Human hydatidosis in Dalmatia, Croatia

Morović, Miro

Epidemiol. Infect. (1997), **119**, 271–276. Printed in the United Kingdom

SHORT PAPER
Human hydatidosis in Dalmatia, Croatia

M. MOROVIĆ

Clinic for Infectious Diseases, Clinical Hospital Centre of Rijeka, Medical Faculty University of Rijeka, Kresimirova 42, HR-51000 Rijeka, Croatia

(*Accepted 16 April 1997*)

SUMMARY

Human echinococcosis remains a very serious public health problem worldwide, although a decline in incidence has been observed in some endemic areas during the last decades. However, in some non-endemic areas an increase in new cases and new foci of animal echinococcosis were registered during the same time. In Dalmatia, a well known endemic area of hydatidosis in the most Mediterranean part of Croatia, from the mid-1950s until present a decrease of incidence of over 70% has been registered. Age, sex and occupational category specific incidence as well as lethality rate have remained the same as before. Migrations from rural to urban regions seem to be the most important parameter in the changing epidemiology of human hydatidosis in Dalmatia.

Human hydatidosis is a severe parasitic disease endemic in many areas of the world, including the entire Mediterranean littoral. Immunodiagnostic methods tend to show high specificity but low sensitivity, and therefore the diagnosis of human hydatid disease is based on more sensitive ultrasound and CT scanning. Surgery is still the treatment of choice although with benzimidazole carbamates an important adjuvant and in some cases alternative models of therapy have emerged.

During the last two to three decades a number of hydatid control programmes have led to a significant fall in the incidence of human hydatid disease in some endemic areas [1, 2]. A similar but not as significant trend was seen for animal echinococcosis in some countries too. On the other hand, an increase in new cases of human infections [3–5] and new foci of animal echinococcosis [6–8] have been registered in some nonendemic areas.

In Dalmatia, a well known endemic area of echinococcosis, which covers some 11758 km² of Croatian territory and lies along the Eastern Coast of the Adriatic Sea, the first hospitally treated cases of hydatid disease were described by Peričić, Lalić and Marčelić at the beginning of 1890s. From this period until the mid-1950s Suić had calculated that about 5500 patients were treated in the Dalmatian hospitals of which 4208 were notified in the four main hospitals in Zadar, Sibenik, Split and Dubrovnik. The greatest number of hospitalized patients with hydatidosis were registered from the mid-1940s until the mid-1950s when the average number reached about 160 cases annually as shown in Figure 1*a*.

The prevalence of hospitalized patients per 100000 inhabitants in Dalmatia during this period is shown in Fig. 1*b*. The curve shows an ascending trend with a rise from about 2–3 to about 28 patients annually.

Most patients (93·3%) lived in the rural areas and only few cases came from the major coastal cities [9].

The high prevalence of infection in dogs, the slaughter of livestock without veterinary control, the widespread rural practice of feeding dogs with the viscera of home-butchered sheep and the lack of public health education were taken as the main reasons for the increasing incidence. The prevalence of hydatid cysts in slaughtered domestic animals during the years of the maximal incidence of human disease was also significantly high. As shown in Figure 2

