. The word 'and' precedes the citation of the last author. Surnames with indications of relatedness (Filho, Jr., Neto, Sobrinho, etc.) should be spelled out after the last name (e.g., Silva Sobrinho, J.). Do not use ampersand (&) in the citations or in the reference list.

As in text citations, multiple citations of same author or group of authors in the same year shall be differentiated by adding lowercase letters after the date. In the case of homonyms of cities, add the name of the state and country (e.g. Gainesville, FL, EUA; Gainesville, VA, EUA). Sample references are given below.

Articles

The journal name should be written in full. In order to standardize this type of reference, it is not necessary to quote the website, only volume, page range and year. Do not use a comma (,) to separate journal title from its volume; separate periodical volume from page numbers by a colon (:).

Miotto, F. R. C.; Restle, J.; Neiva, J. N. M.; Castro, K. J.;

Sousa, L. F.; Silva, R. O.; Freitas, B. B. and Leão, J. P. 2013. Replacement of corn by babassu mesocarp bran in diets for feedlot young bulls. Revista Brasileira de Zootecnia 42:213-219.

Articles accepted for publication should preferably be cited along with their DOI.

Fukushima, R. S. and Kerley, M. S. 2011. Use of lignin extracted from different plant sources as standards in the spectrophotometric acetyl bromide lignin method. Journal of Agriculture and Food Chemitry, doi: 10.1021/ jf104826n (in press).

Books

If the entity is regarded as the author, the abbreviation should be written first accompanied by the corporate body name written in full. In the text, the author must cite the method utilized, followed by only the abbreviation of the institution and year of publication. e.g.: "...were used to determine the mineral content of the samples (method number 924.05; AOAC, 1990)". Newmann, A. L. and Snapp, R. R. 1997. Beef cattle. 7th ed. John Wiley, New York. AOAC - Association of Official Analytical Chemistry. 1990. Official methods of analysis. 15th ed. AOAC International, Arlington, VA.

Book chapters

The essential elements are: author (s), year, title and subtitle (if any), followed by the expression "In", and the full reference as a whole. Inform the page range after citing the title of the chapter. Lindhal, I. L. 1974. Nutrición y alimentación de las cabras. p.425-434. In: Fisiologia digestiva y nutrición

de los ruminantes. 3rd ed. Church, D. C., ed. Acríbia, Zaragoza. Theses and dissertations It is recommended not to mention theses and dissertations as reference but always to look for articles published in peer-reviewed indexed journals. Exceptionally, if necessary to cite a thesis or dissertation, please indicate the following elements: author, year, title, grade, university and location. Castro, F. B. 1989. Avaliação do processo de digestão do bagaço de cana-de-açúcar auto-hidrolisado em bovinos. Dissertação (M.Sc.). Universidade de São Paulo, Piracicaba. Palhão, M. P. 2010. Induced codominance and double ovulation and new approaches on luteolysis in cattle. Thesis (D.Sc.). Universidade Federal de Viçosa, Viçosa, MG, Brazil.

Bulletins and reports

The essential elements are: Author, year of publication, title, name of bulletin or report followed by the issue number, then the publisher and the city. Goering, H. K. and Van Soest, P. J. 1970. Forage fiber analysis (apparatus, reagents, procedures, and some applications). Agriculture Handbook No. 379. ARS-USDA, Washington, D.C., USA.

Conferences, meetings, seminars, etc.

Quote a minimal work published as an abstract, always seeking to reference articles published in journals indexed in full. Casaccia, J. L.; Pires, C. C. and Restle, J. 1993. Confinamento de bovinos inteiros ou castrados de diferentes grupos genéticos. p.468. In: Anais da 30ª Reunião Anual da Sociedade Brasileira de Zootecnia. Sociedade Brasileira de Zootecnia, Rio de Janeiro.

Weiss, W. P. 1999. Energy prediction equations for ruminant feeds. p.176-185. In: Proceedings of the 61th Cornell Nutrition Conference for Feed Manufacturers. Cornell University, Ithaca.

Article and/or materials in electronic media

In the citation of bibliographic material obtained by the Internet, the author should always try to use signed articles, and also it is up to the author to decide which sources actually have credibility and reliability.In the case of research consulted online, inform the address, which should be presented between the signs

< >, preceded by the words “Available at” and the date of access to the document, preceded by the words “Accessed on:”.

Rebollar, P. G. and Blas, C. 2002. Digestión de la soja integral en rumiantes. Available at: <http://www.ussoymeal. org/ruminant_s.pdf.> Accessed on: Oct. 28, 2002.

Quotes on statistical software

The RBZ does not recommend bibliographic citation of software applied to statistical analysis. The use of programs must be informed in the text in the proper section, Material and Methods, including the specific procedure, the name of the software, its version and/or release year. “... statistical procedures were performed using the MIXED procedure of SAS (Statistical Analysis System, version 9.2.)“

1.1. Structure of the article for short communication and technical note

The presentation of the title should be preceded by the indication of the type of manuscript whether it is a short communication or a technical note, which must be centered and bold.

The structures of short communications and technical notes will follow guidelines set up for full-length papers, limited, however, to 14 pages as the maximum tolerated for the manuscript.

Processing and publishing fees applied to communications and technical notes are the same for full-length papers.

1.2. Additional guidelines for style and units – Use of percentage

Because of the intense use of units in percentage form (%), the Editorial Board of Revista Brasileira de Zootecnia defines that percentage should be exceptionally and seldom used only for description of relative variations (e.g., variation of a result obtained in a given treatment in relation to other treatment) and not as an absolute unit of measurement.

3.3.1. Chemical or feed composition of diets

Chemical compositions of diets or feedstuffs have to be expressed as mass contents, e.g., g kg−1 of dry matter or

3.3.2. Measures of intake Measures of intake have to be expressed as mass consumed per mass unit per unit of time.

Example:

Incorrect: "... animals presented average intake of 2.52% of body weight..." Correct: "… animals presented average intake of 25.2 g kg−1 d−1 of body weight…"

3.3.3. Units expressed as coefficients

In animal science, it is common to produce variables given by the ratio between two variables. Therefore, because they represent direct measures made at the experimental unit and not relative comparisons among different situations (e.g., among treatments), those variables have to be expressed as mass unit per mass unit. Most common examples:

Measures of digestibility coefficients:

Incorrect: "... the apparent digestibility coefficient of dry matter was 62.5%..."

Correct: "... the apparent digestibility coefficient of dry matter was 0.625…" (In this example, because it is a fractional measure, it is understood that it is expressed as g g−1 or kg kg−1). Another possibility is to express it as 625.0 g kg−1 of dry matter.

Measures of fractions in degradation assays or body fraction yields or microbial growth

Incorrect: "... estimate of potentially degradable insoluble fraction of protein was 36.2%..."

Correct: "... estimate of potentially degradable insoluble fraction of protein was 36.3 g/100 g..." Another possibility is to express it as 363.0 g kg−1 of crude protein.

Incorrect: "...average carcass dressing was 52.1% of body weight..."Correct: "...average carcass dressing was 52.1 kg/100 kg of body weight..."Incorrect: "… a microbial yield efficiency of 12.53% in comparison with intake of total digestible nutrients…"Correct: "… a microbial yield efficiency of 125.3 g of microbial protein per kg of total digestible nutrients…"Rates or variations over time in enzymatic measures or degradation assays or transit in the gastrointestinal tract

Incorrect: "… passage rate of fibrous material in the rumen environment was 3.5%/h…"

Correct: " passage rate of fibrous material in the rumen

environment was 0.035 h−1…” The number of decimal places to be presented should not exceed four; otherwise use scientific notation, i.e., a × 10b, or change the scale of measurements.Coefficients of correlation and determination, and descriptive levels of probabilityCoefficients of correlation and determination, and levels of probability are fractions and should not be expressed as percentage.Incorrect: “… the coefficient of determination of the model was 92.53% ” Correct: “ the coefficient of determination of the model wa0.9253 ”Incorrect: “... variables were strongly correlated (r = –82.39%) ”Correct: “...variables were strongly correlated (r = –0.8239) Incorrect: “ α = 5%.”Correct: “... α = 0.05.”

3.3.4. Correct use of percentages

As previously highlighted, percentage should be used only for description of relative variations. And it must be used with parsimony.

1.3. Additional guidelines for style and units – Representation of dispersion

The clear, cohesive and correct representation of the results of a research paper is a key component of the characteristics that comprise comprehension, quality and reliability of the scientific publishing process.

