RABIES BULLETIN EUROPE - Vol. 4/Nr. 2/1980

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The RABIES BULLETIN EUROPE is compiled and edited by the

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1. INTRODUCTION

1.1. Contents of the Bulletin

This issue describes the rabies position in Europe for the 2nd quarter 1980. The situation is described in general under 2. and for individual European countries under 2.1. to 2.25. The case data reported to the Centre are tabulated under 4.

Data for May and June were received from Rumania and it is hoped that Rumania will once more become a regular contributor to the Bulletin.

No data were available from the USSR for the 2nd quarter 1980; rabies in the European part of the USSR during the 1st quarter 1980 is described under 2.24 and tabulated under 4.5.

The rabies data for the German Democratic Republic for the 3rd quarter 1979 has been included in this Bulletin (2.6 and page 24). A revised version of the table summarising rabies in Europe for the whole of 1979 is given on page 18. It includes the completed data for the DDR, corrections in the number of human cases i.e. 2 in Yugoslavia and 1 in France, previously omitted and the rabies data for the European part of the USSR. A new column 'Unspecified' has been inserted into the table and describes animals not denoted as either domestic or wild in received data; these were previously added to 'Unspecified wild animals'.

In Section 3 there is a report on Consultations on cell culture vaccines and their protective effect in man, held in Essen, Federal Republic of Germany in March 1980. A short article titled 'Problems of natural foci of sylvatic and arctic rabies' describes rabies in the USSR. As animal species are not named in data from the European part of USSR it helps clarify the picture of rabies in that region.

The geographical distribution of the disease in Europe during the 2nd quarter 1980 is shown on the maps in the Annex. Due to the use of a more detailed map, rabies in Turkey can now be plotted more accurately; this accounts for the apparent change in the spatial distribution.

2. RABIES IN EUROPE, 2ND QUARTER 1980

Table 1 on page 16 summarises the rabies case data reported to the centre for the period April 1 to June 30, 1980.

A total of 4071 incidences of rabies were recorded in the 2nd quarter, a reduction of 27.9% compared with the 1st quarter when 5645 rabies cases were registered. All countries affected by rabies, excepting Austria, Belgium and Norway, reported fewer cases. Rabies in the German Democratic Republic, the German Federal Republic and Turkey accounted for 55.9% of reported cases.

There were 3179 (78.1%) cases of rabies in wild animals of which 2769 (68.0% of total cases) were in foxes and 220 (5.4%) in mustelids. Of 892 rabies cases in domestic species, 430 (10.6% of total cases) were recorded in dogs, 170 (4.2%) in cats and 162 (4.0%) in cattle. 330 of the dog rabies cases were reported from Turkey.

Finland, the United Kingdom, Portugal and Sweden continued to remain rabies free and no cases were reported from Bulgaria, Greece, the Netherlands and Spain. No human cases were registered during the reporting period.

In comparison with the 2nd quarter of 1979, the total number of reported rabies cases rose by 14.6% (from 3551 in 1979 to 4071 in 1980). The proportion of cases in the different animal species however was virtually unchanged.

Individual country reports are as follows:

2.1. Rabies in Austria (AUT)

by W. Krocza and E. Scharfen

A total of 288 rabies cases were reported in the 2nd quarter 1980. The number of wild life rabies cases rose to 279 from 229 found during the 1st quarter, whereas among domestic animals the positive cases dropped from 21 in the first quarter to 9 in this quarter.

The Bundeslaender Salzburg, Niederoesterreich and Wien were free of rabies and in Burgenland only 1 case occurred in Seewinkel, district of Neusiedl am See near the Hungarian frontier.

In Oberoesterreich a small increase of positive cases was recorded in the eastern part of the district of Steyr. In the other districts of this county however, only four cases were found; 2 near the Czechoslovakian frontier and one each in the districts of Gmunden and of Kirchdorf-Krems.

From the district of Steyr, the course of the foremost line of the infected area goes through the Bundesland Steiermark in the districts of Liezen, Leoben, Bruck an der Mur and Muerzzuschlag. The isolated cases in the districts of Murau, Judenburg, Knittelfeld, Voitsberg and Graz-Umgebung are apparently remnants of the previous massive infection.

The Carinthian (Kärnten) part of the previously existing, rather continuous front-wave of the epizootic broke up, leaving a few cases in the district of Voelkermarkt, one in Klagenfurt-Land and 2 cases in St. Veit an der Glan.

In the Bundesland Tirol the number of rabies cases in the district of Imst was found to be six times higher than in the first quarter (15 in 1st quarter, 93 in 2nd quarter) and the number of cases in the district of Landeck doubled (from 19 to 39 cases). In the districts of Reutte, Innsbruck-Land, Kufstein and Kitzbuehel however, only sporadic cases were recorded. A similar sporadic distribution also prevailed in the Bundesland Vorarlberg.

2.2. Rabies in Belgium

by R. Depierreux

When one refers only to the figures, the situation concerning the evolution of rabies in Belgium appears less favourable in 1980 than in 1979. Whereas 25 cases were registered in the whole of 1979, 34 cases have been reported in the first half of 1980; 28 foxes, 1 badger, 4 cattle and 1 cat. 23 of the 34 cases were diagnosed in the 2nd quarter 1980.

The situation on the ground however, appears less alarming than one is led to believe from the figures. Indeed, it must be remarked that all the cases are localised in the east of Belgium in the region near the border with Luxembourg and the Federal Republic of Germany.

Given the applied measures in the border region - the reduction of the fox population, particularly the gassing of fox earths in spring, one is led to surmise that there was an infiltration of foxes across the border. We are thus brought to reflect and to stress of the necessity for co-ordinated action between neighbouring countries in the application of measures in the fight against rabies.

2.3. Rabies in Bulgaria (BUL)

No cases were registered during the reporting period.

2.4. Rabies in Czechoslovakia (CZE)

by Dr. Neumann

As in accordance with seasonal variations the occurrence of rabies in the 2nd quarter 1980 decreased in comparison with the first. 301 cases were recorded in the 2nd quarter and 435 in the first quarter, a reduction of 30.8%.

In comparison with the same period in 1979 the number of rabies cases increased considerably; 2nd quarter 1979 - 201 cases, 2nd quarter 1980 - 301 cases, an increase of 49.8%. The increase occurred solely in wild species (176 cases in 1979 and 284 in 1980), a 61.4% increase. In the same period the incidence of rabies in domestic animals decreased by 34.6% from 26 cases to 17.

In the 2nd quarter 1980, rabies was diagnosed in 263 foxes (163 foxes in 2nd quarter 1979), 1 badger (3), 13 martens (0), 1 polecat (2), 2 roe deer (8) 2 mouflon (0), 1 red deer (0), 1 wildcat (0), 8 dogs (14), 7 cats (12), 1 cattle (0), 1 sheep (0). The occurrence of rabies in wild species represents 94% total cases. New cases of rabies occurred in the following districts; Prague-West, Ostrawa, Cadce, Martin, Bardejov, Spisskâ Novâ Ves. The distribution of rabies cases was very similar to that in the 1st quarter with the majority in the north west in districts bordering the frontier with the German Democratic Republic.

No case of rabies was registered in man.

2.5. Rabies in Denmark (DEN)

by S. Møllgaard

In the 2nd quarter 1980, 11 rabies cases were registered. There were 8 cases of rabies in foxes (4 in June) and 3 in sheep.

The gassing season has ended but poisoning of foxes with strychnine will be continued during the summer months. No rabies was reported from the northern area of the combat zone (Ribe and Kolding) where 23 rabies cases were reported in the 4th quarter 1979 and 2 cases in the 1st quarter 1980. In the south of Denmark, it is thought that rabies has again crossed the Danish-German frontier causing to date, 2 cases of fox rabies.

2.6. Rabies in Germany, Democratic Republic (DDR)

In the 2nd quarter 1980, 461 rabies cases were reported of which 354 (76.8%) were fox rabies, 24 (5.2%) dog rabies and 28 (6.1%) cat rabies. There has been a reduction 13.8% since the 1st quarter when 535 incidences were reported.

The distribution of rabies was little changed. The regions Karl-Marx-Stadt, Gera and Suhl in the south of the country bordering Czechoslovakia and the Federal Republic of Germany, and of Rostock in the north having a higher concentration of reported cases.

Rabies data for the 3rd quarter 1979 is belatedly included in section 4 (p. 24). 267 rabies cases were reported of which 195 (73.0%) were fox rabies, 7 (2.6%) dog rabies and 18 (6.7%) cat rabies. The geographic distribution and number of rabies incidences showed little change from the 2nd quarter 1979.