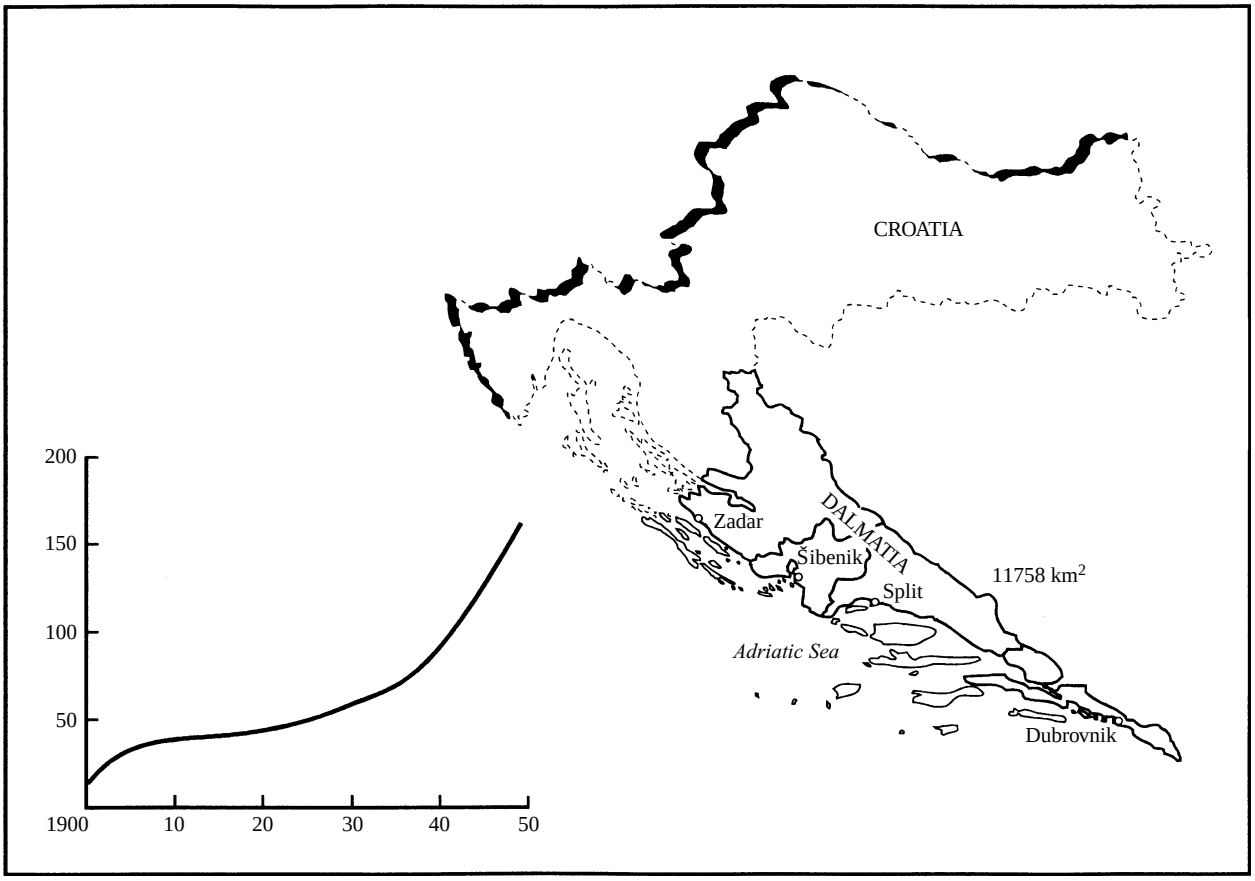

Fig. 1*a*. Annual rate of new cases of human hydatidosis in Dalmatia, Croatia, 1900–50.

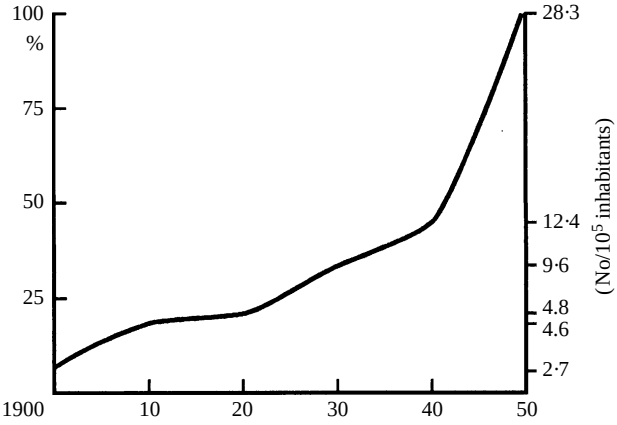

Fig. 1*b*. The average number of hospitalized patients with hydatidosis per 100000 inhabitants in Dalmatia, Croatia, 1900–50.

from 1952–6 approximately 33% of cattle, 18% of sheep, 5% of goats and 20% of pigs were found to be infected, with some difference between communities [9].

During the second part of the century, however, the epidemiological picture of human hydatidosis in Dalmatia has radically changed, with a progressive fall in the number of hospitalized patients with hydatidosis registered everywhere in the district. From the mid-1950s until the mid-1980s some 1771 patients with hydatidosis were reported to be treated in the four main Dalmatian hospitals. The annual number of new cases during this period is shown in Fig. 2*a*. The prevalence of hospitalized patients had been decreased during this period in some of the districts, namely Sibenik and Zadar, from nearly 100 patients to some 10–14 patients annually with some more rapid fall ensued from the very beginning of the 1980s [10, 11]. The prevalence of hospitalized patients per 100000 inhabitants in Dalmatia during this period is shown in Fig. 2*b*. The curve shows a descending trend with a decline of about 70% during the last 40 years.