However, the direct observation of the manuscripts submitted and the papers published by RBZ enlightens the plurality of the forms of exposure of the indicators of significance and dispersion (measures of uncertainty) of the results presented. The Editorial Board of RBZ understands that the number of particularities in the form of exposing the results is directly proportional to the number of experimental designs and arrangements, as well as the number of statistical methods utilized. Nevertheless, standard guidelines should and can be adopted by the authors in order to make the manner of exposure of the results more homogeneous. Thus, the guidelines presented below, which comprise the most common situations, must be followed by the authors for the correct establishment of the publishing style of Revista Brasileira de Zootecnia.

3.4.1. About the representation of the descriptive levels of probability for type I error (P-value)

Following the international trend of results exposure in research papers, the authors are recommended to present P-values from the statistical analyses to the readers, regardless of the critical level of probability adopted in the manuscript (α value). Whatever methods have been applied will not alter the discussion content at all. However, this makes the presentation of results more clear and allows the reader to make “judgments” on the results if they have a different view from that presented by the authors. Reference notes for significance (e.g., use of asterisks) should be avoided.

It is mandatory that the P-value be presented with three decimal places. It must not be displayed with 2 decimal places, for it can generate ambiguity of interpretation (e.g., let us suppose that one assumes α = 0.05. If two variables tested independently present P-values of 0.049 and 0.051, the rounding off for the two decimal places will make a P-value of 0.05 for both; however, one shows significant effect, whereas the other does not.)

3.4.2. About the critical level of probability (the α value) adopted in the manuscript and the significance representation throughout the text

For the right discernment between significance and non-significance in hypothesis testing, according to the Neyman-Pearson school, there is the need for establishing a (maximum) critical level of probability acceptable for type I error, from which the differences must be assumed as non-significant, most commonly known as "α value". This must be properly exposed at the end of the description of the statistical procedures, because it is part of the methods set for the research paper.
Example: "...α = 0.05." The choice of the α value must be done during the experimental planning, considering the factors inherent to the environment and the experimental material and the natural variability of the response variables to be assessed at the assay. Although the α value refers nominally to control of type I error, it must be pointed out that the probability of occurrence of type I and II errors commonly manifest antagonistically. Therefore, more strict α values (e.g., 0.01) represent a great control of type I error, but may reduce the level of control of type II error. In this way, it is up to the researcher, after the proper experimental considerations, to define the priorities of control of the statistical errors in their conditions and to adopt the pertinent α level. If an author chose to make assertions about significance or no significance based on the previous choice of α, the indication of significance must agree with that choice. For instance, let us take a study conducted with α = 0.05. In this study, the analysis of variance showed a P-value of 0.019. When presenting this to the reader in the text, the author must utilize: "…a difference was observed (P<0.05)." For expressions in the text, use the letter P (capital letter), not in italic and without spaces. Example: "…intake increased (P<0.05), but there was no change in weight gain (P>0.05)." Additionally, for an RBZ's convention, the symbols ≤ or ≥ must not be used. Use only < or >. Do not use the form "P=0.XX".The basic theory of hypothesis testing shows us the fact that there are two, and only two, distinct regions under a distribution of probability when this is utilized in the test: acceptance region of H0 and rejection region of H0 (or region of no rejection of H0 and region of no acceptance of H0, as some areas would rather use).This leads us to the warning about two common mistakes involving the interpretation of significance: the use of the term "tendency" or "trend" and the qualification of significance (according to the Neyman-Pearson school). To illustrate the first mistake, let us suppose that an author is conducting a research project in whose planning α = 0.05. At the analyses, for one of the variables, a P-value of 0.061 was observed. Due to the proximity of this value to the α value, the researcher presents in their text: "…for the X variable there was tendency for difference…" Considering the summarized idea of tests and hypotheses presented previously, this type of argument is invalid, since there is no region of "tendency for acceptance of H0" or "tendency for rejection of H0". Thus, the value of the statistics calculated can only be included in the regions of "rejection" or "not rejection" of H0. In this sense, the proximity of the value to α does not matter, contrarily to which region the statistics' calculated value suits.Otherwise, to illustrate the second mistake, let us take a research paper in whose planning α = 0.05. In this case, two variables presented at ANOVA, P-values of 0.035 and 0.002. Some may state that the first result is taken as significant, and the second as "highly" significant, which characterizes qualification. Again, there is the warning: the proximity between the values of P and α does not matter. Hence, there are no "little", "very", "highly" or

“poorly” significant results, but only significant or non- significant.There is an increasing tendency among authors worldwide to commingle the Fisher school with the Neyman-Pearson school, i.e., to present significance level and compromise statistical precision with body of evidence in rejecting or not rejecting the null hypothesis. The Fisher school is based on body or strength of evidence, which means that the lower the P-value, the stronger the evidence. By body of evidence we mean that for some reason, such as some experimental conditions that could be controlled but were not, or some variable intervals presented can be calculated as the upper minus the lower limits of the confidence interval. Therefore, provided that the assumption about the distribution of errors holds true, for a given statistics computed from the or variables that are known to interfere on treatment. For all cases effects but were not dealt with for some particular reason (cost, rain, drought, etc.), a researcher is not forced to conclude in favor of the maintenance of the status quo simply because he (she) found P=0.058. Therefore, we strongly suggest the presentation of the confidence intervals because they combine the magnitude of a treatment effect with statistical precision and, as such, it circumvents the accept-reject dichotomy of the null hypothesis. Confidence intervals move us away from that dichotomy (Stang et al., 2010)1. The probability that a continuous random variable equals any one value is ZERO. That’s why confidence intervals are built, because instead of making inference about the true value of a parameter, we are now interested in inferring that the true value of the parameter lies within some interval, i.e., the confidence interval. For all practical applications this means that estimates have to be given as the estimate of the mean plus or minus a certain amount (Mood et al., 1974)2. Therefore,

reported above, s2 = RMS, in which RMS is the residual mean square.

3.4.3. Suggestions of styles for the representation of P-values and dispersion indicators in Tables for the most common experimental designs and arrangements3

Balanced experiments with qualitative treatments, conducted without the adoption of experimental arrangements, and considering homogeneous variances among treatments

In these situations, this form of table is recommended:sample size (n) and sample variance (s2). The value t1–α/2 is some statistics that could be computed from sample size and on the prior establishment of th

There are statistical softwares that present confidence intervals as outputs, and in such cases, the length of the Epidemiology 25:225-230. 2 Mood, A. M.; Graybill, F. A. and Boes, D. C. 1974. Intoduction to the theory of statistics. McGraw-Hill Kogakusha, LTD., Tokyo. The standard error of the mean must be expressed with the same number of decimal places applied to the means, and can be represented in the table by the acronym “SEM” or by the notation SX. For the specific case of this example, SEM is calculated as: arrangements and considering homogeneous variances among treatments

The differences between quantitative treatments must not be interpreted by means of conventional tests of multiple comparisons (e.g., Tukey, LSD, Duncan, SNK, Dunnett). It is important to emphasize that in case of supposition of homogeneous variances among treatments, only one indicator of variance must be presented; the indication of different standard errors to the different treatments is inconsistent with the

presuppositions of the analyses.Balanced experiments balanced with qualitative treatments, conducted without the adoption of experimental arrangements and considering heterogeneous variances among treatmentsThis type of experimental interpretation has become common with the evolution of the statistical software, especially with the utilization of PROC MIXED, from SAS. In this case, as different variances will be assumed among treatments, each treatment must be followed by its respective indicator of dispersion; in this case, the standard error may be used. Another possibility is to present the associated confidence intervals for treatment means.

Table 3 - Characteristics of the metabolism of nitrogen compounds in animals fed different protein nonlinear).A common and usually efficient form to interpret can be achieved by performing orthogonal decomposition of the sum of squares for treatments in contrasts associated with the different order effects (e.g., linear, quadratic, cubic, etc.). This decomposition can be done through the adjustment of equation of linear regression corresponding to the highest significant order effect4.

In the case of orthogonal decomposition, it must be emphasized that experiments carried out with "p" levels (in the case above, four levels of additive in the diet; p = 4) provide evaluation of "p-1" order effects (in the example, p – 1 = 3; linear, quadratic and cubic). The adoption of the maxim "models of cubic or superior order do not make sense" must be careful, and in some cases, this can distort the presentation and interpretation of results.

We stress that the indicator of dispersion presented in Table 1 is inherent to the treatment's mean (thence the association by the symbol ±). In this case, the standard error is mandatory (standard deviation must not be used). The presentation of the confidence intervals may offer a rather comprehensive data description.

