PRODUCTION NOTES

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A survey of northern Victorian dairy farmers to investigate dairy calf management: calf rearing practices

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Objectives To describe the calf-rearing practices carried out in northern Victorian dairy herds and to identify weaknesses that may affect calf health and welfare by comparing the results with current industry recommendations.

Methods Survey of dairy farms from Rochester and the surrounding farming area.

Results The response rate was 39% (58/150). Many dairy producers were not meeting the current industry recommendations in the following areas: (1) delayed access to pellets and roughage, (2) failing to provide access to water from birth, (3) delayed disbudding of calves, (4) delayed timing of booster vaccinations, (5) weaning based on age alone, (6) failing to isolate sick calves and (7) early sale age of excess calves.

Conclusion The results from this survey highlight the need for greater awareness of industry standards for calf husbandry and weaning.

Keywords calf management; dairy cattle; industry standards

Abbreviation CI, confidence interval

It is common practice on dairy farms in northern Victoria to remove calves from their dams shortly after birth and rear them artificially. It is generally accepted that the calves need to be provided with a clean, comfortable environment with protection from the elements and predation. During this period, the first 2–3 months of life, calves are required to be supplemented with milk or milk replacer, roughage and concentrates and are subjected to a

number of husbandry procedures, including dehorning/disbudding and vaccinations, which can be stressful. There are limited data available on the common calf-rearing facilities, feeding practices and husbandry practices carried out by dairy farmers in Australia.

Farm-based surveys, such as the current survey, are a valuable tool in describing practices in the calf-rearing process that are not meeting industry standards, as well as useful for identifying where current scientific-based recommendations are poorly integrated into on-farm practices.[1] The objective of this survey was to firstly describe the calf-rearing practices carried out in northern Victorian dairy herds and secondly, to identify weaknesses in the calf-rearing practices that may affect calf health and welfare by comparing the results with current industry recommendations.

Materials and methods

A survey of 60 questions was sent to 150 commercial dairy farms across Rochester and the surrounding farming area. The survey was divided into three sections, with the results for the two sections on herd description and colostrum management described in a separate paper.[2]

Section 3 consisted of 18 questions focussing on calf rearing and management, including questions on calf-rearing routines such as housing arrangements, feeding regimens and husbandry practices.

All questionnaires returned were individually examined and the data were recorded in Microsoft Excel 2010 (Microsoft Corp., Redmond, WA, USA). Descriptive statistics were calculated using IBM SPSS Statistics 2013 for Windows, Version 22.0 (IBM Corp., Armonk, NY, USA).

The results were compared with current Australian and international industry recommendations.[3–5]

In the current survey, the variable assessed was defined as not meeting the current industry recommendations if e 25% of respondents were not meeting the industry recommendation.

Results

Of the 150 questionnaires sent out, 58 (39%) were returned. Herd statistics for the 58 participating farms are described in a separate paper.[2] Survey responses to the questions in Section 3 are summarised in Table S1.

When asked about their criteria for weaning, 34% (95% confidence interval (CI) 20.6–43.8) of respondents indicated that calves were weaned based on age alone, while 43.4% (95% CI 28.1–52.5) were weaned based on a combination of age, weight and concentrate consumption (Table 1).

The majority of surveyed farms (88.7%, 95% CI 69.2–89.1) indicated that they had established protocols for the treatment of sick calves. Of the farms surveyed, only 39.6% (95% CI 25.1–49.1) always isolated sick calves from their healthy pen mates; 60.4% (95% CI 42.5–67.3) failed to routinely isolate sick calves (Table 1).

Of the 58 survey respondents, 20 farms (35.8%; 95% CI 22.1–45.6) failed to provide calves with access to water from birth; the mean age of access across the 58 farms was 4.7 days

(Table 2). Of the farms surveyed, e 32.0% (95% CI 19.1–42.0) and e 35.8% (95% CI 22.1–45.6) offered pellets and roughage, respectively, to dairy calves older than 3 days.

With regard to the husbandry practices of disbudding and vaccination, the calves were disbudded at a mean age of 6.3 (SD 3.72) weeks and their primary vaccination was administered at a mean age of 8.9 (SD 3.16) weeks and booster vaccinated at a mean age of 14.8 (SD: 17.2) weeks (Table 2).

The mean age at sale of excess bull and heifer calves was 5.1 (SD 1.15) days.

Discussion

There are limited data available on the calf-rearing practices on dairy farms in northern Victoria. This study presents data on these and highlights a distinct lack of conformity to industry recommendations in key areas of calf management including delayed access to pellets and roughage, failing to provide access to water from birth, delayed disbudding of calves, delayed timing of booster vaccinations, weaning based on age alone, failing to isolate sick calves and early sale age of excess calves.