Analysing the factors responsible for this changing epidemiology of human hydatidosis in Dalmatia the four main events could be identified.

The sex and age distribution of patients have not changed significantly during the century. Females (about 60%) and the most productive age-group (20–60 yr) have continued to be the most frequently

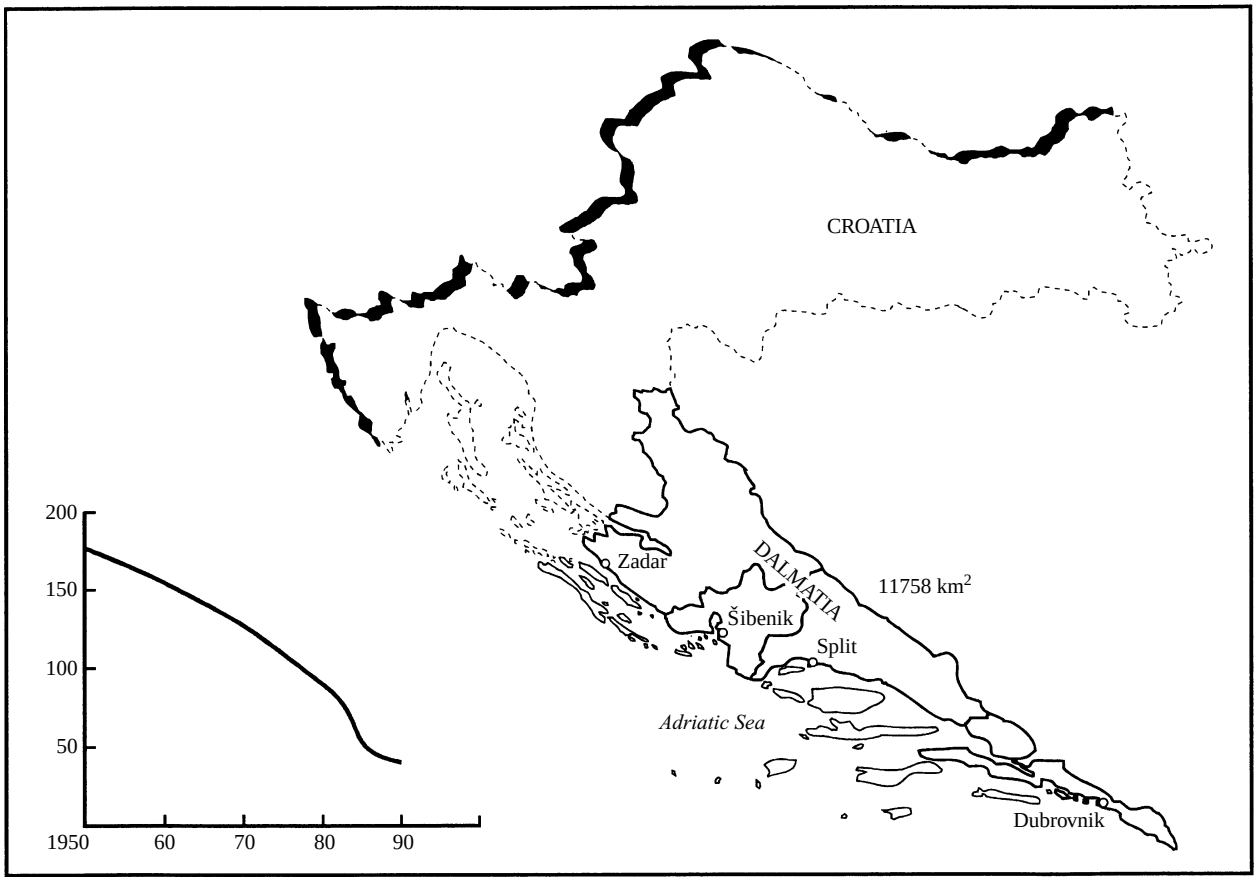

Fig. 2*a*. Annual rate of new cases of human hydatidosis in Dalmatia, Croatia, 1950–90.