In some cases where high-degree effects are not significant, one can proceed to its grouping in the interpretation of the experiment as "lack of fit", which can reduce the number of columns in the tables.4 When fitting the linear regression models, use the notation "r^2" (lowercase) for functions with a single independent variable (e.g., simple linear) and "R^2" (capital letter) for the functions with more than one independent variable or for polynomial models (e.g., quadratic).One example is shown in Figure 1, which simulates the interpretation of the concentration of rumen ammonia nitrogen as a function of the time after feeding. Observing the points equivalent to the average concentrations obtained in each period, it can be easily seen that the concentration of ammonia nitrogen rises up to the point of highest concentration more intensely than it declines after this point. So, at the interval evaluated, the elevation and reduction of the concentration of ammoniacal nitrogen are asymmetric in relation to the point of maximum concentration. The interpretation of start to build the aim of studies in terms of their possible interaction or their direct (independent) effects, should they not interact with themselves, on the response variables. Hence, this piece of information (interaction and/or independent effects) must be presented coherently to the reader.

1.4. Additional guidelines for style and units – Abbreviation

The use of defined abbreviations and acronyms by the authors, especially for treatments, should be avoided. When necessary, the abbreviation should be defined the first time it is used in the summary (abstract) and again in the body of the manuscript

There is no need to define symbols for chemical elements or simple compounds. Units of weights and measures conform to international standards; therefore it is incorrect to create new abbreviations.
Abbreviations in the titles and tables should be avoided. Long terms or expressions that aesthetically do not fit as written in tables should be spelled out as footnote of the table or figure.Example: “Average contents of dry matter (DM), crude protein (CP), acid detergent fiber (ADF), neutral detergent
fiber (NDF), ether extract (EE), mineral matter (MM), organic matter (OM), total carbohydrates (TC), non-fiber carbohydrates (NFC), and total digestible nutrients (TDN) of the ingredients of the experimental diets.” Suggestion: “Chemical composition of the experimental diets”
Do not start a sentence with an abbreviation, acronym or symbol.Wrong: “TC is a parameter that influences the final quality of the silage.” Suggestion: Total carbohydrate composition influences the final quality of the silage.The use of abbreviations and acronyms in the summary should be limited. Too many abbreviations in the text makes it aesthetically cluttered and impairs the comprehension. The description by using abbreviations is appropriate for the author, but difficult to interpret for the reader, who will need to stop reading to consult the descriptions in the text. Units of measure are not abbreviated when they follow a number in full at the beginning of a sentence. Wrong: 2 L of water were added to the contents for analysis (...) Suggestion: Two liters of water were added (...)
All abbreviations are written as singular, although they can be plural in the context (VFA instead of VFAs).
Abbreviations are generally not permitted in either the title or conclusions.
3.5.1. Abbreviations
AA = amino acid
AAI = essential amino acid(s)
ACTH = adrenocorticotropic hormone ADDM = apparent digestibility of dry matter ADF = acid detergent fiber
ADFI =average daily feed intake (differs from DMI) ADG = average daily gain
ADIN = acid detergent insoluble nitrogen ADL = acid detergent lignin
ADP = adenosine diphosphate AI = artificial insemination AIA = acid insoluble ash
AMP = adenosine monophosphate ANOVA = analysis of variance
ATP = adenosine triphosphate ATPase = adenosine triphosphatase avg = average (use only in tables) BCS = body condition score
BHBA = β-hydroxybutyrate
BLUE =best linear unbiased estimator BLUP = best linear unbiased predictor bp = base pair
BSA = bovine serum albumin bST = bovine somatotropin BTA = Bos taurus autosome
BUN = blood urea nitrogen BW = body weight
CCW= cold carcass weight
cDNA = complementary deoxyribonucleic acid
CF = crude fiber
CI = confidence interval*

CLA = conjugated linoleic acid CN = casein
CoA = coenzyme A
Co-EDTA = Cobalt ethylenediaminetetraacetate CP = crude protein
cRNA = complementary ribonucleic acid CV = coefficient of variation*
DCAD = dietary cation-anion difference DE = digestible energy
df = degrees of freedom* DFD(meat) = dark, firm, and dry DIM = days in milk
DM = dry matter
DMI = dry matter intake DNA = deoxyribonucleic acid DNase = deoxyribonuclease
EBV = estimated breeding value
eCG = equine chorionic gonadotropin ECM = energy-corrected milk
EDTA = ethylenediaminetetraacetic acid EE = ether extract
EFA = essential fatty acid EIA = enzymeimmunoassay
ELISA = enzyme-linked immunosorbent assay EPD = expected progeny difference
ETA = estimated transmitting ability FA = fatty acid
FCM = fat-corrected milk FFA = free fatty acids
FSH = follicle-stimulating hormone
GAPDH = glyceraldehyde 3-phosphate dehydrogenase GC-MS = gas chromatography-mass spectrometry
GE = gross energy
GH = growth hormone
GHRH = growth hormone-releasing hormone GLC = gas-liquid chromatography
GLM = general linear model
GnRH = gonadotropin-releasing hormone h2 = heritability*
hCG = human chorionic gonadotropin HCW = hot carcass weight
HEPES = N-2-hydroxyethyl piperazine-N'-ethanesulfonic acid
HPLC = high performance (pressure) liquid chromatography HTST = high temperature, short time
i.d. = inside diameter
i.m. = intramuscular
i.p. = intraperitoneal
i.v. = intravenous IFN = interferon
Ig = immunoglobulin
IGF = insulin-like growth factor
IGFBP =insulin-like growth factor-binding protein IL = interleukin
IMI = intramammary infection IR = infrared reflectance
IVDMD = in vitro dry matter disappearance LA = lactalbumin
LD50 = lethal dose 50% LG = lactoglobulin
LH = luteinizing hormone
LHRH = luteinizing hormone-releasing hormone Lig = lignin
LM = longissimus(dorsi) muscle LPS = lipopolysaccharide
LSD = least significant difference* LSM = least squares means*
mAb = monoclonal antibody ME = metabolizable energy
MEn = metabolizable energy corrected for nitrogen balance MIC = minimum inhibitory concentration

ML = maximum likelihood
MP = adenosine monophosphate MP = metabolizable protein
mRNA = messenger ribonucleic acid MS = mean square*
mtDNA = mitochondrial deoxyribonucleic acid MUFA = monounsaturated fatty acids
MUN = milk urea nitrogen n = number of samples*
NAD = nicotinamide adenine dinucleotide NADH = reduced form of NAD
NADP = nicotinamide adenine dinucleotide phosphate NADPH2 = reduced form of NADP
NAGase = N-acetyl-ß-D-glucosaminidase NAN = nonammonia nitrogen
NDF = neutral detergent fiber NE = net energy
NEFA = nonesterified fatty acids NEg = net energy for gain
NEl = net energy for lactation
NEm = net energy for maintenance
NEm+p =net energy for maintenance and production NEp = net energy for production
NFC = nonfiber carbohydrates NPN = nonprotein nitrogen
NRC = National Research Council NS = nonsignificant*
NSC = nonstructural carbohydrates
o.d. = outside diameter OM = organic matter
* Use generally restricted to tables and parenthetical expressions.
PAGE = polyacrylamide gel electrophoresis PBS = phosphate-buffered saline
PCR = polymerase chain reaction pfu = plaque-forming unity
PG = prostaglandin
PGF2α = prostaglandin F2α
PMNL = polymorphonuclear neutrophilic leukocyte PMSG = pregnant mare's serum gonadotropin
PSE = pale, soft, and exudative (meat) PTA = predicted transmitting ability PUFA = polyunsaturated fatty acids QTL = quantitative trait loci
r = correlation coefficient*
R2 = coefficient of determination* RDP = rumen-degradable protein
REML = restricted maximum likelihood
RFLP = restriction fragment length polymorphism RIA = radioimmunoassay
RNA = ribonucleic acid RNase = ribonuclease
rRNA = ribosomal ribonucleic acid RUP = rumen-undegradable protein
s.c. = subcutaneous
SCC = somatic cell count SCM = solids-corrected milk SD = standard deviation*
SDS = sodium dodecyl sulfate SE = standard error*
SEM = standard error of the mean* SFA = saturated fatty acids
SNF = solids-not-fat
SNP = single nucleotide polymorphism sp., spp. = one species, several species SPC = standard plate count
SS = sums of squares*
SSC = sus scrofa chromosome
SSPE = saline-sodium phosphate-edta buffer ST = somatotropin
TCA = trichloroacetic acid