2.7. Rabies in Germany, Federal Republic (DEU)

In the 2nd quarter 1980, 1329 rabies cases were reported, of which 1175 (88.4%) were in wild species and 154 (11.6%) in domestic animals. The fox accounted for 1004 (75.5%) incidences, and mustelids 98 (7.3%). A 34.0% reduction in rabies incidence from 2014 cases in the 1st quarter 1980 occurred.

The overall geographic distribution of rabies was little changed. Regions in the north and west of the country had the least infection and Saarland and Baden-Wuerttemberg in the south and south west had the most. The most notable reductions in incidence were recorded in Darmstadt and Kassel (Hessen), Rheinhessen (Rheinland-Pfalz), Stuttgart and Karlsruhe (Baden-Wuerttemberg) and Mittelfranken (Bayern). These regions recorded a drop in the number of reported cases from 769 in the 1st quarter to 318 in the 2nd quarter or 65.8% of the total reduction. Small increases were noted in Trier and Koblenz (Rheinland-Pfalz), Saarland and Schleswig-Holstein.

2.8. Finland (FIN)

The country remained rabies-free.

2.9. Rabies in France (FRA)
by L. Andral

A total of 381 rabies cases were registered in the 2nd quarter 1980, comprising 75 domestic animals and 306 wild animals of which 290 were foxes. In the 1st quarter 589 animals were reported rabid of which 509 were foxes.

No noticeable change since the 1st quarter 1980 can be reported in the evolution of the disease. Much of the front of the disease is in the zone reached several years ago. The advance of the front in the department of Haute Savoie also appears to be slowing down.

2.10. Rabies in Greece (GRE)

No cases were registered during the reporting period.

2.11. United Kingdom (GBR)

The country remained rabies-free.

2.12. Rabies in Hungary (HUN)

142 rabies cases were registered in the 2nd quarter 1980 of which 135 (95.1%) were in foxes, 2 (1.4%) in dogs and 3 (2.1%) in cats.

The very marked reduction in incidence between the 1st and 2nd quarters, observed in previous years was apparent again in 1980. A reduction in incidence of 62.7%, from the 1st quarter, when 381 cases were registered, occurred. The areas of Hungary affected by rabies has not greatly altered though with fewer reported cases the distribution is more sporadic than in the 1st quarter.

2.13. Rabies in Italy (ITA)

2 cases of rabies were reported in the 2nd quarter 1980. Both incidences, in badgers, occurred in the district Ovaro where 2 of the 3 reported cases in the 1st quarter 1980, were registered.

Since the 2nd quarter of 1978 when 82 cases were reported, the incidence of rabies has continued to diminish.

2.14. Rabies in Luxembourg (LUX)
by A. Schiltges

Only 1 case of rabies was diagnosed in the 2nd quarter 1980, 7 cases fewer than in the first quarter. This incident, in a fox was in the north of the country and contrasts to the position in the first quarter when 7 of the 8 cases were in south and south west Luxembourg. Providing the tendency continues a marked reduction of rabies cases can be expected in 1980 compared with 1979.

2.15. Netherlands (NET)

The country continued to remain rabies-free.

2.16. Rabies in Norway (NOR)
by R. Vollan and H.O. Bach-Gansmo

15 cases of rabies were reported in the second quarter 1980, 11 in arctic fox, 3 in reindeer and 1 case of rabies in seal. No case of rabies has been diagnosed in domestic animals or man.

There is no evidence to indicate that the disease has been introduced into the Islands of Svalbard by importation of domestic animals. It is surmised that rabies has been brought from the arctic islands or mainlands east or west of Svalbard by polar bear or polar fox. The islands are largely uninhabited and inaccessible and it is therefore impossible to know when the outbreak started.

Immediately following 12 March 1980 (when the first case of rabies, in an arctic fox, was diagnosed) the free traffic of animals and animal products from Svalbard to mainland Norway (1000 km distant) was suspended and strict quarantine and control measures were applied. All dogs and cats on the islands have been vaccinated. All cases where animals and animal products have been brought from Svalbard to mainland Norway during the preceding 6 months have been closely investigated and quarantine and other preventative measures have been applied. No case of rabies has been diagnosed on mainland Norway.

2.17. Rabies in Poland (POL)

183 rabies incidences were registered in the 2nd quarter 1980. Of the total, there were 147 (80.3%) cases in wild species and 36 (19.7%) in domestic species. The incidence in the fox was 131 (71.6%), in dogs 12 (6.6%) and in cats 17 (9.3%).

Compared with the 1st quarter 1980 when 274 cases were reported, there has been a reduction in incidence of 33.2%. This is a more marked reduction than the 12.1% recorded from the 1st to 2nd quarter of 1979.

As in previous quarters, the majority of polish regions were affected by rabies. Slightly, higher case densities were found in a number of western regions; Jelenia Gora, Szczecin, Gorzow and Zielona Gora, all bordering the German Democratic Republic.

2.18. Portugal (POR)

The country remained rabies-free.

2.19. Rabies in Rumania (RUM)

Rabies data for May and June were received. 10 new outbreaks were reported, 5 in domestic animals (2 in dogs, 3 in unspecified domestic species) and 5 in wild species (all unspecified).

It should be noted that the disease was reported in terms of 'new outbreaks'. It is not certain that a 'new outbreak' represents a single case of rabies. This should be taken into account when reading the case data table on page 21.

2.20. Rabies in Spain (SPA)

No cases were registered during the reporting period.

2.21. Sweden (SWE)

The country remained rabies-free.

2.22. Rabies in Switzerland (SWI)
by A. Wandeler

During the 2nd quarter 1980, the Swiss rabies diagnostic centre received 1430 animals for examination. There were 238 positive for rabies, compared with 390 in the 1st quarter 1980; 69% were in foxes, 14% in mustelids. For the first time in Switzerland a wild boar was found rabid.

Rabies cases were distributed nearly at random through northern parts of Switzerland. High case densities were observed in the Bernese Kandertal, in a midlands area between Luzern, Zurich and Schaffhouse, and in the vicinity of Davos, canton Grison.

During the period of observation 5 persons were bitten by proven rabid animals; 1 by a dog, and 4 by cats.

2.23. Rabies in Turkey (TUR)

486 rabies cases were registered in the 2nd quarter 1980. Of the total, 330 incidences were in dogs (67.9%), 27 in cats (5.6%) and 87 in cattle (17.9%). There has been a reduction of 4.1% since the 1st quarter 1980 when 507 cases were reported.

The distribution of rabies was very similar to that in the first quarter. The only notable reduction in the number of cases was in the district of Konya with 43 cases in the 1st quarter and 9 in the second.

A new map of Turkey has been used to plot the rabies cases. This permits more accuracy and accounts for the apparent change in the geographic distribution of rabies incidence.

2.24. Rabies in the Union of Soviet Socialists Republics (USSR)

- 1st quarter 1980 -

286 cases of rabies in animals were registered during the 1st quarter of 1980 in the European part of USSR territory. During the preceding quarter 243 cases were reported. Animal species were not specified.

2.25. Rabies in Yugoslavia (YUG)

200 rabies cases were registered in the 2nd quarter 1980, 24 cases fewer than in the 1st quarter (a reduction of 10.7%). Of the total, there were 175 cases of fox rabies (87.5%), 18 unspecified wild species, 5 dogs and 2 cats. Compared with the 2nd quarter 1979, the number of cases has increased by 66.7%, from 120 cases in 1979 to 200 in 1980.

Rabies is largely restricted to northern Yugoslavia; Slovenia, Croatia and Wojwodina. A few isolated incidents were also reported from Central Serbia.

In Slovenia, rabies is spreading in a south easterly direction after crossing the border from Austria in the 1st quarter 1979. Three new districts became infected in the 2nd quarter 1980 and the number of cases increased by 73.1% from 82 to 142. The incidence of rabies in Croatia was sporadic. Fewer districts reported rabies in the second quarter and the number of cases dropped by 70.9% from 55 to 16. In Wojwodina, 37 rabies cases were registered in the 2nd quarter compared with 82 in the 1st (a 54.9% reduction). Again the incidence of rabies was more sporadic with fewer districts reporting rabies.

In Central Serbia and in Kosovo, 5 rabies cases were reported (5 cases in the 1st quarter). Dog rabies prevails in the south of Yugoslavia and therefore, exceptionally for this area, one case of rabies in fox was registered. The second case of fox rabies in central Serbia occurred in the district of Smed. Palarska, an area near to Wojwodina (where sylvatic rabies is prevalent).