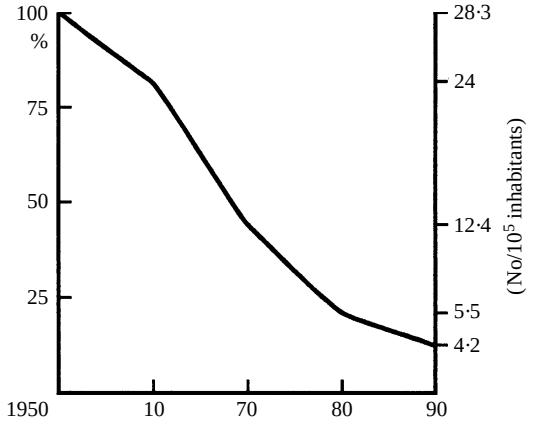

Fig. 2*b*. The average number of hospitalized patients with hydatidosis per 100000 inhabitants in Dalmatia, Croatia, 1950–90.

affected groups [10, 11]. The last analysis of specific disease incidence among various occupational categories in the Zadar area showed that housewives were the predominantly affected group (42%) followed by agricultural workers (31·3%) and children (8·7%). Also, as reported by Zivković and Barić, the lethality rate has remained during the last 3–4 decades within the same range as earlier, i.e. somewhat more than 2% [10, 11]. In spite of the decline in human case number in some communities prevalence rates in domestic animals have sometimes increased when compared with the earlier period. The study conducted by Zivković on open farms in the community of Šibenik during the 1970s showed that about 80% of sheep older than 3 years were infected in comparison with only some 8% during the 1950s, about 40% of cattle in comparison with 24%. In closed farms, which presented the fewer ones in Dalmatia the animals were well protected from infestation [12].

Prevalence rates in dogs in the rural part of Šibenik ranged around 15% during the 1970s. From the beginning of the 1980s, deworming with Praziquantel replaced the use of Arecoline and was carried out systematically by veterinarians together with rabies vaccination, with much better effect. Unfortunately, this resulted in a general agreement among veterinarians that the problem of animal echinococcosis had considerably diminished (personal communications) but no statistical evidence of this was attested. In fact, numerous dogs in periurban and rural areas evaded

