Evaluation of semen collected from commercial rams by electro-ejaculation

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ANNUAL ram pre-breeding soundness examinations (PBSes) are accepted as an integral component of veterinary flock health to identify rams not capable of achieving high conception rates. This preliminary study collected information as to current practice on commercial farms with the aim of contributing to the development of ‘best practice’ guidelines (Anon 2014).

Records were collected from 280 rams presented for routine PBS in autumn 2013 to five first-opinion veterinarians, one in the southwest of England and four from one practice in northeast England. The study population consisted of all rams on 20 farms and only newly purchased rams on four farms. In accordance with usual practice, each ram was physically examined, external genitalia were palpated and semen was collected by electro-ejaculation on up to two separate occasions. Findings were recorded on standard data collection forms. Maximum scrotal circumference (SC) was measured in centimetres using a tensioned tape measure (Reliabull; Lane).

The vets in the northeast worked alone, using a Lane electro-ejaculator and bright field microscopy with a green filter and low condenser and the vet in the southwest used a technician to handle the semen, a Medata electro-ejaculator and a phase-contrast microscope. All glass equipment were warmed to 30–37°C, the microscope stage to 35–57°C and the sample volume was measured to the nearest 0.2 ml. The semen sample was assessed for gross density, on a scale of 1 (water) to 5 (thick cream), gross motility (on a scale of 1 to 5 at 40× and 100× magnification) and progressive motility of a sample diluted in PBS under 100× and 200× magnification. Data were collated using Excel (Microsoft 2010). The vet recorded their recommendations to the farmer as satisfactory (‘OK’), unsatisfactory (‘not OK’) or whether a retest was advised as based on their current practice. Statistical analysis was performed using a Fisher’s exact test to compare recommendations between the vets at different locations and P values <0.05 were considered significant. No data were collected as to the proportion of ewes that conceived when the rams were used.

Nineteen breeds were represented, of which the major types were Texel (70 rams), Suffolk (65), blue-faced Leicester (38), Lleyn (25), Beltex (18) and Primera (13). All the Primera rams were in the southwest sample. 17.6 per cent of rams were below condition score 3 and 2.2 per cent were above condition score 4 out of a total score of 5.

The following areas were examined, with the percentage of rams scored as abnormal given in parentheses: feet (17.6 per cent), teeth (12.7 per cent), rest of body (5.5 per cent), brisket (5.4 per cent), penis (1.9 per cent), scrotum (3.9 per cent) and prepuce (1.1 per cent). Left and right testicles were scored as ‘soft’ for 7.4 per cent and 7.7 per cent, and ‘small’ for 4.9 per cent and 5.6 per cent of rams, respectively. The epididymis were considered abnormal in the left head in 1.5 per cent of rams and in the left tail, right head or right tail in 2.1 per cent of rams each.

Semen quality was considered ‘questionable’ if gross motility score <5 out of 5 or progressive motility was <50 per cent. This was recorded for 41 per cent of rams with abnormal testicle size; for 57 per cent rams with abnormal testicle tone; for 75 per cent of rams with abnormal head of epididymis; and for 86 per cent of rams with an abnormal tail of epididymis on either the left or right side.

SC ranged from 26 to 44 cm with a mean and median circumference of 37 cm and a mode of 38 cm. When ram lambs, shearlings and hill breeds were removed from the sample, there were 57 out of 168 rams (22 per cent) with an SC of <36 cm; three of these rams produced questionable semen sample and two were recommended for a retest. SC was 36–38 cm for 68 (41 per cent) rams and >38 cm for 62 (37 per cent) rams.

Of the 280 rams, veterinarians considered that 235 (83.9 per cent) rams were suitable (‘OK’) for breeding that season. Thirty-six (12.9 per cent) rams were considered not suitable (‘not OK’), and the suitability of nine (3.2 per cent) rams was considered questionable with the recommendation of retesting at a later date. There was a significant difference (Fisher’s exact; P=0.011) in the number of rams recommended to be retested by the southwest vet (12.9 per cent) compared with the northeast vets (2.0 per cent). There was no significant difference between vets in the proportions of rams that were classified as either ‘OK’ (Fisher’s exact; P=0.8) or ‘not OK’ (P=0.5). In the northeast, seven rams, which were considered ‘not OK’, had an SC >36 cm with no recorded physical abnormalities or abnormalities of the external genitalia.

In this study, 84 per cent of rams were considered fit for breeding, which was more than the 71.1 per cent suggested by a large study in western USA (Van Metre and others 2012), though in that study 20 per cent of failures were attributed to ‘inflammatory causes’ that included cases of Brucella ovis, a disease not present in the UK (Sargison 2008).

It is important to determine the validity of a decision made from genital palpation for veterinarians or farmers without access to electro-ejaculation, and in this study, the semen sample was questionable 41–56 per cent of the time a genital abnormality was palpated. This figure is considerably higher than the 13–38 per cent found in previous studies (Edgar, 1959; Barr, 1984) and would support the suggestion that a ram with a palpable genital abnormality should not be relied upon for breeding (Boundy, 1992, Sargison, 2008).

Although there was space on the data collection form for recording sperm morphology, this was not undertaken for the majority of rams in this study, which possibly reflects
Veterinarians usual practice for commercial rams. Best practice guidance suggests that, for certification purposes, PBSE of rams should include examination of sperm morphology (Boundy, 1992, 1993, Penny, 2010, Anon, 2014).

The divergence between vets in the number of rams that were recommended to be retested may reflect farm, breed or regional factors or may reflect different operator approaches to interpretation of PBSE. There is evidence to show that electro-ejaculation may fail to produce satisfactory semen samples from rams of normal fertility on up to 18 per cent of occasions and a ram should not be considered unsuitable for breeding unless it produces an unsatisfactory semen sample three times over a period of six weeks (Edgar, 1959, 1963). Arguably the rams in this study that were considered unsuitable for breeding based solely upon the production of a single unsatisfactory semen sample should have been retested.

This study supports the latest Sheep Veterinary Society advice (Anon 2014), which recommends that routine electro-ejaculation and evaluation of semen provides appropriate additional information when rams are to be used in high-pressure situations, such as single sire mating or with large numbers of ewes but that it may not be appropriate in low-pressure situations. A ram should not be considered unsuitable for breeding based on the collection of a single questionable semen sample on a single day, and it is important that the reason is clearly explained to the farmer.

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