TDN = total digestible nutrients TLC = thin layer chromatography TMR = total mixed ration
Tris = tris(hydroxymethyl)aminomethane TSAA = total sulfur amino acids
UF = ultrafiltration, ultra filtered UHT = ultra-high temperature UV = ultraviolet
VFA = volatile fatty acids
wt = weight (use only in tables)
Physical units and other units
× = crossed with, times
°C = celsius (with number
µ (prefix) = micro
µCi = microcurie
µE = micro-einstein
µF = microfarads
µg = microgram
µg kg−1 = parts per billion
µL = microliter
amu = atomic mass unit atm = atmosphere
bp = base pair ca. = circa
cal = calorie
cc, cm3 = cubic centimeter cfu = colony-forming unit Ci = curie
cm = centimeter cM = centimorgan
cm2 = centimeter, square cP = centipoise
cpm = counts per minute cps = counts per second
CPU = central processing unit cu = cubic
D = density d = day(s)
Da = dalton dL = deciliter
Eq = equivalents g = gram
g = gravity h = hour(s) ha = hectare
Hz = cycles per second (hertz) IU = international unit
J = joule
K = Kelvin
k (prefix) = kilo kb = kilobase
Kbp = kilobase pair KB = kilobyte
kcal = kilocalorie
keV = kiloelectron volts kg = kilogram
kPa = kilopascal KU = Klett units L = liter
ln = logarithm (natural) log10 = logarithm (base 10) lx = lux
M (prefix) = mega m (prefix) = milli m = meter
M = molar (concentration) mg kg−1 = parts per million min = minute(s)
mL = milliliter
mM = millimolar (concentration) mm Hg = millimeters of mercury mm3 = cubic millimeter
mmol = millimole (mass) mo = month(s)
mol = mole (number, mass) n (prefix)= nano

N = Newton
N = normal (concentration) ng = nanogram
p (prefix) = pico P = probability Pa = Pascal
pfu = plaque-forming unit pg = picogram
rpm = revolutions per minute RU = rennet activity unit
s = second(s)
U = unit
use lx = foot-candle
use mmol kg−1 = osmolality V = volt
vol = volume
vol vol−1 (use parenthetically) = volume/volume W = Watt
wk = week(s)
wt vol−1 (use parenthetically) = weight/volume yr = year(s)
Time: The 24h clock should be used, e.g.: 14.00 hours;
14.30 hours

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CAPÍTULO II

AVALIAÇÃO DO ESTRESSE MATERNO-FILIAL EM REBANHOS LEITEIROS PORTADORES DE LENTIVÍRUS DE PEQUENOS RUMINANTES NA REGIÃO SEMIÁRIDA DO NORDESTE BRASILEIRO

Periódico: **Journal of Veterinary Behavior** (ISSN: 1558-7878)
Qualis: B1 na Zootecnia
Fator de Impacto: 1.590
Status: Submetido em 20/07/2020

Avaliação do estresse materno-filial em rebanho leiteiro portador de lentivírus de pequenos ruminantes na região semiárida do nordestino brasileiro

Evaluation of maternal-filial stress in a dairy goat herd with small ruminant lentivirus infection in the Brazilian northeastern semiarid region

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DESTAQUES

- Separação pós-parto e desmame precoce não afetaram o peso ao desmame dos cabritos
- Separação de neonatos de suas mães pós-parto exerce causa de estresse para as crias
- O grau de estresse maior nas matrizes dá-se em função de fatores externos
- Cabras submetidas a retirada das crias pós-parto não perdem a habilidade materna

ABSTRACT

The objective of this study was to evaluate maternal-filial stress in a positive herd for small ruminant lentiviruses (SRLVs), submitted to a control program for this disease, in the Northeastern semi-arid region, through ethological analysis and quantification of cortisol in the blood plasma and the hair coat. After the parturitions, four subgroups were formed according to the order of birth (primiparous or pluriparous) and to natural or artificial suckling: primiparous goats with natural suckling (PriN), primiparous goats with artificial suckling (PriA), pluriparous goats with natural suckling (PluN) and pluriparous goats with artificial suckling (PluA). The attentive posture was higher in goats from the PriA group (30.6%) compared to PriN (15.9%) and PluA (13.7%). The matrices of the PriN group showed lesser positioning behavior when compared to the PluN, (17.8%, 31.6%, respectively) ($p \leq 0.05$). As for the behavior of the kids, there was a difference ($p \leq 0.01$) for the vocalization parameter between those separated from

pluriparous mothers (60.48%) and those kept with the mother (8.54%). The same occurred with the kids of the primiparous (43.20%; 6.99%) separated and those kept with their mothers, respectively. The separated kids of pluriparous mothers had a higher record for attempted escape ($p \leq 0.05$), attentive posture ($p \leq 0.01$), and restlessness ($p \leq 0.01$), concerning those kept with their mothers. Primiparous kids were more restless ($p \leq 0.01$) and attentive ($p \leq 0.01$). The plasma cortisol and hair values did not differ ($p > 0.05$), except at parturition. It is concluded that the postpartum separation exerts higher levels of stress in the kids, mothers already have a level of stress related to external factors, and the postpartum separation does not interfere in the maternal ability of the mothers in subsequent births.

Key words: Animal welfare, dairy goats, behavior, measurement of cortisol, lentivirosis

RESUMO

Objetivou-se avaliar o estresse materno-filial em rebanho positivo para lentivírus de pequenos ruminantes (LVPRs), submetido a programa de controle desta enfermidade, no semiárido nordestino, por análise etológica e quantificação de cortisol no plasma sanguíneo e no pelame. Após as parições formaram-se quatro subgrupos conforme a ordem de parto (primíparas e pluríparas) e aleitamento adotado (natural ou artificial): cabras primíparas com amamentação natural as crias (PriN), cabras primíparas com aleitamento artificial as crias (PriA), cabras pluríparas com amamentação natural as crias (PluN) e cabras pluríparas com aleitamento artificial as crias (PluA). A postura vigilante foi maior em cabras do grupo PriA (30,6%) em relação as PriN (15,9%) e as PluA (13,7%). As matrizes do grupo PriN manifestaram menor comportamento de

posição para mamada em relação as PluN, (17,8%, 31,6%, respectivamente) ($p \leq 0,05$). Quanto ao comportamento das crias, houve diferença ($p \leq 0,01$) para o parâmetro vocalização entre as separadas das mães pluríparas (60,48%) e às mantidas com a mãe (8,54%). O mesmo ocorreu com as crias das primíparas (43,20%; 6,99%) separadas e as mantidas com as progenitoras, respectivamente. As crias separadas de mães pluríparas apresentaram maior registro para tentativa de fuga ($p \leq 0,05$), postura vigilante ($p \leq 0,01$) e inquietação ($p \leq 0,01$), em relação às mantidas com suas progenitoras. As crias de primíparas se mostraram mais inquietas ($p \leq 0,01$) e vigilantes ($p \leq 0,01$). Os valores do cortisol plasmático e do pelo não diferiram ($p > 0,05$), exceto ao parto. Conclui-se que a separação pós-parto exerce maiores níveis de estresse nas crias, já matrizes apresentam nível de estresse relacionado a fatores externos, e a separação pós-parto não interfere na habilidade materna das matrizes nos partos subsequentes.

Palavras-chave: Bem-estar animal, caprinos leiteiros, comportamento, mensuração de cortisol, lentiviroses

INTRODUÇÃO

O bem-estar animal influência de distintas formas os animais de produção, e recentemente tem chamado a atenção dos consumidores dotados de maior senso crítico, com relação à segurança alimentar e a ética (Stilwell, 2016).

Para atender a essa demanda, a avaliação do bem-estar animal (BEA) deve ser realizada a campo, integrada ao desenvolvimento de programas de monitoramento animal e ao uso de indicadores qualitativos e quantitativos de bem-estar (Grosso et al., 2016).

Neste sentido, a análise comportamental dos animais é um critério qualitativo que reflete a inter-relação entre o animal e o seu ambiente (Miranda-de La Lama e Mattiello, 2010), bem como fornece informações relevantes acerca do estado emocional do animal, porém para ser irrefutável requer o uso de indicadores quantitativos de BEA (Battini et al., 2014). Deste modo, a mensuração de concentrações de cortisol nos mais distintos tipos de amostras biológicas é uma alternativa para certificar o grau do estresse, oriundo de algumas práticas de manejo adotadas em sistemas leiteiros de produção (Souza et al., 2012). Adicionalmente, a determinação do cortisol a partir do pelo é um método não-invasivo que reduz as chances de resultados incorretos (Battini et al., 2015), e que mensura a longo prazo a atividade do eixo hipotálamo-hipófise-adrenal (HPA) nas mais diversas espécies de mamíferos (Furtbauer e Solman, 2019).