3. MISCELLANEOUS

3.1. WHO Consultations on Cell Culture Rabies Vaccines and their Protective Effect in Man (Essen, Federal Republic of Germany, 5-7 March 1980)*)

Summary

The above consultations were held to assess and collate the most recent advances in the development of measures for the protection of man against rabies and also to point the direction in which they may be utilized most fruitfully.

Present knowledge does not permit any single parameter to be identified as a measure of the protective effect of rabies vaccines. Protection by vaccine can only be deduced from post-exposure trials in animals and in the experience obtained from persons vaccinated following natural exposure. Nevertheless, individual factors have been identified and studied with respect to their protective effect. The role of interferon induction and active immune protection seems to be confirmed, but there are still conflicting results concerning the possible role of cell mediated immunity.

There is some indication that differences in interferon induction by tissue culture rabies vaccines are influenced by the procedure chosen for antigen concentration. Interferon inducers added at low, non-toxic levels may also exert an adjuvant effect on specific immune responses. One of the most important aspects discussed by the participants concerned the antigenic specificities of rabies virus strains detected by monoclonal antibody. This offers the possibility of characterizing rabies virus strains. Further studies must show whether this technique can be used to select better vaccine production strains which match the street virus involved in an epidemic.

Special emphasis was given to the development of cell culture vaccine (HDCS) and to it successful use in the post-exposure treatment of man. No serious side effects have been reported after many thousands of vaccinations, nor have any treatment failures occurred. The sophisticated techniques required in production contribute to its high cost, making its availability to developing countries uncertain.

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*) see also Rabies Bulletin Europe Vol. 2/No. 1/1978 - WHO Informal Consultation on Reference Preparations and Potency Tests for Rabies Vaccines.

The most recent developments mentioned were the strain differences elicited by monoclonal antibodies and the possibility of synthesizing rabies G protein by incorporating the necessary gene into E.coli.

3.1.1 Antigenic characteristics of rabies viruses

Antigenic variations were detected among a limited number of street virus strains investigated by analysis with a panel of monoclonal antibodies directed against glycoprotein and nucleocapsid antigens of rabies virus. Animals immunized with a standard rabies vaccine (PV-11 strain) were only partially protected when challenged with street rabies variants which shared only a limited number of the antigenic determinants with the virus used for vaccine preparation. They were, however, fully protected against the homologous virus and against street viruses sharing several antigenic determinants. These results clearly indicate that the selection of vaccine strains and the method used for evaluating the potency of rabies vaccines may need to be reinvestigated.

A more careful analysis should be initiated of street rabies virus isolated at different geographical sites and of differing species origin. Special attention should be given to strains of virus obtained from individuals who have died in spite of post-exposure treatment. If the results indicate a lack of protection, a search will be made for strain or strains of fixed or street virus with the broadest spectrum of cross-reactivity with street virus present in a given geographical area. This strain(s) could be proposed for use in vaccine production.

WHO is further encouraged to initiate training of laboratory personnel in the production of monoclonal antibodies. In regard to the variability rate of the rabies virus, search for natural mutants of this virus should be regionally correlated with those of influenza virus.

3.1.2 Immune response and associated genetic factors

The immune response to rabies virus is remarkable in that it is difficult to correlate the outcome of rabies infection with those parameters of the immune response (IR) which can be presently measured. Antibody in serum and brain, interferon (IF) in serum and brain and cell mediated cytotoxicity in spleen are present after peripheral injection of lethal and attenuated rabies variants. However, the immunoregulatory effect of IF induced early by vaccine, an IF inducer or the challenge virus is an unexamined area. The importance of early IF induction and concomitantly enhanced immune lysis of cells needs to be investigated: their relation to the development of the later aspects of the immune response and to protection or survival from infection remains to be determined.

In the light of recent developments in the field of immunology it appears that rabies virus, being highly neurotropic, may not have access to antigen cells, thus being antigenic but not immunogenic.

No real parameter except survival actually determines immunity against rabies virus. It seems reasonable to correlate antigens of the major histocompatibility complex (MHC) with several characteristics of the immune reaction (humoral and cellular?) and to evaluate this reaction against the immuno-genetic background of the vaccine.

3.1.3 Cell culture vaccines

The following numbers of persons at least have so far been treated with cell culture vaccines specifically considered at the meeting

human diploid (Wi-38) or (MRC-5)	80 000
dog kidney	150
bovine foetal kidney	2 000
chick embryo fibroblast	2 000

It was stressed that the combined efficacy and innocuity of cell culture vaccines makes them superior to classical nervous tissue and duck embryo vaccine.

The major conclusions were:

1. The different types of tissue culture vaccines discussed are apparently free from extraneous viruses and bacteria.
2. The data presented suggest that within the limits of the tests of the manufacturer, all the types of vaccine discussed are indeed inactivated.
3. The available data indicate that these products are of sufficient potency to induce a satisfactory immune response.
4. No problems with vaccine stability were reported.

No severe neurological nor allergic reaction was noted after the use of any of these vaccines.

3.1.4 Interferon

1. There appears to be a relation between the local injection of interferon or interferon inducers and the efficacy of post-exposure rabies treatment in experimental animals.
2. Exogenous interferon is still prohibitively expensive.
3. Human diploid vaccine produces an irregular interferon response.
4. The interferon inducing potential of other rabies vaccines has not been examined.
5. Poly ICLC*) is an effective addition to post-exposure rabies prophylaxis in mice and rhesus monkeys and has also been shown to induce interferon in man.

3.1.5 The following recommendations were made:

(a) Vaccine types and production

1. The general guidelines of WHO regarding the freedom of vaccine and vaccine substrates from extraneous viruses and bacteria should be followed.
2. Inactivation of vaccines should be tested in each lot to be distributed. The type of testing should include:
   a) The intracerebral inoculation into at least 20 weanling mice;
   b) subpassage of at least 25 ml of the bulk vaccine onto either cells more sensitive or the same type of cells used for virus production, as per WHO requirements.

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*) Poly ICLC: polyriboinosinic-polyribocytidylic acid containing poly-L-lysine and carboxymethylcellulose..

3. All tissue culture rabies vaccines should have a minimum antigenic value of 2.5 International Units per dose as determined by the NIH or other accepted tests.
4. All vaccines should be adequately tested for their stability during the recommended period up to expiration.
5. All vaccines should be carefully monitored to ensure that they cause no severe adverse reactions.

(b) Studies on interferon induction and its possible adjuvant effect

6. Further studies should be carried out with different interferon inducers in experimentally infected laboratory animals.
7. Further studies in man should be carried out on the interferon inducing potential of human diploid vaccines and other vaccines for human use. While interferon clearly plays a role in protection as shown in animal studies and interferon inducing vaccines are desirable, more investigation is needed to establish the relationship between vaccine induced interferon and vaccine protective efficacy. Studies are particularly indicated to assess HDCS vaccine of different lots and potencies to establish whether these variables are significantly related to interferon induction.
8. Poly ICLC should be tested for its efficacy and safety and as an adjunct to post-exposure rabies treatment in man.

(c) Vaccine potency and safety

9. The schedule of doses for post-exposure treatment should be as short as possible and be based on the potency of the vaccine and on the proven efficacy of the schedule.
10. The stability of vaccine used in developing countries should be investigated i.e. stability of vaccine held at an elevated temperature (37°C for 4 weeks).
11. *In vitro* systems for the potency testing of rabies vaccines should be further investigated.

(d) Vaccine for developing countries

12. Developing countries should be encouraged to switch directly from the production of Nervous Tissue Vaccine (NTV) to cell culture vaccines.
13. The technique for removing the encephalitogenic factor from NTV (technique of Kaplan and Turner) should be available to any developing country.
14. A manual for the production of cell culture vaccine should be written to enable the transfer of this technology to developing countries.
15. The development of new tissue culture vaccines should be encouraged with the objective of producing effective and inexpensive vaccines for human anti-rabies treatment.
16. Studies with available high potency tissue culture vaccines: a) using smaller doses administered by the intradermal route; b) using vaccine of lowered antigenicity but with added adjuvant, to meet the worldwide need for vaccine are needed.

(e) Treatment schedules

17. The use of antirabies serum or globulin in conjuction with vaccine continues to be the treatment of choice for severe exposures, but studies should be conducted to determine the efficacy of highly potent tissue culture vaccines for post-exposure treatment with increased or varying amounts of serum or globulin or with vaccine alone.

18. Although various treatment regimens have been successfully used with the new potent tissue culture vaccines, it is recommended that in order to make meaningful comparisons possible, all new tissue culture vaccines should be evaluated for efficacy following the widely used regimen first applied under field conditions in Essen.