Calf feeding

Calves should be offered roughage and a pellet/grain mix from as early as day 3 of life onwards, even when calves are offered a high-volume milk ration.[6] Early access to grain and/or grain-based products, which are fermented in the rumen to produce volatile fatty acids, propionate and butyrate, is essential for well-developed ruminal papillae and, therefore, a rumen that will be prepared for a non-liquid diet post weaning.[7] In this study, the majority of respondents indicated calves' access to roughage and pellets/grain mix (starter ration) at less than 1 week of age; however, over one-third of calves did not have access to roughage until they were e 2 weeks old.

Fibre in the diet is important for the development of the muscular layer of the rumen.[7]The fibre source being offered to calves should be 1–2 cm in length and should make up at least 10–25% of their daily ration.[3] Most farms in the study offered a suitable fibre source in the form of roughage, with only one herd offering ???, which is not an ideal source of fibre until well after weaning.

Access to water

It is a requirement of the Australian Animal Welfare Standards and Guidelines for Cattle that calves should have free access to fresh, clean water from birth.[4] Earlier access to water has been shown to increase concentrate and roughage intake (31% more than calves not offered water) and increase weight gain (38% more than calves not offered water).[8]

In the current survey, 35.8% of herds failed to provide water for calves from birth and the maximum age at which calves were first allowed access to water was 48 days, which coincided with weaning on that particular farm. These practices do not align with the current Australian Animal Welfare Standards and Guidelines for Cattle.[4]

Calf vaccination and dehorning

Two common husbandry events that generally occur in the preweaning period are dehorning and vaccination.

Current Australian recommendations are to disbud or dehorn (with a preference to disbudding) as young as possible.[9] This recommendation is in alignment with the American Veterinary Medical Association and the UK's Farm Animal Welfare Council's recommendations. The Cattle Standards and Guidelines Writing Group also state that pain relief must be given to calves dehorned at over 6 months of age.[4] Most herds in this study were disbudding before the mandatory age requirement for analgesia, although the timing of disbudding should occur earlier in many herds to minimise the pain and distress experienced by the calves .

The typical vaccination schedule for dairy calves includes administering the primary vaccination at 6–8 weeks of age and the second booster vaccination at 12 weeks of age.[3] Of the farms surveyed, the majority met the industry standard for the timing of primary vaccination, but the second booster vaccination was, on average, slightly delayed.

Calf weaning

Weaning of dairy calves occurs much earlier than if the calves were to remain on the dam and is one of the first major dietary transitions for calves. The decision to wean replacement heifer calves may be based on several factors including age, weight, concentrate intake or a combination of all three.

Although age and weight were common criteria used to wean calves on the surveyed farms, nutritionally, the most appropriate time to wean dairy calves is based on concentrate intake.[5] Weaning based on concentrate intake allows a faster physiological development without any negative effect on rumen development, weight gain or health status.[10] Between 0.75 and1 kg/day of concentrate consumption is recommended for Holstein-Friesian calves and 0.5–0.75 kg/day for Jersey calves for e 3 consecutive days.[3]

In this study, the average concentrate consumption per head per day in herds that weaned based on concentrate consumption met the current recommendations.

Treatment of sick calves

Having written, established antibiotic protocols on farms promotes consistency when treating sick calves and reduces the risk of incorrect treatment.[11] Isolating sick calves from healthy pen mates is recommended for e 3 weeks to avoid build-up of pathogens shed in the environment.[12] The practice of isolating treated sick calves from their healthy pen mates is also important for reducing the risk of cross-contamination of antibiotic residue in untreated bobby calves.[3] In our survey, the majority of farms followed industry recommendations and had established protocols for treating sick calves. However, the majority of surveyed farms failed to always isolate sick calves from healthy ones, which may be a result of lack of facilities to isolate sick calves or a lack of awareness of cross-contamination between sick and health calves or when a calf or calves have been identified as being sick within a pen, the cohort in the pen are considered to be exposed and therefore the sick calf/calves are not removed from the pen.

Sale of excess calves

It is a legal requirement that bull calves and surplus heifer calves are a minimum age of 5 days, a minimum weight of 23 kg, in good health, alert, able to rise unaided from a lying position, have firm hooves that are worn flat and a wrinkled, withered and shrivelled naval cord before sale. Premature calves (including induced calves) must be at an equivalent stage of fitness as a 5-day-old full term calf. It is also a requirement to feed milk or milk replacer on farm within 6 h of transport and have an auditable and accessible record that identifies the time and date they were last fed.[3,4] This set of criteria is essential for improving calf welfare and selecting healthy calves vigorous enough to withstand the stresses associated with transportation and to reduce the risk of morbidity or mortality during transportation.