A desmama precoce (50 dias de idade) e o aleitamento artificial são práticas comuns em rebanhos leiteiros (Magiero et al., 2015), enquanto a separação materno-filial ao parto é parte importante dos programas de controle dos Lentivírus de Pequenos Ruminantes (LVPRs) (Rodrigues et al., 2018), os quais são transmitidos principalmente pela via lactogência (colostro e leite) (Pisoni et al., 2010) e causa uma enfermidade degenerativa incurável e sem vacina eficaz (Venturino et al., 2019). Estas práticas tem sido preconizadas a anos, sendo adotada no rebanho leiteiro da Embrapa Caprinos e Ovinos a mais de 20 anos, portanto abrangeu várias gerações de cabras leiterias, o que poderia influenciar a habilidade materna deste rebanho.

No entanto, ainda não foi mensurado o nível de estresse que tais práticas de manejo acarretam aos animais, uma vez que são passíveis de influenciar não apenas o bem-estar como afetar a etologia dos animais, e das gerações subsequentes. Nesse contexto, objetivou-se avaliar o estresse materno-filial em rebanho positivo para LVPRs

no semiárido nordestino por análise etológica e quantificação de cortisol no plasma sanguíneo e pelame.

MATERIAL E MÉTODOS

Dados meteorológicos

Os valores de temperatura média e umidade relativa do ar ao longo de todo período experimental foram mensurados a cada hora através da estação automática do Instituto Nacional de Meteorologia (INMET) localizada na fazenda Três Lagoas, estrada Groaíras, km 4 no município de Sobral-Ceará.

Seleção e manejo das matrizes

Foram utilizadas 16 cabras adultas com idade de dois a quatro anos da raça Anglo-nubiana positivas para LVPRs nos testes de *Western Blot* (WB) e *Nested*-PCR (*n*PCR) conforme metodologia descrita por Rodrigues et al. (2014) e Marinho et al. (2018), respectivamente. As cabras foram submetidas a monta controlada após indução natural do estro (efeito macho). Eram mantidas em regime intensivo, com dieta base para cabras em gestação e pós-parto, seguindo as recomendações da *National Research Council* - NRC (2007). A dieta constou de ração balanceada segundo o peso vivo, contendo 59% grão de milho, 22% farelo de soja, 18% torta de algodão e 1% calcário, além do volumoso a base de capim elefante (*Pennisetum purpureum) picado* e água *ad libitum*.

O parto foi induzido aos 145 dias de gestação com aplicação de 50 µg de Cloprostenol (Ciosin®, MSD Saúde Animal, Estados Unidos) via intramuscular. Logo após a aplicação do hormônio, as cabras foram monitoradas para a ocorrência do parto no intervalo de, aproximadamente, 48 horas. As cabras pluríparas pariram 16 cabritos, e

as primíparas 15 crias, totalizando 31 crias. Ressalta-se que todos os partos foram assistidos.

Conformação e manejo dos grupos experimentais

Foram formados dois grupos experimentais cada um composto por oito matrizes com peso vivo uniforme, sendo um grupo formado por cabras primíparas e outro por fêmeas pluríparas. Após o parto os referidos grupos foram novamente divididos nos seguintes subgrupos: cabras primíparas com amamentação natural das crias (PriN); cabras primíparas separadas das crias com aleitamento artificial (PriA); cabras pluríparas com amamentação natural das crias (PluN) e cabras pluríparas separadas das crias com aleitamento artificial (PluA). Cada subgrupo era composto por quatro matrizes, enquanto as crias foram dispostas nos subgrupos da seguinte forma: oito crias junto com suas respectivas mães (PriN) ; grupo de sete crias das cabras (PriA); nove crias junto com suas respectivas mães (PluN) e um grupo com sete crias das cabras (PluA). Os subgrupos foram alojados em baias separadas, com crias com amamentação natural permanecendo junto as mães (subgrupo PriN e PluN) e as crias com aleitamento artificial em baias separadas das mesmas (subgrupo de crias PriA e PluA). Salienta-se que as crias oriundas de parto gemelares dos subgrupos PriN e PluN permaneceram juntas a respectiva progenitora recebendo o mesmo tratamento.

Logo após o parto todas as crias foram pesadas (balança mecânica, 20 kg) e submetidas ao corte e desinfeção do umbigo com iodo a 10% e observação, individualmente, do consumo de colostro, seja com mamadeira (crias com aleitamento artificial) ou diretamente na mãe (amamentação natural). A pesagem das crias foi realizada novamente no desmame/desaleitamento, o qual ocorreu aos 50 dias de idade das crias, determinado o ganho de peso no período estudado, conforme fórmula abaixo:

$$GP = PF - PI$$

Onde:

GP = Ganho de peso;

PF = Peso final;

PI = Peso inicial

O aleitamento artificial foi realizado duas vezes por dia, nos horários de 8h00 e 14h00, com leite caprino termizado, em mamadeiras coletivas à razão de 20% do peso vivo, sendo ajustado semanalmente. A partir da segunda semana de vida foi oferecido a todas as crias, de ambos os grupos e subgrupos, alimento sólido de forma gradativa, contendo 65% de grão de milho, 34% de farelo de soja e 1% de calcário, além do volumoso a base de capim Tifton 85 (*Cynodon* spp.) e água *ad libitum*, formulado de acordo com o *National Research Council*- NRC (2007).

Avaliação comportamental

Para a avaliação do comportamento foi utilizado um etograma para cada categoria (matrizes e crias), contendo parâmetros associados ao estresse e à habilidade materna (Quadro 1). As observações foram feitas diariamente pelo mesmo observador, por 20 minutos sem intervalo, no turno da manhã de 8h00 a 10h00, desde o nascimento até a desmama, incluindo dos cabritos separados de suas progenitoras ao nascimento.

Dosagem de Cortisol

Os níveis de cortisol foram avaliados tanto nas cabras como nas crias através da análise de amostras de sangue e pelo.

Inicialmente, o plasma sanguíneo utilizado na avaliação foi obtido a partir da coleta de sangue de todos os animais experimentais por meio da punção da veia jugular, utilizando sistema a vácuo e, tubos de 5 mL com anticoagulante ácido etilenodiamino tetra-acético (EDTA), seguido de centrifugação (centrífuga Excelsa® II 206 BL) não

refrigerada a 2000 *g* por 20 minutos. Posteriormente, foi armazenado em microcubos de 1,5 mL e mantido em ultra-freezer a -80ºC até realização da análise.

Nas cabras, o sangue foi coletado em quatro momentos distintos: após indução do parto, imediatamente após o parto, 24 horas pós-parto e aos 50 dias pós-parto, na ocasião da desmama. Nos cabritos coletou-se ao nascimento e aos 15, 30, 50 e 80 dias de idade. As coletas de sangue e pelos foram realizadas, concomitantemente, todas no período da manhã, exceto no momento do nascimento dos cabritos devido à diferença nos horários do parto. Salienta-se que a mensuração do cortisol sanguíneo e do pelo nos cabritos aos 80 dias de idade foi realizada no intuito de avaliar o estresse após um mês de desmama.

A coleta de pelos e extração do cortisol desse tipo de amostra foi realizada segundo metodologia descrita por Endo et al. (2018). Nas matrizes, o pelo foi coletado somente no dia da desmama, enquanto nos cabritos, coletou ao nascimento, aos 50 e 80 dias de idade.

Para a mensuração dos níveis de cortisol nas amostras coletadas de plasma sanguíneo e pelo, utilizou-se o kit comercial de imunoensaio enzimático (Cortisol ELISA Kit, ENZO), conforme recomendações do fabricante e análise realizada por espectrofotômetro (Thermo Electron OY, Multiskan FC) com leitura da absorbância à 405 nanômetros (nm).

Análise estatística

O delineamento experimental utilizado foi inteiramente casualizado. Avaliaram-se os pressupostos de normalidade e homogeneidade de variâncias através dos testes de Shapiro-Wilk e Bartlett, respectivamente. Em seguida, utilizou-se o teste F através da análise de variância (ANOVA), seguido do teste de Tukey para as variáveis quantitativas. Já para a análise etológica utilizou-se o teste não paramétrico de Qui-

quadrado (χ^2), levando em consideração para todos os casos o nível de significância de 1% e 5%. Com as análises estatísticas sendo realizado pelo programa R Studio Team (2019), versão 1.2.5033.

RESULTADOS

O peso ao nascer e ao desmame (50 dias de idade), bem como o ganho de peso dos animais desmamados (Tabela 1), não diferiram entre os grupos ($p \geq 0,05$), os quais apresentaram desempenho satisfatório, com média de 8,9 kg de peso ao desmame.