    The "Essen regimen" is as follows:

    Pre-exposure immunization - 3 doses of vaccine, one each on days 0, 7 and 21.
    Post-exposure prophylaxis - 6 doses of vaccine, one each on days 0, 3, 7, 14, 28 and 90.
19. Studies should continue to reduce further the number of inoculations for these vaccines.

3.2. Problems of natural foci of sylvatic and arctic rabies

by M. Selimov, A. Tatarov, R. Ilyasova, V. Onikhimovskaya
The USSR AMS Institute of Poliomyelitis and Viral Encephalitides, Moscow

One should consider persistent natural foci of fox rabies formed in different regions in the forties of this Century and covering vast territories, to be a new epidemiological form of rabies. In Europe, side by side with the focus emerging in the former territory of East Prussia, a second focus was noted in the delta of the Volga in the Astrakhan region where there was a high population of raccoon dogs, foxes and wolves (Isakov, 1949). From this focus the infection spread in the eastern direction to Kasakhstan, Omsk and Novosibirsk districts and Altai region, it reached the territory of Tuvinskaya Autonomic Republic in 1978; in the north and north-eastern directions it spread to Volgograd, Saratov, Tambov, Lipetsk and Penza regions, and other regions of the central part of the Russian Soviet Federative Socialist Republic, as well as the southern region of the Moscow district, all turned out to be involved. In north-western and western directions the infection migrated to Kalmyk ASSR, Stauropol and Krasnodar regions, Rostov district, Ukraine and Moldavia. Lithuania, Byelorussia and Latvia were involved both from Kalingrad district and Poland. In 1968 the infection came to Estonia from Latvia. The territory of the Ukraine was affected, probably both by Kaliningrad and Astrakhan foci.

As Figure 1 shows, natural foci of fox rabies in this country occupy the territory of Baltic republics, Byelorussia, Russian Socialist Republic (to the south of latitude 56^{o} north and from west to east from Kaliningrad district up to the Khaborovsk region), Ukraine, Kasakhstan and Moldavia. Fox rabies foci are registered in Georgia, Azerbaijan, Armenia, Uzbekistan, although in Caucasus and Central Asia there are outbreaks of an urban type. There are foci of arctic rabies in the Tundra.

The fox continues to play a leading role in modern rabies epizootics. Up to the end of the twenties not a single rabies case resulting from a fox bite was registered in our country. From 1946 up to 1956 the fox turned out to be a source of rabies in 5.3% of hydrophobia cases and by 1968 this figure had increased to 37.5% (Selimov, 1978).

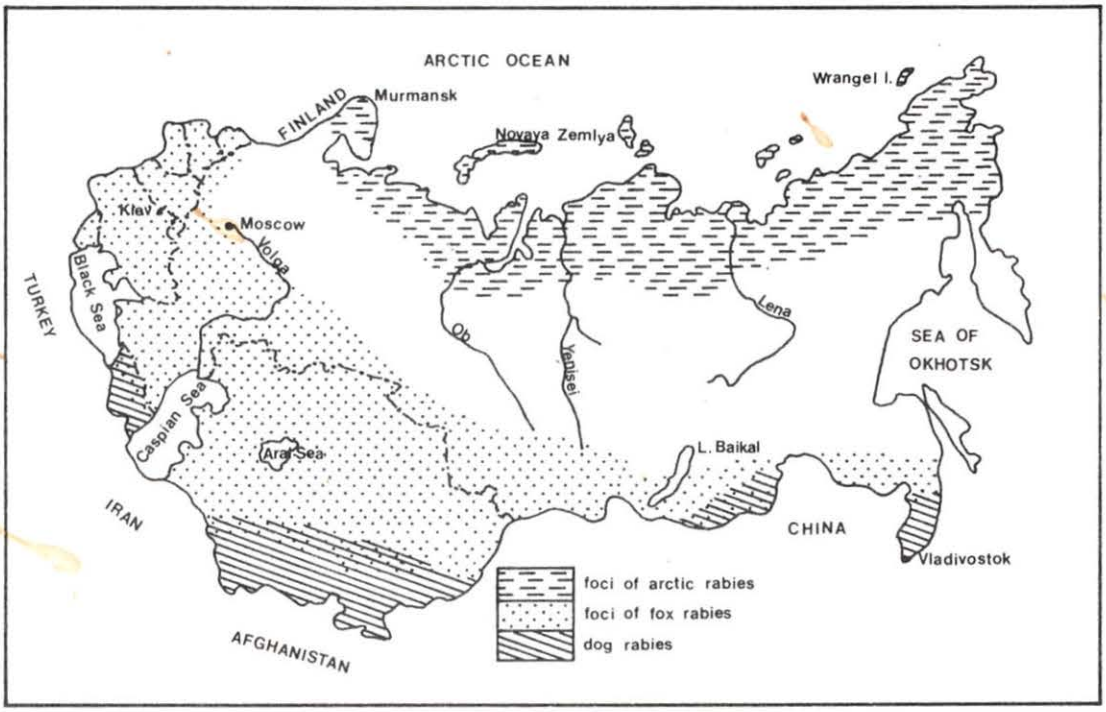

Figure 1: Distribution of arctic, fox and dog rabies in the USSR.

Persistance of rabies natural foci are explained by some authors through the presence of inapparent infection in foxes and polar foxes (R. Kantorovich, 1957). To verify this hypothesis, a virological survey of fox and arctic fox rabies natural foci was carried out. The results of the attempts to isolate virus by intracerebral inoculation in young mice and FA test are shown in Tables 1 and 2.

Simultaneous examination of brain and salivary glands of 54 foxes having the virus in the CNS showed that salivary glands were infected in 22 cases (40%). In 47 foxes with no virus in the CNS the salivary glands of all the animals were found not to contain virus either. Out of 55 polar foxes with virus in the CNS, salivary glands were found to be infected in 23 (40.2%). The virus was absent in the salivary glands of 139 polar foxes in which rabies infection could also not be demonstrated in the CNS (Table 2).

Mice inoculated with arctic rabies virus and showing no clinical signs of the disease were tested by the FA technique. There was no significant difference between the rates of rabies infection in the group tested by the FA technique and the rabies rate in a control group, the survivors of which were kept until day 35 after inoculation. Out of 89 mice which survived in the control group, not a single one showed positive fluorescence.

Thus, we failed to confirm the findings on natural infection of foxes and polar foxes up to 75 and 76% are infected respectively during the peak of epizootics (Kantorovich, 1957; Kantorovich et al., 1967).

Animals tested	Brain			Salivary glands		
	No animals examined	Virus isolation	%	No animals examined	Virus isolation	%
Fox	452	94	20.8	101	22	21.7
Racoon dog	18	4	22.0	6	-	-
Ferret	26	5	19.0	6	-	-
Wolf	20	2	10.0	2	1	-
Marten	6	-	-	-	-	-
Polar fox	1283	61	4	194	23	12.0
Polar bear	1	-	-	-	-	-
Sable	5	-	-	-	-	-
Glutton	1	-	-	-	-	-
Dicrostonyx torquatus	341	-	-	-	-	-
Lemmus sibiricus	488	-	-	-	-	-
Microtus gregalis Pallas (1778)	357	-	-	-	-	-
Other rodents	76	-	-	-	-	-

Table 1: The results of virological studies of natural foci of sylvatic and arctic rabies.

Animals tested	No animals tested	Brain		Salivary glands	
		+	-	+	-
Foxes	54	54	0	22 (40%)	32
	47	0	47	0	47
Polar foxes	55	55	0	23 (40.2%)	32
	139	0	139	0	139

Table 2: Results of simultaneous brain and salivary glands virus assays in foxes and polar foxes.

The problem of the role of inapparent infection in ecology of sylvatic and arctic rabies virus remains to be defined. However, our present-day knowledge suggests that the persistence of rabies in natural foci should be explained rather with the long incubation period in foxes and polar foxes than by the subclinical course of rabies infection.