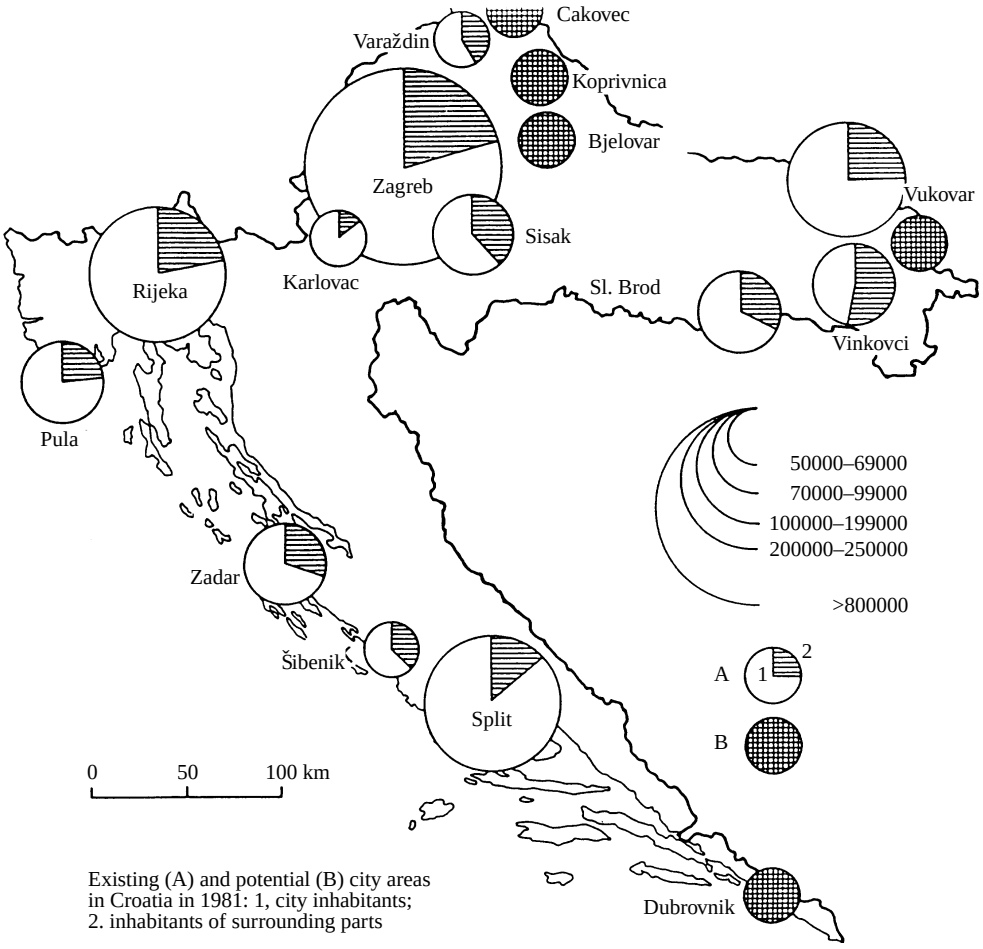

Fig. 3. Existing and potential city areas in Croatia.

treatment and because echinococcosis among wild animals was not addressed at all it remains a public health problem.

We believe that the principle factor in explaining the fall in prevalence rates of human hydatidosis since the 1950s are population movements since the Second World War involving migrations from rural to more developed urban regions. These migrations, either daily or permanent, either from villages on mainland or from islands, have considerably changed the demographic picture leading to crowded cities and proportionally empty villages. The number of migrating people has especially increased from the early 1970s.

Figure 3 shows the existing proportion, or better to say the disproportion in the number of inhabitants in the cities versus the villages according to the districts in Croatia in 1981. Figure 4 shows the influence of daily migrations of people on demographic picture in the Zadar area, Dalmatia. Daily migrations were highest in the city areas. Figure 5 shows the increase in population density in cities with over 2000 inhabitants in Croatia from 1981–92.

Analysis of the Zadar area (1121 km^2) by Barić showed that about 25% of the patients during the last 30 years lived in towns [11] in comparison with the data from the first half of the century which showed that only some 7% of hospitalized patients lived in towns [9]. This increasing number is relative however since, according to patients' epidemiological data, most of them had migrated from villages after they probably became infected. The incidence rate decreased from 28·3 during the early 1950s to some 10–14 patients per 100000 inhabitants during the 1980s, i.e. about 70%. When calculated only for the last 30 years (1960–90) this decrease was in some districts even greater, more than 80% [11].

Another problem has become visible during the last three decades, the problem of disease notification, as reported from Chile [13]. In our country echinococcosis has been put under obligation to be notified by the Epidemiologic service of the Health Institute of