As vocalizações das matrizes não diferiram ($p \geq 0,05$) entre os grupos e subgrupos (Tabela 2). Todas as cabras que permaneceram com as crias ao pé (primíparas e pluríparas), reconheceram suas crias e manifestaram habilidade materna após o parto, evidenciado pelo comportamento de: cheirar e lamber suas crias; e se manter na posição de mamada. O comportamento de cheirar e lamber foram similares nos dois grupos (Tabela 2). Somente uma cabra plurípara rejeitou uma das três crias que pariu, porém somente na sétima semana após o parto.

No que diz respeito, ao comportamento de permanecer em posição para a mamada o mesmo foi mais expresso nas pluríparas constatado em 31,6% (31/98) das observações, enquanto nas primíparas foi apenas em 17,8% (19/107), sendo estatisticamente distinto ($p < 0,05$). Quanto à postura vigilante a qual pode ser um indicativo de estresse, as observações foram diferentes ($p \leq 0,01$) entre as cabras pluríparas (13,7%) e primíparas (30,6%) que tiveram suas crias separadas ao nascer. Além disso, este mesmo comportamento no grupo de primíparas foi maior nas cabras que tiveram suas crias separadas logo após o parto (30,6%) em comparação com as que permaneceram com as crias ao pé (15,9%) ($p < 0,05$) (Tabela 2).

Os parâmetros comportamentais avaliados nos cabritos são apresentados na Tabela 3. Para a vocalização de crias de matrizes pluríparas, houve diferença ($p \leq 0,01$), entre o subgrupo que não permaneceu com as respectivas mães (60,48%) e entre os mantidos com a progenitora (8,54%). O mesmo foi observado no grupo das matrizes primíparas, sendo que 43,20% das crias separadas dessas matrizes vocalizaram, enquanto que apenas 6,99% mantidas com suas respectivas progenitoras apresentaram esse comportamento ($p \leq 0,01$).

Crias separadas da mãe logo após o parto apresentaram o comportamento de tentativa de fuga (2,40% e 0,97%) e postura vigilante (9,58% e 6,31%), observações feitas, respectivamente no grupo das matrizes pluríparas e primíparas, porém sem diferir estatisticamente. Estes comportamentos não foram observados nas crias mantidas com as mães (Tabela 3).

Adicionalmente, foi observada inquietação em crias de matrizes pluríparas, vindo a apresentar diferença ($p \leq 0,01$) entre os subgrupos, crias separadas da mãe (26,95%) e o subgrupo das crias que não foram apartadas (3,66%). Da mesma maneira, foi visto no grupo das matrizes primíparas, 32,52% das crias separadas da mãe ficaram mais inquietas, já as de matrizes com crias ao pé, a inquietação foi observada em apenas 1,61% dos registros (Tabela 3). Ao avaliar o parâmetro brincadeira, observou-se diferença ($p \leq 0,01$) para as crias somente no subgrupo que foram separadas de suas progenitoras, sendo 20,96% expressos em crias de matrizes pluríparas e 37,38% em crias de matrizes primíparas (Tabela 3).

Quanto ao parâmetro hormonal, os níveis de cortisol extraído dos pelos das matrizes aos 50 dias de estudo não foram diferentes, tanto entre os grupos que permaneceram com as crias (1,93 ng/mL ± 1,21; 1,55 ng/mL ± 0,95), quanto àquelas

que foram separadas logo após o parto (0,56 ng/mL ± 0,24; 2,26 ng/mL ± 2,29), nas matrizes pluríparas e primíparas, respectivamente.

As concentrações dos níveis de cortisol dos pelos dos cabritos oriundos de matrizes pluríparas e primíparas estão apresentadas na tabela 4. Nota-se que, assim como ocorreu nas matrizes, os níveis de cortisol do pelo de cabritos não diferiram entre os grupos e os subgrupos ao parto, e com 50 e 80 dias após a parição. Não havendo relação entre os tipos de aleitamento empregados e/ou a origem dos cabritos quanto à experiência reprodutiva das mães.

Com relação às análises de sangue, não foi verificada diferença nos níveis plasmáticos de cortisol das fêmeas entre os grupos de matrizes pluríparas e primíparas, condição também apresentada entre os subgrupos cria não separada e separada, durante a indução, parto, um dia posterior ao parto e 50 dias após a parição (Tabela 5).

Enquanto isso, na tabela 6 pode-se visualizar os níveis plasmáticos de cortisol dos cabritos submetidos ao manejo de separação ou não da mãe, avaliados em momentos distintos. A partir desses dados, denota-se que as crias de todos os grupos apresentaram no momento do parto, alto nível de cortisol plasmático ($p \leq 0,05$) em relação aos demais momentos de 15, 30, 50 e 80 dias posteriores à parição. É válido ressaltar que os parâmetros ambientais na presente pesquisa tiveram médias para temperatura ambiente entre 22,1ºC a 32,4ºC e umidade relativa do ar em torno de 82%, ao longo de todo período experimental que veio a ocorrer em plena estação chuvosa na região.

DISCUSSÃO

No presente estudo, demonstra-se que o desenvolvimento ponderal dos cabritos não foi influenciado pelo sistema de aleitamento (natural ou artificial), uma vez que não ocorreu diferença entre os grupos e constatou-se um ganho de peso, no período (50 dias de idade), normal para a raça (Ferreira et al., 2008). Além disso, os resultados

encontrados foram similares aos relatados por Ferreira et al. (2008) e Peixoto et al. (2014) ao realizarem a prática de desmama precoce em cabritos de raças de aptidão leiteira.

O comportamento de vocalização é expresso em diferentes circunstâncias, inclusive na comunicação materno-filial, porém não constatamos diferenças no número de vocalizações entre matrizes de diferentes grupos e subgrupos, colaborando com os trabalhos de Lynch et al. (1992) e Ligout et al. (2011), pois este comportamento pode ser tanto utilizado pela mãe para comunicação com sua cria, como também em condições estressantes devido a separação da cria após o nascimento. Pensamos que trabalhos que meçam qualidades e tipos de vocalização possam fornecer melhores parâmetros para avaliação de situações de estresse.

O vínculo materno-filial, em geral, se faz pela produção de feromônios liberados pelos recém-nascidos, sendo vitais e comprobatórios para o reconhecimento e a comportamentos materno nos cuidados da cria (Mariz et al., 2007), o qual é caracterizado como habilidade materna. O comportamento de cheirar e lamber as crias, assim como de vocalizar são atitudes comportamentais que constituem os principais parâmetros etológicos observados logo após o nascimento (Dwyer e Lawrence, 1998).

No presente estudo todas as matrizes que permaneceram com suas crias apresentaram habilidade materna, mesmo as cabras pluríparas que, devido ao programa de LVPRs, nunca tiveram a possibilidade de ter o contato com suas crias em parições anteriores, e nem mesmo terem sido elas próprias criadas por suas progenitoras, sendo evidenciado que o instinto materno é um comportamento nato da espécie. Embora, uma das cabras tenha rejeitado uma das três crias que pariu, essa rejeição só veio a ocorrer semanas após o parto, e possivelmente em decorrência do aspecto nutricional e da capacidade de sobrevivência da cria.

As cabras pluríparas, embora tão inexperientes quanto as primíparas quanto aos cuidados com as crias, apresentaram com maior frequência posição para mamada, ocorrência essa relatada também por Dwyer (2008) que ao trabalhar com a interação materno–filial em pequenos ruminantes atribuiu melhor habilidade materna as fêmeas pluríparas, em relação às primíparas. Possivelmente as fêmeas em primeira ordem de parto apresentam temperamento mais nervoso e tendem a se estressar mais durante a parição.

A separação abrupta entre mãe e cria potencialmente acarreta estresse e consequentemente, alterações comportamentais nos animais (Henrique et al., 2017), o que no presente estudo foi evidenciado pela postura vigilante (parâmetro indicativo de estresse), principalmente nas matrizes primíparas submetidas a separação da cria.

Na avaliação etológica dos cabritos constatou-se uma frequência de vocalização maior nos animais que foram separados das progenitoras, além de apresentarem comportamento mais inquieto. Estes comportamentos eram esperados, pois a presença materna constitui, naturalmente, um efeito tranquilizador às crias, e a separação pode produzir reações de ansiedade e estresse tanto na mãe quanto na prole (Lynch et al.,1992), situação essa que explica ter sido observado tentativa de fuga e postura vigilante, somente nas que foram submetidas a separação de suas mães. Desse modo, denota-se o baixo grau de bem-estar animal das crias apartadas de suas progenitoras ao nascer.