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TABLE 1

EUR EUROPE 2/80	RABIES CASES													1. 4.80 - 30. 6.80	
LOCATION	DOMESTIC ANIMALS							WILD ANIMALS						HUMAN CASES	TOTAL
CODE NAME	DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL		
01 AUSTRIA	-	5	1	-	3	-	9	226	30	11	12	-	279		288
02 BELGIUM	-	1	4	-	-	-	5	17	1	-	-	-	18		23
03 BULGARIA *							0						0		0
04 CZECHOSLOVAKIA	8	7	1	-	1	-	17	263	1	14	3	3	284		301
05 DENMARK	-	-	-	-	3	-	3	8	-	-	-	-	8		11
06 GERMAN DEM. REPUBLIC	24	28	5	2	3	1	63	354	3	15	23	3	398		461
07 FED.REP. OF GERMANY	29	45	44	7	28	1	154	1004	27	71	61	12	1175		1329
08 FINLAND *							0						0		0
09 FRANCE	17	15	12	7	24	-	75	290	5	-	4	7	306		381
10 GREECE *							0						0		0
11 HUNGARY	2	3	1	-	-	-	6	135	-	-	1	-	136		142
12 ITALY							0	-	2	-	-	-	2		2
13 LUXEMBOURG							0	1	-	-	-	-	1		1
14 NETHERLANDS *							0						0		0
15 POLAND	12	17	6	-	-	1	36	131	2	3	5	6	147		183
16 RUMANIA **	2	-	-	-	-	3	5	-	-	-	-	5	5		10
17 SPAIN *							0						0		0
18 SWITZERLAND + LIECHT.	1	20	1	-	11	-	33	165	27	7	5	1	205		238
19 TURKEY	330	27	87	4	23	8	479	-	-	1	-	6	7		486
20 YUGOSLAVIA	5	2	-	-	-	-	7	175	-	-	-	18	193		200
22 NORWAY ***							0	-	-	-	-	15	15		15
TOTAL	430	170	162	20	96	14	892	2769	98	122	114	76	3179	0	4071
PER CENT	10.6	4.2	4.0	0.5	2.4	0.3	21.9	68.0	2.4	3.0	2.8	1.9	78.1	0.0	100.0

* NO CASES, ** WITHOUT DATA FOR APRIL, *** ON ISLAND OF SVALBARD.

TABLE 2

EUR EUROPE 2/80								RABIES CASES 'OTHER ANIMAL SPECIES'										1. 4.80 - 30. 6.80		
LOCATION	OTHER DOMESTIC ANIMALS				OTHER WILD ANIMALS															
CODE NAME	DONKEY	PIG	OTH.DOM. HERBIVOR	OTH.DOM. ANIMALS	ARCTIC FOX	COYOTE	WOLF	RACOON DOG	WILD CAT	SEAL	REINDEER	WILD BOAR	MOUFLON	SQUIRREL	HOUSE MOUSE	HARE	RAT	OTH.WILD ANIMALS	UNSPECIFIED	TOTAL
04 CZE	-	-	-	-	-	-	-	-	1	-	-	-	2	-	-	-	-	-	-	3
06 DDR	-	1	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	4
07 DEU	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	1	-	9	13
09 FRA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	7
15 POL	-	1	-	-	-	-	-	5	-	-	-	-	-	1	-	-	-	-	-	7
16 RUM	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	8
18 SWI	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
19 TUR	6	-	2	-	-	2	1	-	-	-	-	-	-	-	3	-	-	-	-	14
20 YUG	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	-	18
22 NOR	-	-	-	-	11	-	-	-	-	1	3	-	-	-	-	-	-	-	-	15
TOTAL	7	2	2	3	11	2	1	5	1	1	3	3	4	1	3	1	1	30	9	90
PER CENT	7.8	2.2	2.2	3.3	12.2	2.2	1.1	5.6	1.1	1.1	3.3	3.3	4.4	1.1	3.3	1.1	1.1	33.3	10.0	100.

TABLE 3

EUR E U R O P E 1979					R A B I E S C A S E S										1. 1.79 - 31.12.79
LOCATION	D O M E S T I C A N I M A L S							W I L D A N I M A L S						UNSPEC	HUMAN CASES	TOTAL
CODE NAME	DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL			
01 AUT	11	23	26	2	13	–	75	1616	127	29	163	9	1944	–	1	2020
02 BEL	–	3	4	–	–	–	7	17	–	1	–	–	18	–		25
03 BUL *							0						0	0		0
04 CZE	32	37	1	–	4	–	74	671	7	8	23	4	713	–		787
05 DEN	–	–	19	1	1	–	21	133	–	10	–	–	143	–		164
06 DDR	66	114	66	1	67	1	315	1011	8	36	103	10	1168	–		1483
07 DEU	72	164	292	33	93	4	658	3815	81	222	246	16	4380	51		5089
08 FIN *							0						0	0		0
09 FRA	49	39	131	15	59	–	293	1351	15	–	18	–	1384	28	1	1706
10 GRE	1	–	–	1	–	–	2						0	–		2
11 HUN	24	37	18	2	1	3	85	1185	–	–	5	7	1197	–		1282
12 ITA	–	–	–	–	1	–	1	61	10	–	7	–	78	–		79
13 LUX	–	2	7	1	–	–	10	11	1	–	–	–	12	1		23
14 NET	1	–	–	–	–	–	1						0	–		1
15 POL	59	83	49	1	5	3	200	734	13	13	53	26	839	–		1039
16 RUM **																–
17 SPA	–	1	–	–	–	–	1						0	–		1
18 SWI + LIE	6	71	57	5	46	1	186	992	65	53	77	3	1190	–		1376
19 TUR	975	106	385	18	46	38	1568	2	2	–	–	20	24	–	3	1595
20 YUG	12	5	4	–	–	1	22	387	–	–	–	–	387	7	2	418
21 USR							0						0	1057		1057
TOTAL	1308	685	1059	80	336	51	3519	11986	329	372	695	95	13477	1144	7	18147
PER CENT	7.2	3.8	5.8	0.4	1.9	0.3	19.4	66.0	1.8	2.0	3.8	0.5	74.3	6.3	0.0	100.0

* NO CASES, ** NO DATA.

AUT	AUSTRIA	RABIES CASES														1. 4.80 – 30. 6.80
LOCATION		DOMESTIC ANIMALS							WILD ANIMALS						HUMAN CASES	TOTAL
CODE	NAME	DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL		
B5	NEUSIEDL AM SEE							0	1	–	–	–	–	1		1
K2	KLAGENFURT-LAND							0	–	1	–	–	–	1		1
K3	ST. VEIT	–	–	–	–	1	–	1	1	–	–	–	–	1		2
K6	VOELKERMARKT							0	6	2	–	–	–	8		8
O4	GMUNDEN							0	1	–	–	–	–	1		1
O6	KIRCHDORF							0	1	–	–	–	–	1		1
O10	ROHRBACH							0	1	1	–	–	–	2		2
O12	STEYR-LAND							0	8	4	1	–	–	13		13
ST1	BRUCK/MUR							0	11	1	1	–	–	13		13
ST5	GRAZ-LAND							0	3	–	–	–	–	3		3
ST7	JUDENBURG							0	1	2	–	–	–	3		3
ST8	KNITTELFELD							0	2	–	–	–	–	2		2
ST10	LEOBEN	–	–	1	–	–	–	1	30	4	–	4	–	38		39
ST11	LIEZEN	–	1	–	–	1	–	2	30	10	–	5	–	45		47
ST12	MUERZZUSCHLAG							0	4	–	–	–	–	4		4
ST13	MURAU							0	–	1	–	–	–	1		1
ST15	VOITSBERG							0	1	–	–	–	–	1		1
T1	IMST							0	87	–	5	1	–	93		93
T2	INNSBRUCK-LAND	–	1	–	–	1	–	2	2	–	–	1	–	3		5
T3	KITZBUEHEL							0	1	–	–	–	–	1		1
T4	KUFSTEIN							0	1	–	–	–	–	1		1
T5	LANDECK	–	2	–	–	–	–	2	28	4	4	1	–	37		39
T7	REUTTE							0	2	–	–	–	–	2		2
V1	BLUDENZ	–	1	–	–	–	–	1	2	–	–	–	–	2		3
V2	BREGENZ							0	1	–	–	–	–	1		1
V4	DORNBIRN							0	1	–	–	–	–	1		1
TOTAL		0	5	1	0	3	0	9	226	30	11	12	0	279	0	288
PER CENT		0.0	1.7	0.3	0.0	1.0	0.0	3.1	78.5	10.4	3.8	4.2	0.0	96.9	0.0	100.0

