

BRIEF COMMUNICATION

NEW DATA ON *Echinococcus* spp. IN SOUTHERN BRAZIL

Mário L. DE LA RUE(1), Anke DINKEL(2), Ute MACKENSTEDT(2) & Thomas ROMIG(3)

SUMMARY

40 *Echinococcus* isolates from sheep and cattle in Southern Brazil were genetically analysed in order to obtain further data on the presence of different taxa of the *Echinococcus granulosus* complex. Differentiation was done using a PCR technique and sequencing of mitochondrial cytochrome c oxidase subunit 1 (CO1). Most samples (38) could be allocated to the sheep strain (G1) of *E. granulosus*, while two samples belonged to *E. ortleppi*, previously known as cattle strain (G5) of *E. granulosus*. Due to the shorter prepatent period in dogs of the latter taxon, this records have important implications for the design of control measures in this endemic region.

KEYWORDS: *Echinococcus granulosus*; Strains; Southern Brazil.

Cystic echinococcosis (hydatid disease) is a well documented zoonosis of worldwide occurrence. It is caused by the dog tapeworm, *Echinococcus granulosus*, which is long recognized as an assembly of various distinct strains and, recently, species⁸. Maturation time, host range and infectivity to humans are known to differ considerably between strains and species, and knowledge on the locally prevailing tax is mandatory for the estimation of health risks and the design of control programmes. In the southern part of the federal state Rio Grande do Sul (southern Brazil), where this study was conducted, the rural economy is based on extensive cattle and sheep breeding, and dogs are frequently kept to assist with herding. Surveys of the previous five years resulted in *Echinococcus* prevalence estimates of 19% in cattle, 3% in sheep and 20% in rural dogs (AGRICULTURAL SECRETARY-RS, 1999; BRAZILIAN AGRICULTURAL MINISTRY, 2001 - Personal communication). Human cystic echinococcosis is believed to be widespread, but hospital records are either unavailable or unreliable. In 1999, HAAG *et al.*⁵ for the first time reported the presence of *E. ortleppi* (formerly known as cattle strain G5 of *E. granulosus*) in southern Brazil, and after this, BARTHOLOMEI-SANTOS *et al.*¹ confirmed it in a genetical approach but no information on geographic distribution and prevalence was provided. In neighbouring Argentina, the presence of *E. granulosus* G1 (sheep strain), G2 (Tasmanian sheep strain), G6 (camel strain) and G7 (pig strain) were reported⁶.

For this study, hydatid cysts were collected from animals of the endemic area in Southern Brazil at three local slaughterhouses (Cities of Santa Maria, Bagé and Rosário do Sul). In total, 40 cysts were collected from cattle (n = 28) and sheep (n = 12). Cyst material

(protoscoleces or cyst wall) was preserved in 70% ethanol. A PCR technique was employed to identify the *Echinococcus* strain or species as described⁴. Basically, all samples were analysed using an *E. granulosus* G1 specific PCR. All samples which were negative in G1 specific PCR subsequently underwent an *E. granulosus* G5/G6/G7 specific PCR and afterwards a semi nested PCR for *E. granulosus* G5.

To confirm the presence of *E. granulosus* (G5) an additional sequencing of partial mitochondrial cytochrome c oxidase subunit 1 (CO1) was done².

Table 1
E. granulosus and *E. ortleppi* presence in cattle and sheep in Rio Grande do Sul State (Southern Brazil)

Cattle	<i>E. granulosus</i> (G1)	<i>E. ortleppi</i>
Lungs	18	2
Liver	8	-
Sheep	<i>E. granulosus</i> (G1)	<i>E. ortleppi</i>
Lungs	6	-
Liver	6	-

As shown in Table 1, all of 12 samples from sheep belonged to *E. granulosus* G1, while two of 28 samples from cattle were identified as *E. ortleppi*, both of the latter located in the lungs. Although these data are very preliminary, it appears that G1 is the most common taxon in

(1)Depto. de Microbiologia e Parasitologia, Universidade Federal de Santa Maria, Santa Maria, RS, Brasil.

(2)University of Hohenheim, Dept.of Parasitology, D-70599, Stuttgart, Germany.

(3)University of Ulm, Section Infectiology, D-89081, Ulm, Germany.

Correspondence to: Depto. de Microbiologia e Parasitologia, Universidade Federal de Santa Maria, 97105-900 Santa Maria, RS, Brasil. Tel:+55 55 32208437. E-mail: delarue@smail.ufsm.br

this region, both in sheep and in cattle. Protoscolices were observed in samples from both host species, which means that the two economically most important livestock species are of epidemiological importance for the transmission. G1 is - worldwide - suspected to be the principal genotype affecting humans, while the extent of the human pathogenicity of *E. ortleppi* is still unclear with a single human case on record so far³. However, the prepatent period in dogs of *E. ortleppi* is one week shorter as compared to the G1 strain of *E. granulosus*⁷. This, in turn, is a valuable information, since the dosing regimes of dogs in control programmes are designed for the longer development time of G1, and *E. ortleppi* may reach the stage of egg shedding within dog dosing intervals. Even without regard of the zoonotic potential, the enormous economic loss due to condemnation of infected livers and lungs alone calls for efficient control measures targeting both taxa of *Echinococcus*. This paper is therefore to be considered as a first contribution to the subject, to be followed by detailed epidemiological surveys on geographical and host distribution of the various *Echinococcus* taxa.

RESUMO

Novos dados sobre *Echinococcus* spp. no sul do Brasil

Quarenta isolados de *Echinococcus* provenientes de ovinos e bovinos do sul do Brasil foram analisados geneticamente com o objetivo de obter dados a respeito das diferentes cepas dentro do gênero *Echinococcus granulosus*. A diferenciação foi feita empregando-se a técnica de PCR e o seqüenciamento da subunidade I da citocromo c oxidase (COI). A maior parte das amostras (38) pôde ser alocada na cepa ovina (G1) enquanto duas amostras pertenceram ao gênero *E. ortleppi*, anteriormente conhecido como cepa bovina (G5) do *E. granulosus*. Devido ao menor período pré-patente em cães deste último gênero ressalta-se a importância do presente registro devido às

implicações no delineamento de medidas de controle nesta região endêmica

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