Prates et al. (2015) ao analisarem a intensa vocalização e tentativa de fuga em ruminantes jovens, correlacionaram tais comportamentos com a busca por comunicação com a mãe, percebendo grande estresse nestes animais, tanto para aqueles que foram manejados em piquetes separados e sem nenhum contato visual com suas respectivas mães, bem como, aqueles que estabeleceram vínculo com outros animais.

A ruptura de contato da cria com a mãe, com consequente perda do acesso ao úbere e leite, modificação no hábito alimentar, bem como, as transformações no ambiente social e físico, em geral, são diagnosticadas como eventos estressores no ato do desmame (Enríquez et al., 2011), pois estes jovens vivenciam situações de desconforto e medo, com alterações fisiológicas, como também, manifestações de comportamentos negativos como solidão, medo, frustação e aborrecimento, prejudicando o bem-estar desses animais (Lima e Barbosa Filho, 2013; Bittar et al., 2016). No presente estudo, a análise comportamental evidenciou o estresse das crias apartadas de suas progenitoras, porém não há estudos deste estresse no BEA e na saúde e vida produtivas futura destes animais, que podem ser mais graves em rebanhos portadores de LVPRs.

Avaliações comportamentais são relevantes como indicador de bem-estar animal, e mudanças de postura e comportamentos podem serem associadas à adaptação dos animais a situações ou ambientes estressantes (Broom e Molento, 2004). Neste sentido, a ocorrência do comportamento de brincadeiras nos animais submetidos à separação materna pode denotar a capacidade destes animais em se adaptar ou tentar contornar a falta da mãe de forma a reduzir o impacto e superar os sentimentos negativos (Rushen, 2000). Desse modo, os produtores poderiam minimizar o estresse dos animais agregando métodos estratégicos, como o uso de enriquecimentos ambientais, melhorando o BEA (Oliveira et al., 2015).

Ao realizar a dosagem de cortisol no pelo de cabritos e matrizes observou-se que os níveis apresentados, independentemente do grupo avaliado, foram superiores aos encontrados por Battini et el. (2015) para cabras lactantes da raça Saanen (0,027 ng/mL), porém em condições climáticas distintas do clima semiárido do Nordeste do

Brasil (Uetake et al., 2018). Deve-se ressaltar que ao parto normalmente o cortisol sérico é elevado fisiologicamente (Nodari et al., 2016).

No entanto, os níveis plasmáticos de cortisol de cabritos e matrizes permaneceram alterados e acima do preconizado por McDonald e Pineda (1989), os quais afirmam que na ausência de estresse, o cortisol plasmático em caprinos permanece entre 8–19 ng/mL. Portanto, provavelmente o clima elevou o grau de estresse no rebanho.

CONCLUSÃO

A separação materno-filial pós-parto exerce estresse principalmente nas crias, e potencialmente compromete o bem-estar animal em animais jovens da raça Anglo-nubiana em rebanhos portadores de LVPRs.

Cabras provindas de rebanho com uso contínuo de práticas de separação de crias ao nascer para controle da LVPRs, não perdem sua habilidade materna nos partos subsequentes.

AGRADECIMENTOS

À Embrapa Caprinos e Ovinos e ao Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) pelo apoio estrutural e financeiro.

Contribuição dos Autores: Todos os autores participaram do desenvolvimento e execução da pesquisa. E, todos revisaram o manuscrito, leram e aprovaram a versão final.

DECLARAÇÃO DE ÉTICA

O presente estudo foi previamente aprovado pelo Comitê de Ética no Uso de Animais (CEUA) da Embrapa Caprinos e Ovinos, recebendo o número de protocolo 010/2018, seguindo as diretrizes do Conselho Nacional de Controle de Experimentação Animal (CONCEA, Lei 11.794 de oito de outubro de 2008) e demais resoluções normativas subsequentes.

CONFLITO DE INTERESSE

Declaramos não haver nenhum conflito de interesse.

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502

503 Quadro 1. Descrição dos parâmetros comportamentais avaliados na relação materno-filial para as matrizes e crias no semiárido nordestino

504

	PARÂMETROS	DESCRIÇÃO
MATRIZES	1. Vocalização	Emissão de sons, berros, balidos e/ou grunhidos repetidamente
	2. Cheirar	Identificação através do olfato, por toda extensão ou uma parte do corpo da(s) cria(s)
	3. Lamber	Limpeza e remoção de secreções e/ou restos placentários aderidos ao corpo da(s) cria(s) no momento do nascimento
	4. Posição para mamada	Cabra parada e firmemente em pé com a aproximação de sua(s) cria(s) ao úbere
	5. Rejeição da cria	Afastamento da mãe com a aproximação de sua(s) cria(s) sem permiti-la(s) mamar
	6. Postura vigilante	Animal parado e atento a movimentos ou barulhos externos à baia
CRIAS	1. Vocalização	Emissão de sons, berros, balidos e/ou grunhidos repetidamente
	2. Tentativa de fuga	Sair ou tentar retirar-se da baia
	3. Postura vigilante	Cria parada e atenta a movimentos e barulhos externos à baia
	4. Inquietação	Animal caminhando de um ponto a outro da baia repetidas vezes
	5. Apatia/Tristeza	Animal quieto, parado sem interagir com a mãe e/ou com as demais crias
	6. Isolamento	Animal afastado continuamente dos demais e/ou das mães
	7. Brincadeira	Animais ativos e dispostos, interação com os demais, identificação de pulos e saltos

Tabela 1. Peso ao nascer, ao desmame e ganho de peso de cabritos Anglo-nubianos submetidos a distintos manejos de aleitamento no semiárido nordestino.

Grupo	Subgrupo	Nº de crias	Peso ao Nascer (kg)	Ganho de peso (kg)	Peso ao desmame (kg)
Crias de Pluríparas	Separadas da mãe	7	3,59±0,44a	4,93±1,28a	8,52±1,31a
	Mantidas com a mãe	9	3,11±0,50a	5,49±0,75a	8,60±1,03a
Crias de Primíparas	Separadas da mãe	7	3,20±0,48a	6,04±1,19a	9,24±1,05a
	Mantidas com a mãe	8	3,09±0,40a	5,89±0,98a	8,98±1,23a

Letras minúsculas na mesma coluna indicam diferença estatística entre as crias ao pé e as fêmeas separadas da(as) cria(s) no momento do parto ($p < 0,05$).

Tabela 2. Análise comportamental de matrizes pluríparas e primíparas da raça Anglo-nubiana positivas para lentivírus de pequenos ruminantes (LVPRs), com crias ao pé ou separadas das mães logo após o parto, no semiárido nordestino.

	Matrizes Pluríparas		Matrizes Primíparas	
Paramêtros Etológicos	Com cria(s) ao pé n/N (%)	Separada da(s) crias(s) n/N (%)	Com cria(s) ao pé n/N (%)	Separada da(s) crias(s) n/N (%)
Vocalização	18 / 98 (18,4%) Aa	11/102 (10,8%) Aa	16/ 107 (15,0%) Aa	09/108 (8,3%) Aa
Cheirar	10 /98 (10,2%) A	-	15 /107 (14,0%) A	-
Lamber	10 /98 (10,2%) A	-	11/ 107 (10,3%) A	-
Posição Mamada	31 /98 (31,6%) A*	-	19/107 (17,8%) B*	-
Rejeição da Cria	01 /98 (1,0%) A	-	0 /107 (0,0%) A	-
Postura Vigilante	08 /98 (8,2%) Aa	14/102 (13,7%) A**a	17 /107 (15,9%) Aa	33/108 (30,6%)B**b*
Movimento de cavar	00/98 (0,0%) Aa	2/102 (2,0%) Aa	1/ 107 (0,9%) Aa	0/108 (0,0%) Aa

N – Total de avaliações de comportamento realizadas durante o experimento; n – Número de determinado comportamento manifestado pelo animal.

Letras maiúsculas na mesma linha indicam diferença estatística entre matrizes pluríparas e primíparas *($p < 0,05$) e ** ($p < 0,01$).

Letras minúsculas na mesma linha indicam diferença estatística entre as matrizes com cria ao pé e as fêmeas separadas da(as) cria(s) no momento do parto ($p < 0,05$).

Tabela 3. Análise comportamental de cabritos procedentes de matrizes pluríparas e primíparas da raça Anglo-nubiana portadoras de lentivírus de pequenos ruminantes (LVPRs) submetidos ao manejo de separação ou não da mãe após o parto, no semiárido nordestino.