RABIES CASES															1. 4.80 - 30. 6.80
LOCATION	DOMESTIC ANIMALS							WILD ANIMALS						HUMAN CASES	TOTAL
CODE NAME	DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL		
BEL BELGIUM															
LG LIEGE	-	1	-	-	-	-	1	7	1	-	-	-	8		9
LX LUXEMBOURG	-	-	4	-	-	-	4	10	-	-	-	-	10		14
TOTAL	0	1	4	0	0	0	5	17	1	0	0	0	18	0	23
PER CENT	0.0	4.3	17.4	0.0	0.0	0.0	21.7	73.9	4.3	0.0	0.0	0.0	78.3	0.0	100.0
DEN DENMARK															
050505 BREDEBRO							0	3	-	-	-	-	3		3
050531 SKAERBAEK	-	-	-	-	3	-	3						0		3
050539 TINGLEV							0	5	-	-	-	-	5		5
TOTAL	0	0	0	0	3	0	3	8	0	0	0	0	8	0	11
PER CENT	0.0	0.0	0.0	0.0	27.3	0.0	27.3	72.7	0.0	0.0	0.0	0.0	72.7	0.0	100.0

R A B I E S C A S E S															1. 4.80 – 30. 6.80
LOCATION	D O M E S T I C A N I M A L S							W I L D A N I M A L S						HUMAN CASES	TOTAL
CODE NAME	DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL		
ITA I T A L Y															
33025 OVARO							0	–	2	–	–	–	2		2
LUX L U X E M B O U R G															
0602 TROINE							0	1	–	–	–	–	1		1
RUM R U M A N I A *															
06 BISTRITA-NASAUD	1	–	–	–	–	–	1						0		1
08 BRASOV	–	–	–	–	–	1	1						0		1
09 BRAILA	–	–	–	–	–	1	1						0		1
12 CLUJ							0	–	–	–	–	1	1		1
20 HUNEDOARA							0	–	–	–	–	1	1		1
26 MURES							0	–	–	–	–	1	1		1
29 PRAHOVA	–	–	–	–	–	1	1	–	–	–	–	1	1		2
31 SALAJ	1	–	–	–	–	–	1	–	–	–	–	1	1		2
TOTAL	2	0	0	0	0	3	5	0	0	0	0	5	5	0	10
NOR N O R W A Y															
ISLAND OF SVALBARD							0	–	–	–	–	15	15		15

* WITHOUT DATA FOR APRIL.

CZE CZECHOSLOVAK SOCIALIST REPUBLIC — RABIES CASES — 1. 4.80 - 30. 6.80

LOCATION	DOMESTIC ANIMALS							WILD ANIMALS						HUMAN CASES	TOTAL
CODE NAME	DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL		
00 DISTRICT OF PRAGUE							0						0		0
01 CENTRAL BOHEMIA	1	1	-	-	-	-	2	20	1	4	-	-	25		27
02 SOUTH BOHEMIA							0	16	-	-	-	-	16		16
03 WEST BOHEMIA	4	-	-	-	-	-	4	92	-	2	-	-	94		98
04 NORTH BOHEMIA	1	-	1	-	1	-	3	80	-	6	2	2	90		93
05 EAST BOHEMIA							0	18	-	1	1	-	20		20
06 SOUTH MORAVIA	-	1	-	-	-	-	1	3	-	-	-	-	3		4
07 NORTH MORAVIA	-	3	-	-	-	-	3	13	-	-	-	-	13		16
0 CSR	6	5	1	-	1	-	13	242	1	13	3	2	261		274
10 DISTRICT OF BRATISLAV							0						0		0
11 WEST SLOVAKIA	1	-	-	-	-	-	1	3	-	-	-	1	4		5
12 CENTRAL SLOVAKIA	-	2	-	-	-	-	2	17	-	1	-	-	18		20
13 EAST SLOVAKIA	1	-	-	-	-	-	1	1	-	-	-	-	1		2
1 SSR	2	2	-	-	-	-	4	21	-	1	-	1	23		27
TOTAL	8	7	1	0	1	0	17	263	1	14	3	3	284	0	301
PER CENT	2.7	2.3	0.3	0.0	0.3	0.0	5.6	87.4	0.3	4.7	1.0	1.0	94.4	0.0	100.0

DDR GERMAN DEMOCRATIC REPUBLIC — RABIES CASES — 1. 4.80 - 30. 6.80

LOCATION CODE	NAME	DOMESTIC ANIMALS DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
I	ROSTOCK	2	2	–	–	–	–	4	30	–	2	4	–	36		40
II	SCHWERIN	3	1	1	–	–	–	5	20	–	2	1	–	23		28
III	NEUBRANDENBURG	5	2	–	–	–	–	7	34	2	2	1	–	39		46
IV	POTSDAM	1	4	1	–	1	–	7	44	1	1	2	1	49		56
V	FRANKFURT/ODER	–	1	–	–	–	–	1	11	–	2	1	1	15		16
VI	COTTBUS	–	3	–	–	–	–	3	21	–	1	1	–	23		26
VII	MAGDEBURG	2	2	1	–	–	–	5	47	–	–	1	–	48		53
VIII	HALLE	1	1	–	–	–	–	2	28	–	–	3	–	31		33
IX	ERFURT	3	–	2	–	–	–	5	15	–	–	2	–	17		22
X	GERA	2	2	–	–	–	–	4	26	–	3	4	–	33		37
XI	SUHL	–	1	–	–	–	1	2	25	–	–	–	1	26		28
XII	DRESDEN	1	2	–	–	1	–	4	15	–	–	2	–	17		21
XIII	LEIPZIG	2	–	–	–	1	–	3	6	–	1	–	–	7		10
XIV	KARL-MARX-STADT	2	7	–	2	–	–	11	31	–	1	1	–	33		44
XV	HAUPTSTADT BERLIN							0	1	–	–	–	–	1		1
TOTAL		24	28	5	2	3	1	63	354	3	15	23	3	398	0	461
PER CENT		5.2	6.1	1.1	0.4	0.7	0.2	13.7	76.8	0.7	3.3	5.0	0.7	86.3	0.0	100.0

DDR GERMAN DEMOCRATIC REPUBLIC — R A B I E S C A S E S — 1. 7.79 - 30. 9.79

LOCATION CODE	NAME	DOMESTIC ANIMALS DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
I	ROSTOCK	-	1	1	-	-	-	2	8	-	-	1	-	9		11
II	SCHWERIN	1	-	2	-	-	-	3	12	-	-	1	-	13		16
III	NEUBRANDENBURG	-	2	3	-	-	-	5	26	-	-	-	-	26		31
IV	POTSDAM	3	3	5	-	1	-	12	23	-	2	2	-	27		39
V	FRANKFURT/ODER	1	-	-	-	-	-	1	1	-	-	1	-	2		3
VI	COTTBUS	-	3	1	-	-	-	4	14	-	-	-	-	14		18
VII	MAGDEBURG	-	1	-	-	-	-	1	13	1	1	1	-	16		17
VIII	HALLE	-	3	-	-	-	-	3	16	-	1	-	-	17		20
IX	ERFURT	-	-	1	-	3	-	4	19	-	-	2	-	21		25
X	GERA	-	-	-	-	2	-	2	20	-	2	-	-	22		24
XI	SUHL	1	1	-	-	-	-	2	6	-	-	-	-	6		8
XII	DRESDEN	-	3	-	-	2	-	5	12	-	2	-	-	14		19
XIII	LEIPZIG	1	1	-	-	-	-	2	5	-	-	3	-	8		10
XIV	KARL-MARX-STADT	-	-	2	-	3	-	5	20	1	-	-	-	21		26
XV	HAUPTSTADT BERLIN							0						0		0
TOTAL		7	18	15	0	11	0	51	195	2	8	11	0	216	0	267
PER CENT		2.6	6.7	5.6	0.0	4.1	0.0	19.1	73.0	0.7	3.0	4.1	0.0	80.9	0.0	100.0

