Diagnosis of *Neospora caninum* related bovine abortion is based on the presence of characteristic histopathological lesions (non suppurative meningoencephalitis, miocarditis, hepatitis, nephritis) and detection of the parasite directly by immunohistochemistry (IHC) or PCR on fetal tissues or indirectly by detection of specific antibodies in fetal fluids. In this study, the presence of *Neospora*-DNA was assessed in fluids from 11 bovine fetuses (mean age 3 months ± 0) belonging to cows experimentally infected (Group A) and 12 confirmed cases (HP and IHC) of natural spontaneous *Neospora*-related abortions (Group B, mean age 5.8 ± 1.6 months). Histology techniques, IHC, nested-PCR on fresh tissues and fluids and indirect fluorescent antibody test (IFAT) on fluids were performed on the fetuses. *N. caninum* specific antibodies were measured using dilutions of fluids from 1:16 to end point titer. Histopathological lesions compatible with protozoa agents were observed in all fetuses from both groups. IHC was positive in at least one fetal tissue (CNS, heart or placenta) in 91% of 11 and 92% of 12 fetuses from Group A and B, respectively. When testing tissues by nested PCR, all fetuses from Groups A and B were positive (except 3 cases from Group B where fresh tissue was not available). *Neospora*-DNA was detected in fluids in 100% and 50% of the fetuses from Group A and B respectively. Only 6/11 fetuses from Group A were positive by IFAT at dilution 1:16. Distribution of IFAT-titers on fetuses in Group B was as follow: negative (7), 1:16 (3) and 1:32 (2). All the positive fetuses to IFAT were also positive to PCR in fetal fluids in Group A, whereas in Group B, 5 fetuses negative by IFAT were positive by PCR, improving the diagnostic sensitivity. The quality of the samples (experimental versus natural abortion) and the age of the fetuses may be responsible for these results. Fetal fluids are not only samples where specific antibodies can be detected but also *Neospora*-DNA could be present. Diagnosis of *Neospora*-infection on bovine fetuses having compatible histopathological lesions could be performed based in the finding *Neospora*-DNA in fetal fluids.