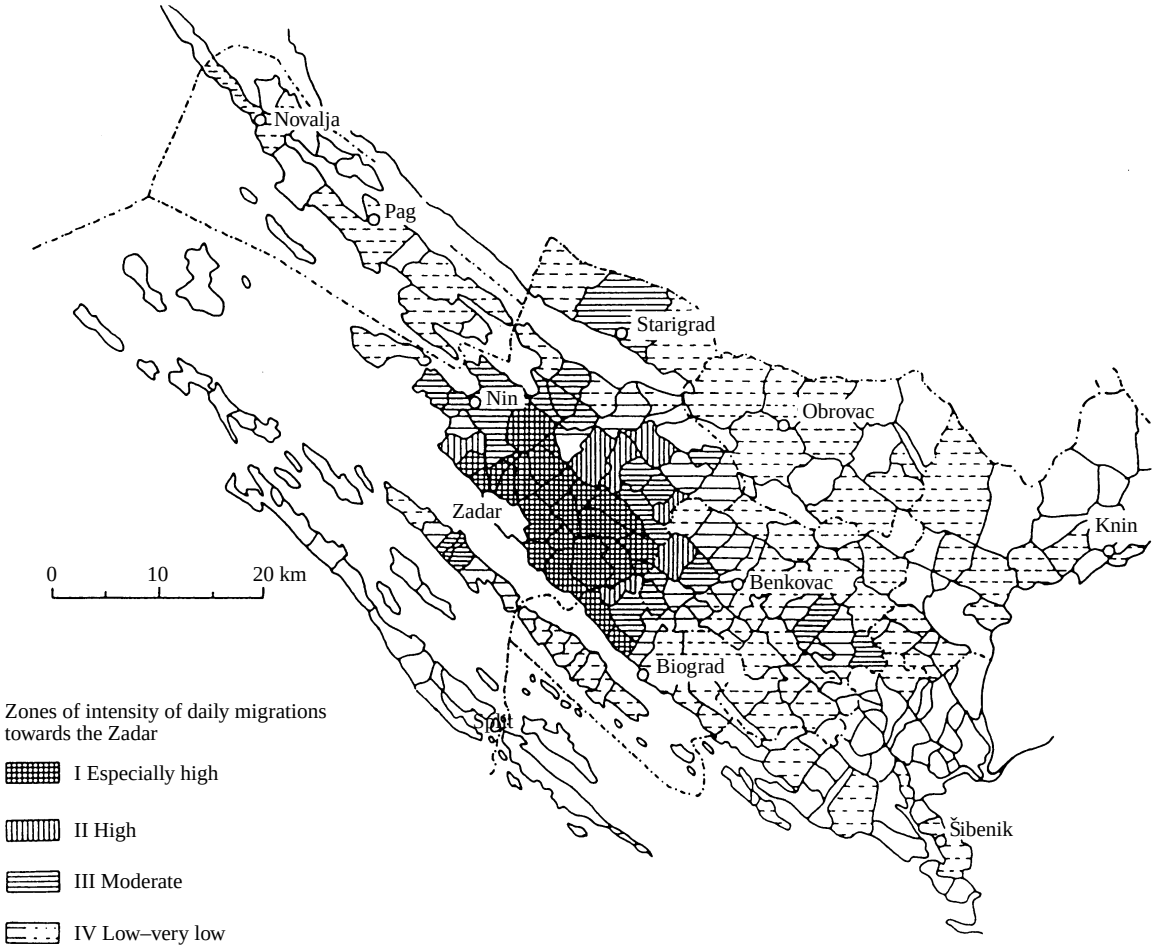

Fig. 4. Daily migrations of workers in the Zadar area, 1981.

the Republic of Croatia from 1965. But, according to the data given by the Institute, only 126 patients were notified in 1965–90, which is approximately only 10·0% of those reported to be hospitalized for hydatid disease. Moreover, in 1980–90 only seven patients registered by the Institute came from Dalmatia, which is about 3% of those hospitalized. These data themselves should be taken as a warning signal.

When summarized, our data show that the risk of hydatidosis for humans in Dalmatia has significantly decreased during the last few decades. This could be attributed primarily to significant demographic changes and only in part to systematic praziquantel deworming of dogs. Both of these processes have become especially intensive from the beginning of 1980s.

However, the unresolved reservoirs of echinococcosis in dogs from periurban and rural areas, in sheep, cattle and goats from open farms as well as in wild animals emphasize the persistent and significant potential for a resurgence of human hydatidosis in Dalmatia. This fact is of special importance since extensive migrations of people happened during the last war for Croatian independence, 1991–5. After the war was stopped new immigrations into the empty rural areas ensued. Therefore the situation of low prevalence of hydatidosis must be accepted as an artificial one and new changes in epidemiology should be expected.

In conclusion, here we have dealt with an example of a changing epidemiology of human hydatidosis not caused by primarily an anti-echinococcosis policy. Unfortunately, the control programme proposed by Zivković in 1980s was never realized [12].

The accumulated experiences from other areas shows that the sustained hydatidosis control can only be achieved by well-planned and realized programmes [1, 2]. These programmes include all activities dealing with epidemiologic surveillance of human and animal hydatidosis, the longitudinal follow-up of operated patients, the follow-up of dewormed dogs, the early identification of a high-risk asymptomatic population,

