6 Summary

Cross-sectional study of the occurrence of *Campylobacter* spp., *Yersinia enterocolitica, Salmonella* spp., Rotavirus and *Cryptosporidium parvum* in dairy farms with problems of diarrhoea in northern Baden-Württemberg.

In order to evaluate the epidemiological situation of *Campylobacter* spp.*, Yersinia enterocolitica, Salmonella* spp.*, bovine Rotavirus and *Cryptosporidium parvum* in dairy farms of northern Baden-Württemberg, 425 fecal samples of calves and 401 fecal samples of cows from 30 dairy farms were collected and examined. At the time of sampling at least one calf of the farm showed clinical signs of diarrhea. In every farm all calves from birth till the age of 21 weeks and their mothers were included in the study. In addition, herd specific and individual animal data were collected as well as samples from the calfboxes and of the watery equipments.

The bacterial agents were isolated by cultivation and differentiated biochemically (*Campylobacter* spp.*, Y. enterocolitica*) or by slide-agglutination reaction (*Salmonella* spp.). In addition, bovine Rotavirus and *C. parvum* in fecal samples of calves were identified by use of commercial ELISA-kits. *C. parvum* further was also identified by phase-contrast microscopy. The following prevalences were determined:

Pathogens		Prevalence
Campylobacter spp.		29,6 %
	C. jejuni subsp. *jejuni*	89,7 %
	C. jejuni subsp. *doylei*	7,1 %
	C. coli	3,2 %
Y. enterocolitica		0,7 %
Salmonella spp.		4,7 %
bovine Rotavirus		7,5 %
Cryptosporidium parvum		19,3 %

In the fecal samples of the cows the prevalence of *Campylobacter* spp. was 13,9 %, of *Y. enterocolitica* 4 % and of *Salmonella* spp. 1,2 %.

Both, clinical evident diarrhea and the frequencies of the examined causative agents were depended upon the age of the calves. Diarrhea appeared significantly more often during the first 4 weeks ante partum. A relationship between the appearance of diarrhea and prevalence of bovine Rotavirus was determined. *Campylobacter* spp .and *Y. enterocolitica* played a secondary role in the cause of calf diarrhea, as for both agents no relationship between the age at first viable clinical signs in the calves and the occurrence of diarrhea could be established. *Salmonella* spp. is frequently excreted by newborns calves (< 1 week) or older calves suffering from other stresses. No significant relationship between the frequency of excretion of *C. parvum* and clinical diarrhea could be determined. Calves excrete *C. parvum* during the first 4 weeks of life as well as later on, which leads to the conclusion, that older calves function as asymptomatic secretors. Therefore, older calves excreting *C. parvum* are very likely an important source of infection for newborn calves.

The total number of cattle and calves in each herd, the method of watering and housing as well as the breed do exert significant influence on the detection frequency of the examined agents. In herds with less than 132 cattle, *Campylobacter* spp. was less frequently detected than in herds with more than 144 cattle.

Salmonella spp. was significantly more often detected in farms with less than 22 calves. The detection frequency of *Campylobacter* spp. was highest in weaned or group-housed calves, whereas *C. parvum* and bovine Rotavirus were highest in single-housed calves or calves raised with nippelbucket. Furthermore, bovine Rotavirus was significantly less often detected in Holstein Friesian calves than in calves of other breeds.

Multivariate analyses clearly demonstrated that bovine Rotavirus as well as *Salmonella* spp. play an important role in the cause of calf diarrhea. Concerning *Campylobacter* spp., *Y. enterocolitica* and *C. parvum*, it is suggested that they are mostly excreted by asymptomatic older calves which function as an important source of infection for younger ones.

The 5 examined pathogenic agents are potentially infectious for humans. Further, because of the prevalences established in this study, calves appear to be a reservoir for these zoonotic agents, which is a factor in the process of human infection that should not to be underestimated.