DEU FEDERAL REPUBLIC OF GERMANY — R A B I E S   C A S E S — 1. 4.80 - 30. 6.80

LOCATION	DOMESTIC ANIMALS							WILD ANIMALS						HUMAN CASES	TOTAL
CODE NAME	DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL		
010 SCHLESWIG-HOLSTEIN	2	1	1	–	1	1	6	15	–	1	–	1	17		23
020 HAMBURG							0						0		0
031 BRAUNSCHWEIG	1	3	4	–	3	–	11	64	2	2	2	–	70		81
032 HANNOVER	–	3	–	–	–	–	3	22	1	2	1	3	29		32
033 LUENEBURG							0	5	–	–	–	6	11		11
034 WESER-EMS							0						0		0
040 BREMEN							0						0		0
051 DUESSELDORF							0						0		0
053 KOELN	–	–	1	–	–	–	1	1	–	–	–	–	1		2
055 MUENSTER							0						0		0
057 DETMOLD							0	7	–	–	–	–	7		7
059 ARNSBERG	–	2	5	–	7	–	14	67	–	2	10	–	79		93
061 DARMSTADT	3	4	–	–	2	–	9	74	1	5	6	–	86		95
062 KASSEL	–	1	1	–	1	–	3	49	–	1	2	–	52		55
071 KOBLENZ	2	5	9	1	–	–	17	48	1	2	5	–	56		73
072 TRIER	–	1	1	–	–	–	2	16	–	1	–	–	17		19
073 RHEINHESSEN-PFALZ	7	8	2	1	3	–	21	21	–	5	6	–	32		53
081 STUTTGART	1	–	1	–	1	–	3	35	3	1	4	–	43		46
082 KARLSRUHE	–	1	1	–	1	–	3	39	1	3	2	–	45		48
083 FREIBURG	4	4	–	–	–	–	8	87	3	5	4	1	100		108
084 TUEBINGEN	–	3	10	1	1	–	15	138	5	15	2	–	160		175
091 OBERBAYERN	–	1	1	–	–	–	2	55	3	5	4	1	68		70
092 NIEDERBAYERN							0	19	–	1	1	–	21		21
093 OBERPFALZ	2	1	1	–	–	–	4	47	–	1	–	–	48		52
094 OBERFRANKEN	1	2	–	–	–	–	3	34	–	4	2	–	40		43
095 MITTELFRANKEN	–	–	–	1	–	–	1	16	2	2	–	–	20		21
096 UNTERFRANKEN	2	1	–	–	–	–	3	59	2	4	–	–	65		68
097 SCHWABEN	–	–	1	–	1	–	2	38	1	6	1	–	46		48
100 SAARLAND	4	4	5	3	7	–	23	48	2	3	9	–	62		85
110 BERLIN (WEST)							0						0		0
TOTAL	29	45	44	7	28	1	154	1004	27	71	61	12	1175	0	1329
PER CENT	2.2	3.4	3.3	0.5	2.1	0.1	11.6	75.5	2.0	5.3	4.6	0.9	88.4	0.0	100.0

FRA FRANCE RABIES CASES 1. 4.80 - 30. 6.80

LOCATION CODE NAME	DOMESTIC ANIMALS DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
01 AIN							0	1	–	–	–	–	1		1
02 AISNE	1	1	–	–	4	–	6	38	–	–	–	–	38		44
08 ARDENNES	2	–	2	–	–	–	4	3	–	–	–	–	3		7
10 AUBE							0	14	1	–	1	–	16		16
21 COTE D'OR	2	1	2	–	5	–	10	26	–	–	–	–	26		36
25 DOUBS							0	4	–	–	–	–	4		4
39 JURA							0	2	–	–	–	1	3		3
51 MARNE	1	2	1	–	–	–	4	13	–	–	–	1	14		18
52 MARNE (HAUTE)	1	–	–	1	4	–	6	29	1	–	–	–	30		36
54 MEURTHE-ET-MOSELLE	2	2	–	–	–	–	4	10	–	–	–	–	10		14
55 MEUSE	–	1	1	1	1	–	4	10	–	–	–	1	11		15
57 MOSELLE	1	–	2	1	4	–	8	10	–	–	–	1	11		19
60 OISE	–	–	–	1	–	–	1	13	–	–	–	–	13		14
67 RHIN (BAS)	1	–	–	1	–	–	2	15	1	–	1	1	18		20
68 RHIN (HAUT)	–	1	–	–	–	–	1	8	–	–	–	–	8		9
70 SAONE (HAUTE)	–	–	3	1	1	–	5	20	–	–	–	2	22		27
73 SAVOIE							0	2	–	–	–	–	2		2
74 SAVOIE (HAUTE)	2	2	–	–	4	–	8	52	1	–	2	–	55		63
77 SEINE-ET-MARNE	1	1	–	–	–	–	2	8	–	–	–	–	8		10
80 SOMME							0	4	–	–	–	–	4		4
88 VOSGES	3	4	1	1	1	–	10	8	1	–	–	–	9		19
TOTAL	17	15	12	7	24	0	75	290	5	0	4	7	306	0	381
PER CENT	4.5	3.9	3.1	1.8	6.3	0.0	19.7	76.1	1.3	0.0	1.0	1.8	80.3	0.0	100.0

HUN H U N G A R Y — R A B I E S   C A S E S — 1. 4.80 - 30. 6.80

LOCATION CODE NAME	DOMESTIC ANIMALS DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
01 BUDAPEST							0	1	-	-	-	-	1		1
02 BARANYA	-	1	-	-	-	-	1	4	-	-	-	-	4		5
03 BACS-KISKUN							0	7	-	-	-	-	7		7
04 BEKES							0	2	-	-	-	-	2		2
05 BORSOD-ABAU-ZEMPLEN	1	1	-	-	-	-	2	7	-	-	-	-	7		9
06 CSONGRAD	-	1	-	-	-	-	1	6	-	-	-	-	6		7
07 FEJER	-	-	1	-	-	-	1	21	-	-	-	-	21		22
08 GYOER-SOPRON							0	6	-	-	-	-	6		6
09 HAJDU-BIHAR							0	6	-	-	-	-	6		6
10 HEVES	1	-	-	-	-	-	1	6	-	-	-	-	6		7
11 KOMAROM							0	17	-	-	-	-	17		17
12 NOGRAD							0	8	-	-	1	-	9		9
13 PEST							0	16	-	-	-	-	16		16
14 SOMOGY							0	4	-	-	-	-	4		4
15 SZABOLCS-SZATMAR							0	3	-	-	-	-	3		3
16 SZOLNOK							0	1	-	-	-	-	1		1
17 TOLNA							0	3	-	-	-	-	3		3
18 VAS							0	5	-	-	-	-	5		5
19 VESZPREM							0	8	-	-	-	-	8		8
20 ZALA							0	4	-	-	-	-	4		4
TOTAL	2	3	1	0	0	0	6	135	0	0	1	0	136	0	142
PER CENT	1.4	2.1	0.7	0.0	0.0	0.0	4.2	95.1	0.0	0.0	0.7	0.0	95.8	0.0	100.0

POL POLAND — RABIES CASES — 1. 4.80 - 30. 6.80

LOCATION CODE NAME	DOMESTIC ANIMALS DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
01 WARSZAWA	2	–	–	–	–	–	2	3	–	–	–	–	3		5
03 BIALA PODLASKA	–	1	–	–	–	–	1	3	–	–	–	–	3		4
05 BIALYSTOK							0	2	–	–	–	2	4		4
07 BIELSKO-BIALA							0	1	–	–	–	–	1		1
09 BYDGOSZCZ	–	1	–	–	–	–	1						0		1
11 CHELM							0	1	–	–	–	–	1		1
13 CIECHANOW	–	2	–	–	–	–	2	3	–	–	–	–	3		5
15 CZESTOCHOWA							0	–	1	–	–	–	1		1
17 ELBLAG	1	–	–	–	–	–	1						0		1
19 GDANSK	–	1	–	–	–	–	1	2	–	–	–	–	2		3
21 GORZOW	1	1	–	–	–	–	2	12	–	1	–	–	13		15
23 JELENIA GORA							0	7	–	–	–	–	7		7
25 KALISZ	1	–	–	–	–	–	1	1	–	–	–	–	1		2
27 KATOWICE							0	1	–	–	–	–	1		1
29 KIELCE							0	2	–	–	–	–	2		2
31 KONIN	–	2	–	–	–	–	2						0		2
33 KOSZALIN							0	7	–	–	–	–	7		7
39 LEGNICA							0	1	–	–	–	–	1		1
41 LESZNO							0	4	–	–	–	–	4		4
43 LUBLIN	–	1	–	–	–	–	1	3	–	–	–	–	3		4
45 LOMZA							0	1	–	–	–	1	2		2
49 NOWY SACZ							0	1	–	–	–	–	1		1
51 OLSZTYN	–	1	2	–	–	–	3	4	–	–	–	1	5		8
53 OPOLE	–	1	–	–	–	–	1	7	–	–	–	–	7		8
55 OSTROLEKA							0	1	–	–	–	–	1		1
57 PILA	1	1	–	–	–	–	2	5	–	–	–	–	5		7
61 PLOCK	–	–	1	–	–	–	1	2	–	–	–	–	2		3
63 POZNAN	–	1	–	–	–	–	1	7	–	–	1	–	8		9
67 RADOM	1	–	–	–	–	–	1	3	–	–	–	–	3		4
69 RZESZOW							0	1	–	–	–	–	1		1
71 SIEDLCE	1	1	–	–	–	–	2	5	–	–	–	1	6		8
77 SLUPSK	2	–	–	–	–	–	2	5	–	–	–	–	5		7
79 SUWALKI	–	1	1	–	–	–	2	2	–	–	–	–	2		4
81 SZCZECIN	1	1	2	–	–	–	4	3	–	1	4	1	9		13
83 TARNOBRZEG							0	1	1	–	–	–	2		2
87 TORUN							0	2	–	–	–	–	2		2
89 WALBRZYCH							0	3	–	–	–	–	3		3
93 WROCLAW	1	–	–	–	–	–	1	11	–	–	–	–	11		12
95 ZAMOSC							0	2	–	–	–	–	2		2
97 ZIELONA GORA	–	1	–	–	–	1	2	12	–	1	–	–	13		15
TOTAL	12	17	6	0	0	1	36	131	2	3	5	6	147	0	183
PER CENT	6.6	9.3	3.3	0.0	0.0	0.5	19.7	71.6	1.1	1.6	2.7	3.3	80.3	0.0	100.0