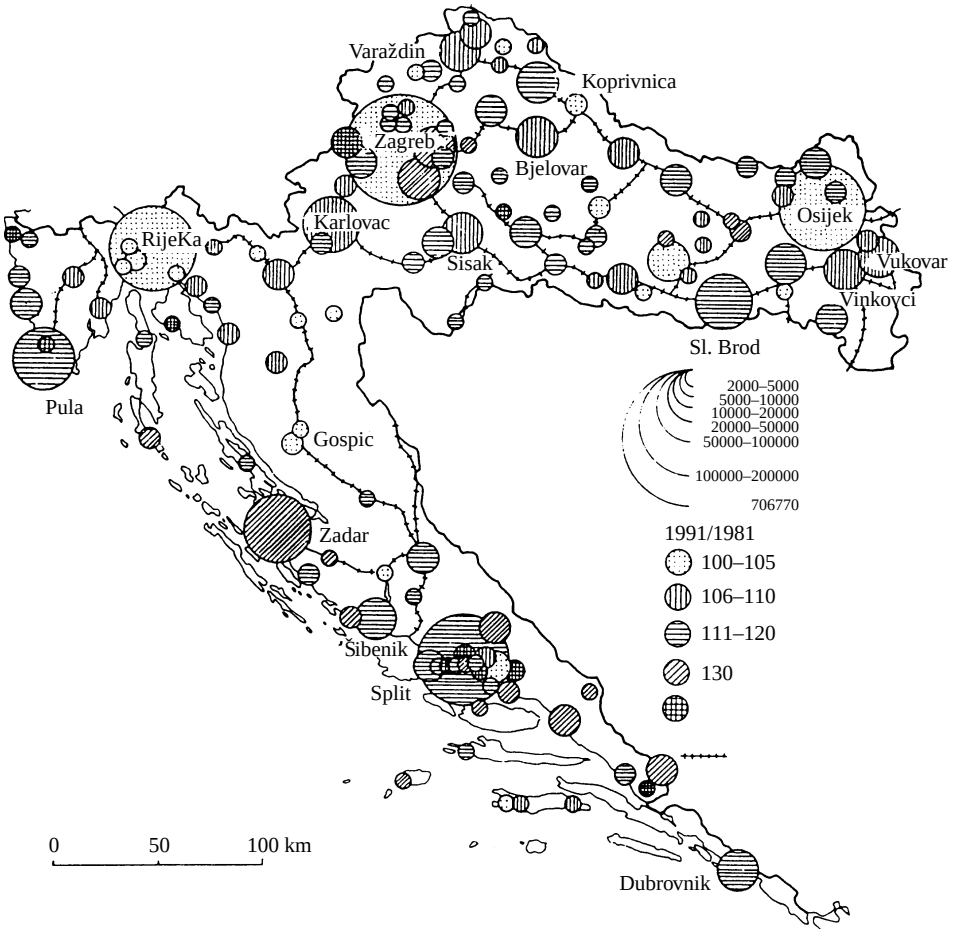

Fig. 5. Increase in city populations in Croatia, 1981–91.

etc. Here we must emphasize again the basic point, i.e. the need for an accurate and permanent system of notification of human as well as animal echinococcosis.

REFERENCES

1. Larrieu E, Costa MT, Cantoni G, et al. Hydatidosis control in the province of Rio Negro, Argentina: evaluation of the veterinary health care activities. Rev Sanid Hig Publica Madr 1994; **68**: 197–202.
2. Palmer SR, Biffin AH, Craig PS, Walters TM. Control of hydatid disease in Wales. B M J 1996; **312**: 674–5.
3. Eckert J, Jacquier P, Baumann D, Raeber PA. Human echinococcosis in Switzerland, 1884–1992. Schweiz Med Wochenschr 1995; **125**: 1989–98.
4. Nahmias J, Goldsmith R, Greenberg Z, el-On J. Hydatid disease in Israel. Harefuah 1993; **124**: 529–34.
5. Donovan SM, Mickiewicz N, Meyer RD, Panosian CB. Imported echinococcosis in southern California. Am J Trop Med Hyg 1995; **53**: 668–71.
6. Furth M, Hoida G, Nahmias J, et al. The development of new foci of echinococcosis in northern Israel: prevalence in domestic animals. J Helminthol 1994; **68**: 45–7.
7. Reichel MP, Lyford RA, Gasser RB. Hyperendemic focus of echinococcosis in north-eastern Victoria. Med J Aust 1994; **160**: 489–501.
8. Hoberg RP, Miller S, Brown MA. Echinococcus granulosus (Taenidae) and autochtonous echinococcosis in a North American horse. J Parasitol 1994; **80**: 141–4.
9. Suić M, Ehinokokoza u Dalmaciji. Liječ Vjesen 1957; 9–10: 474–84.
10. Zivković K. Ehinokokoza čovjeka. Šibenik: Stampa, 1983.
11. Barić D. Retrospective study of echinoccosis in Zadar region from 1960 to 1990. Liječ Vjesn 1994; **80**: 664–71.
12. Zivković K. Preventiva ehinokokoze (hidatidoze) (memorijal). Acta Chirur Iug 1989; suppl **2**: 529–31.
13. Serra I, Araya C, Aranda J, Serra V. Current situation of human hydatidosis in Chile. 2 proposals for correcting its undernotification. Rev Med Chil 1995; **123**: 659–69.