include any estimate of the potential economic advantage because the incidence of milk fever was less and reproductive performance was significantly improved.

It appears that we now have a reasonably practical way, through manipulation of the dietary cation-anion difference in the late prepartum ration, to reduce the incidence of hypocalcemic-related problems in the early postpartum cow, and improve reproductive and lactational performance. Readers are urged to refer to the detailed description presented by Byers (1991) in the Practice Tips section of these proceedings on how to formulate anionic dry cow rations.

## References

Block, E. 1984. Manipulating dietary anions and cations for prepartum dairy cows to reduce incidence of milk fever. Dairy Sci. 67:2939. Boda, J.M. and H.H. Cole. 1954. The influence of dietary calcium and phosphorus on the incidence of milk fever in dairy cattle. J. Dairy Sci. 37:360. Boda, J.M. 1956. Further studies on the influence of dietary calcium and phosphorus on the incidence of milk fever. J. Dairy Sci. 39:96. Byers, D.I. 1991. Formulating anionic dry cow rations. Proc. 24th Annual Convention Am. Assoc. Bovine Practitioners (Practice Tips), Orlando, FL. Curtis, C.R., H.N. Erb, C.J. Sniffen, R.D. Smith, P.A. Powers, M.C. Smith, M.E. White, R.B. Hillman and E.J. Pearson. 1983. Association of parturient hypocalcemia with eight periparturient disordersin Holstein cows. JAVMA 183:559. Dishington, I.W. 1975. Prevention of milk fever (hypocalcemic paresis puerperalis) by dietary salt supplements. Acta. Vet. Scand. 16:503. Dishington, I.W. and J. Bjornstad. 1982. Prevention of milk fever by dietary means. Acta. Vet. Scand. 23:336. Ender, F., I.W. Dishington and A. Helgebostad. 1962. Parturient paresis and related forms of hypocalcemic disorders induced experimentally in dairy

cows. Part II. Acta. Vet. Scand. Suppl. 1. Vol. 3:1. Ender, F., I.W. Dishington, and A. Helgebostad. 1971. Calcium balance studies in dairy cows under experimental induction and prevention of hypocalcemic paresis puerperalis. Z. Tierphysiol., Tierernahr., Futtermittelk. 28:233. Fredeen, A.H., E.J. DePeters and R.L. Baldwin. 1988. Effects of acid-base disturbances caused by differences in dietary fixed ion balance on kinetics of calcium metabolism in ruminants with high calcium demand. J. Anim. Sci. 66:174. Gaynor, P.J., F.J. Mueller, J.K. Miller, N. Ramsey, J.P. Goff and R.L. Horst. 1989. Parturient hypocalcemia in Jersey cows fed alfalfa haylage-based diets with different cation to anionratios. J. Dairy Sci. 72:2525. Grohn, Y.T., H.N. Erb, C.E. McCulloch and H.S. Saloniemi. 1990. Epidemiology of reproductive disorders in dairy cattle: Associations among host characteristics, disease and production. Prev.Vet. Med. 8:25. Huber, T.L., R.C. Wilson, A.J. Stattelman, and D.D. Goetsch. 1981. Effect of hypocalcemia on motility of the ruminant stomach. Am. J. Vet. Res. 42:1488. Hull, B.L. and W.M. Wass. 1973. Abomasal displacement 2: Hyopcalcemia as a contributing factor. Vet. Med. 412. Josson, G., B. Pherson, K. Lundstrom. L.E. Edqvist, and J.M. Blum. 1980. Studies on the effect of the amount of calcium in the prepartum diet on blood levels of calcium, magnesium, inorganic phosphorus, parathyroid hormone and hydroxyproline in milk fever prone cows. Zbl. Vet. Med. A. 27:173. Kendall, K.A., K.E. Harshbarger, R.L. Hays and E.E. Ormiston. 1970. Responses of dairy cows to diets containing varied levels of calcium and phosphorus. J. Dairy Sci. 53:681. National Research Council. 1989. Nutrient requirements of dairy cattle. 6th rev. ed. Nat'l Acad. Sci., Washington, DC. Oetzel, G.R. 1991. Update on the use of anionic slats for milk fever prevention. Proc. Four-State Nutrition Conference, pp.34-45, The-LaCrosse Center, LaCrosse, WI. Oetzel, G.R., J.D. Olson, C.R. Curtis, M.J. Curtis and M.J. Fettman. 1988. Ammonium chloride and ammonium sulfate for prevention of parturient paresis in dairy cows. J. Dairy Sci. 71:3302. Risco, C.A., J.P. Reynolds and D. Hird. 1984. Uterine prolapse and hypocalcemia in dairy cows. JAVMA185:1517. Wiggers, K.D., D.K. Nelson, and N.L. Jacobson. 1975. Prevention of parturient paresis by a low calcium diet prepartum: a field study. J. Dairy Sci. 58:430.

## Abstract

## Transmission of salmonellae among calves penned individually

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An analysis of the spatial and temporal patterns of excretion of salmonellae by calves penned individually showed that non-contagious routes were more important than contagious routes in disease spread. The avoidance of aerosol production, and the effective cleaning and disinfection of utensils between feeds and of buildings between batches, are likely to be more important than pen design in the control and prevention of calf salmonellosis.