	Crias de Matrizes Pluríparas		Crias de Matrizes Primíparas	
	Mantida com a mãe n/N (%)	Separada da mãe n/N (%)	Mantida com a mãe n/N (%)	Separada da mãe n/N (%)
Vocalização	14/165 (8,54%) aA	101/168(60,48%)b** A	13/186 (6,99%)aA	89/206(43,20%)b** A
Tentativa de Fuga	0/165 (0%) aA	4/168 (2,40%)b* A	0/186 (0%)aA	2 /206(0,97%)aA
Postura Vigilante	0/165 (0%) aA	16/168 (9,58%)b** A	0/186 (0%)aA	13/206 (6,31%)b** A
Inquietação	6/165 (3,66%) aA	45/168 (26,95%)b** A	3/186 (1,61%)aA	67/206(32,52%)b** A
Apatia/Tristeza	2/165 (1,22%) aA	5/168 (2,99%)aA	0/186 (0%)aA	0/206 (0%)aA
Isolamento	1/165 (0,61%) aA	5/168 (2,99%)aA	2/186 (1,08%)aA	3/206 (1,46%)aA
Brincadeira	14/165 (8,54%) aA	35/168 (20,96%)b** A	20/186 (10,75%)aA	77/206(37,38%)b** A

N – Total de avaliações de comportamento realizadas durante o experimento; n – Número de determinado comportamento manifestado pelo animal.

Letras minúsculas diferentes, na mesma linha, indicam diferença estatística significativa *($p \leq 0,05$) ou **($p \leq 0,01$) entre os subgrupos mantida com a mãe e separada da mãe, do mesmo grupo.

Letras maiúsculas diferentes, na mesma linha, indicam diferença estatística significativa ($p \leq 0,05$) entre os grupos matrizes pluríparas e matrizes primíparas, no mesmo manejo de separação materno-filial.

Tabela 4. Níveis de cortisol do pelo (ng/mL) de cabritos da raça Anglo-nubiana proveniente de rebanho positivo para lentivírus de pequenos ruminantes (LVPRs) submetidos ao manejo de separação ou não da mãe após o parto avaliado em momentos distintos no semiárido nordestino.

MOMENTO	Cortisol - Crias de mães Pluríparas (ng/mL)		Cortisol - Crias de mães Primíparas (ng/mL)	
	Não Separada	Separada	Não Separada	Separada
Parto	2,21±0,63aA	2,13±2,36Aa	1,98±1,85aA	1,10±0,39aA
50 dias	1,89±1,09aA	2,09±0,70aA	1,42±0,96aA	2,42±2,26aA
80 dias	0,89±0,42aA	1,46±0,54aA	1,36±0,70aA	1,29±0,68aA

* Letras minúsculas diferentes, na mesma linha, indicam diferença estatística significativa ($p \leq 0,05$) entre os subgrupos mãe não separada e mãe separada do mesmo grupo.

** Letras maiúsculas diferentes, na mesma linha, indicam diferença estatística significativa ($p \leq 0,05$) entre os grupos matrizes pluríparas e matrizes primíparas, no mesmo manejo de separação.

Tabela 5. Níveis de cortisol plasmático (ng/mL) de matrizes da raça Anglo-nubiana positivas para lentivírus de pequenos ruminantes (LVPRs) submetidas ao manejo de separação ou não da(s) cria(s) avaliado em momentos distintos no semiárido nordestino.

	Cortisol Sangue - Matrizes (ng/mL)			
	Pluríparas		Primíparas	
MOMENTO	Com cria(s) ao pé	Separada da(s) Crias (s)	Com cria(s) ao pé	Separada da(s) Crias (s)
Indução do Parto	61,47±19,66aA	54,17±25,16aA	70,51±48,04aA	60,34±38,68aA
Parto	71,37±19,11aA	72,38±30,32aA	93,68±56,23aA	69,36±41,15aA
1 dia após o parto	52,72±32,89aA	51,88±24,45aA	58,14±46,25aA	63,93±49,82aA
50 dias (desmame)	36,17±10,65aA	53,98±26,63aA	34,72±3,50aA	45,84±23,83aA

* Letras minúsculas diferentes, na mesma linha, indicam diferença estatística significativa ($p \leq 0,05$) entre os subgrupos cria não separada e cria separada do mesmo grupo.

** Letras maiúsculas diferentes, na mesma linha, indicam diferença estatística significativa ($p \leq 0,05$), entre os grupos pluríparas e primíparas, no mesmo manejo de separação.

Tabela 6. Níveis de cortisol plasmático (ng/mL) de cabritos da raça Anglo-nubiana proveniente de rebanho positivo para lentivírus de pequenos ruminantes (LVPRs) submetidos ao manejo de separação ou não da mãe avaliado em momentos distintos no semiárido nordestino.

	Crias			
	Pluríparas		Primíparas	
MOMENTO	Mãe não separada	Mãe Separada	Mãe não separada	Mãe Separada
Parto	77,19±10,87aA	89,47±16,96aA	98,22±5,64aA	78,54±18,10aA
15 dias	27,98±4,25bA	42,06±11,44bA	37,96±4,59bA	36,72±8,12bA
30 dias	26,81±6,18bA	26,64±4,41bA	27,60±11,16bA	30,97±4,31bA
50 dias	30,29±4,50bA	27,36±7,07bA	31,24±7,69bA	24,72±9,91bA
80 dias	29,39±3,03bA	33,73±10,47bA	29,29±8,51bA	27,27±8,22bA

* Letras minúsculas diferentes, na mesma coluna, indicam diferença estatística significativa ($p \leq 0,05$) entre os momentos.

** Letras maiúsculas diferentes, na mesma linha, indicam diferença estatística significativa ($p \leq 0,05$)

ANEXO B

JOURNAL OF VETERINARY BEHAVIOR
Clinical Applications and Research
ISSN: 1558-7878

DESCRIPTION

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Journal of Veterinary Behavior: Clinical Applications and Research is an international journal that focuses on all aspects of **veterinary behavioral medicine**, with a particular emphasis on clinical applications and research. Articles cover such topics as basic research involving normal **signaling** or **social behaviors, welfare** and/or **housing issues**, molecular or quantitative **genetics**, and applied **behavioral issues** (eg, working dogs) that may have implications for clinical interest or assessment. *JVEB* is thethe official journal of the Australian Veterinary Behaviour Interest Group, the British Veterinary Behaviour Association, Gesellschaft fr Tierverhaltensmedizin und Therapie, the International Working Dog Breeding Association, the Pet Professional Guild, and the Association Veterinaire Suisse pour la Medecine Comportementale.

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AUDIENCE

Veterinarians, Breeders, Trainers

IMPACT FACTOR

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ABSTRACTING AND INDEXING

CAB International Global Health (Index Veterinarius, Veterinary Bulletin) PsycINFO Scopus Science Citation Index Expanded Journal Citation Reports - Science Edition ocus on: Veterinary Science and Medicine

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GUIDE FOR AUTHORS

INTRODUCTION

Please consult this Guide for Authors for further details on the requirements for submitting your paper to *Journal of Veterinary Behavior: Clinical Applications and Research*. The guidelines described in this document should be adhered to carefully, to ensure high-quality and rapid publication of your manuscript.

Aims and scope Journal of Veterinary Behavior: Clinical Applications and Research

Research is an international jornal that focuses on all aspects of veterinary behavioral medicine, with a particular emphasis on clinical applications and research. Articles on basic research involving normal signaling or social behaviors, welfare and, or housing issues, molecular or quantitative genetics, and applied behavioral issues (e.g., working dogs) that may have implications for clinical interest or assessment are encouraged. Focus is not restricted by species of interest.

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In Brief: Practice and Procedure seeks to forge links between the research and practitioner communities. This section features submissions on common behavioral issues about which practitioners ask, and about techniques and approaches used in different types of research. The hope is that those who come from a research background will learn to appreciate the practical issues facing many who read their articles, and those who come from a more patient-oriented approach will learn to appreciate the nuances and intrigue of key aspects of research.
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Reference to a book:

Alcock, J., 1975. Animal Behaviour. Sinauer Associates, Sunderland, MA, pp. 173-204.

Reference to a chapter in an edited book:

Challis, J., Olson, D., 1988. Parturition. In: Knobil, E., J. (Ed), The Physiology of Reproduction, Vol. 2. Raven Press, New York, pp. 2177-2216.

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CONCLUSÕES GERAIS

- A separação materno-filial pós-parto exerce estresse principalmente nas crias, e potencialmente compromete o bem-estar animal em animais jovens da raça Anglo-nubiana em rebanhos portadores de LVPRs.
- Cabras provindas de rebanho com uso contínuo de práticas de separação de crias ao nascer para controle da LVPRs, não perdem sua habilidade materna nos partos subsequentes.