Of the herds selling excess heifers and/or bull calves, the average age at sale met the industry minimum standard; however, there were still a number of farms selling calves younger than 5 days old, potentially compromising the welfare of those calves.[4]

Study limitations

The limitations of this study are detailed in our other paper.[2] Briefly, the limitations include: the potential for bias in the respondents because of their affiliation with the Rochester Veterinary Practice; the exclusion of time-based implications; the survey questions being directed at the herd-level, so the collected data should be regarded as reflecting herd policies, rather than definite events that occur for each individual cow or calf; the features of non-respondents were not determined; and the possibility of misclassification of farmer-reported data in the questionnaire.

Conclusions

The current survey has provided empirical data on the calf-rearing practices in northern Victorian dairy herds and highlights the need for greater awareness of industry standards for calf husbandry among dairy farmers. The survey identified several areas of calf rearing that require improvement, including providing access to fresh water from birth, providing access to pellets and roughage from 3 days of age, disbudding of calves at < 6 months of age, administering booster vaccinations by 12 weeks of age, weaning based on concentrate consumption, always isolating sick calves and selling excess calves at no younger than 5 days of age.

Further education on calf husbandry and management, including the current industry recommendations, can be provided to dairy producers by practising veterinarians and through training programs that are being offered by dairy industry representatives.

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Supporting information

Additional supporting information can be found in the online version of this article at the publisher's website:

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Table 1. Survey responses of 58 surveyed dairy farms on calf rearing and management practices and the current industry recommendations

Survey question	Category	n (%)	95% CI	Industry recommendation
Age of concentrate access (weeks)	d 1	35 (66)	47.5–71.9	< 3 days[6]
	2	12 (22.6)	12.3–32.8	–
	e 3	5 (9.4)	3.7–18.6	–
	Never	1 (1.9)	0.3–9.1	–
Age of roughage access (weeks)	d 1	34 (64.2)	45.8–70.4	< 3 days[6]
	2	12 (22.6)	12.3–32.8	–
	e 3	7 (13.2)	6.0–22.9	–
Roughage type offered to calves	Hay	33 (62.3)	44.1–68.8	–
	Straw	12 (22.6)	12.3–32.8	–
	Hay and straw	7 (13.2)	6.0–22.9	–
	Grass only	1 (1.9)	0.3–9.1	–
Replacement heifer calves vaccinated	Yes	44 (83)	63.5–85.0	Recommeded[3]
	No	9 (17)	8.4–26.9	–
Weaning criteria	Age	18 (34)	20.6–43.8	
	Weight	5 (9.4)	3.7–18.6	–
	Concentrate consumption/head/day	7 (13.2)	6.0–22.9	–
	Combination of the above	23 (43.4)	28.1–52.5	Recommeded[3]
Established protocols for the treatment of sick calves	Yes	47 (88.7)	69.2–89.1	Recommeded[11]
	No	6 (11.3)	4.8–20.8	–

Sick calves isolated from healthy calves	Always	21 (39.6)	25.1–49.1	Recommeded[12]
	Usually	20 (31.7)	23.6–47.3	–
	Occasionally	11 (20.8)	10.9–30.9	–
	Never	1 (1.9)	0.3–9.1	–

CI, confidence interval.

Table 2. Descriptive statistics for 58 surveyed northern Victorian dairy herds on water availability, vaccination, dehorning and weaning practices for calves and current industry recommendations

Feeding/husbandry practice	Mean (SD)	Median	Range (min.–max.)	Industry recommendation
Age of calf when it has access to water (days)	4.7 (1.5)	1	1–48	< 1[4]
Age at which the calves are vaccinated (weeks)	8.88 (3.16)	9	3–16	6–8[3]
Age at which the calves have a booster vaccination (weeks)	14.8 (17.2)	15	7–52	12[3]
Age at which calves are dehorned (weeks)	6.3 (3.27)	6	0.5–20	< 6 m[5]
Criteria for weaning				
Age (weeks)	10. 6 (2.53)	11	8–16	
Weight (kg)	98.57 (20.35)	100	80–130	J: 65–85[13] HF: 90–110[13]
Concentrate consumption per head per day (kg/head/day)	1.5 (0.58)	1.5	1–2	J: 0.5–0.75[3] HF: 0.75–1.0[3]
Age of sale for bull calves and excess heifers (days)	5.1 (1.15)	5	4–10	5[8]

HF, Holstein-Friesian; J, Jersey.

Supplementary Table 1. Survey responses of 58 northern Victorian dairy farms on calf rearing and management practices and the current industry recommendations (where appropriate)

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