SWI SWITZERLAND — RABIES CASES — 1. 4.80 – 30. 6.80

LOCATION CODE NAME	DOMESTIC ANIMALS DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
01 AARGAU	–	8	–	–	1	–	9	4	1	–	–	–	5		14
05 BASEL-LAND	–	1	–	–	1	–	2	6	3	–	1	1	11		13
06 BERN	–	1	–	–	3	–	4	44	8	1	2	–	55		59
07 FREIBURG							0	1	–	–	–	–	1		1
10 GRAUBUENDEN	–	1	–	–	–	–	1	18	2	–	–	–	20		21
11 LUZERN	–	2	–	–	–	–	2	6	–	2	–	–	8		10
12 NEUCHATEL							0	6	–	–	–	–	6		6
15 SCHAFFHAUSEN							0	2	–	–	–	–	2		2
16 SCHWYZ	–	2	–	–	–	–	2	13	1	–	1	–	15		17
17 SOLOTHURN	–	–	–	–	3	–	3	7	3	1	–	–	11		14
18 ST. GALLEN	–	–	1	–	–	–	1	5	2	–	–	–	7		8
20 THURGAU	–	1	–	–	–	–	1	2	–	–	–	–	2		3
22 WAADT	–	1	–	–	–	–	1						0		1
23 WALLIS							0	9	3	–	–	–	12		12
24 ZUG							0	4	1	1	–	–	6		6
25 ZUERICH	–	3	–	–	1	–	4	26	2	2	1	–	31		35
26 JURA	1	–	–	–	2	–	3	12	1	–	–	–	13		16
TOTAL	1	20	1	0	11	0	33	165	27	7	5	1	205	0	238
PER CENT	0.4	8.4	0.4	0.0	4.6	0.0	13.9	69.3	11.3	2.9	2.1	0.4	86.1	0.0	100.0

TUR T U R K E Y R A B I E S C A S E S 1. 4.80 - 30. 6.80

LOCATION CODE NAME	DOMESTIC ANIMALS DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
001 ADANA	5	-	2	-	1	-	8						0		8
003 AFYON	2	-	-	-	-	-	2						0		2
005 AMASYA	10	-	1	-	-	-	11						0		11
006 ANKARA	27	1	9	-	-	-	37						0		37
007 ANTALYA	1	-	2	1	-	-	4						0		4
009 AYDIN	3	-	1	-	-	-	4						0		4
010 BALIKESIR	2	-	1	1	1	-	5						0		5
011 BILECIK	1	-	1	-	-	-	2						0		2
012 BINGOEL	1	1	1	-	-	-	3						0		3
014 BOLU	1	-	1	-	-	-	2						0		2
016 BURSA	12	-	-	-	2	-	14	-	-	-	-	1	1		15
017 CANAKKALE	3	-	-	-	-	-	3						0		3
018 CANKIRI	1	-	-	-	-	-	1						0		1
019 CORUM	18	-	3	-	-	-	21						0		21
020 DENIZLI	12	2	-	-	1	2	17						0		17
021 DIYARBAKIR	1	-	2	-	-	2	5						0		5
022 EDIRNE	1	-	-	-	-	-	1						0		1
023 ELAZIG	1	-	1	-	-	-	2						0		2
024 ERZINCAN	-	-	1	-	-	-	1						0		1
025 ERZURUM	1	2	1	-	-	-	4						0		4
026 ESKISEHIR	5	-	-	-	2	-	7						0		7
027 GAZIANTEP	3	-	-	-	-	-	3						0		3
028 GIRESUN	10	-	1	-	1	-	12						0		12
029 GUEMUESHANE	1	-	1	-	-	-	2						0		2
030 HAKKARI	1	-	-	-	-	-	1	-	-	-	-	1	1		2
033 ICEL	3	-	-	-	-	-	3						0		3
034 ISTANBUL	32	4	2	-	3	-	41						0		41
035 IZMIR	33	5	1	-	-	-	39	-	-	-	-	1	1		40
036 KARS	3	-	-	-	-	-	3						0		3

TUR CONTINUED

LOCATION CODE	NAME	DOMESTIC ANIMALS: DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS: FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
037	KASTAMONU	1	-	1	-	-	-	2	-	-	-	-	1	1		3
039	KIRKLARELI	11	-	-	-	-	-	11						0		11
040	KIRSEHIR	2	-	4	-	2	-	8						0		8
041	KOCAELI	9	-	1	-	-	-	10						0		10
042	KONYA	3	2	2	-	1	-	8	-	-	1	-	-	1		9
043	KUETAHYA	6	-	2	-	-	-	8						0		8
044	MALATYA	1	-	-	-	-	-	1						0		1
045	MANISA	14	1	2	-	3	-	20						0		20
047	MARDIN	3	-	-	-	-	-	3						0		3
048	MUGLA	-	-	1	-	-	-	1						0		1
050	NEVSEHIR	-	-	-	1	-	-	1	-	-	-	-	1	1		2
051	NIGDE	-	-	2	-	-	-	2						0		2
052	ORDU	11	2	7	1	1	-	22						0		22
054	SAKARYA	20	2	8	-	-	-	30	-	-	-	-	1	1		31
055	SAMSUN	27	5	7	-	3	-	42						0		42
057	SINOP	6	-	-	-	-	-	6						0		6
058	SIVAS	2	-	1	-	1	-	4						0		4
059	TEKIRDAG	1	-	-	-	-	-	1						0		1
060	TOKAT	6	-	6	-	1	1	14						0		14
061	TRABZON	1	-	-	-	-	-	1						0		1
062	TUNCELI	2	-	-	-	-	1	3						0		3
063	URFA	1	-	3	-	-	-	4						0		4
064	USAK	1	-	-	-	-	-	1						0		1
066	YOZGAT	5	-	1	-	-	1	7						0		7
067	ZONGULDAK	3	-	7	-	-	1	11						0		11
TOTAL		330	27	87	4	23	8	479	0	0	1	0	6	7	0	486
PER CENT		67.9	5.6	17.9	0.8	4.7	1.6	98.6	0.0	0.0	0.2	0.0	1.2	1.4	0.0	100.0

YUG Y U G O S L A V I A — R A B I E S C A S E S — 1. 4.80 - 30. 6.80

LOCATION CODE	NAME	DOMESTIC ANIMALS DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
III/ 16	IVANICGRAD							0	1	-	-	-	-	1		1
III/ 18	VRBOVEC							0	1	-	-	-	-	1		1
III/ 26	VARAZDIN							0	1	-	-	-	-	1		1
III/ 28	NOVI MAROF							0	1	-	-	-	-	1		1
III/ 29	LUDBREG							0	1	-	-	-	-	1		1
III/ 30	KRIZEYCI							0	3	-	-	-	-	3		3
III/ 31	KOPRIVNICA							0	1	-	-	-	-	1		1
III/ 32	DURDEVAC							0	3	-	-	-	-	3		3
III/ 33	BJELOVAR							0	1	-	-	-	-	1		1
III/ 34	CAZMA							0	1	-	-	-	-	1		1
III/ 41	VIROVITICA							0	1	-	-	-	-	1		1
III/ 50	VALPOVO							0	1	-	-	-	-	1		1
V / 15	RADOVLJICA	1	-	-	-	-	-	1	5	-	-	-	-	5		6
V / 16	JESENICE							0	1	-	-	-	-	1		1
V / 19	KRANJ							0	2	-	-	-	-	2		2
V / 34	MOZIRJE							0	7	-	-	-	2	9		9
V / 35	ZALEC							0	3	-	-	-	-	3		3
V / 37	VELENJE							0	34	-	-	-	7	41		41
V / 38	SLOVENJGRADEC							0	32	-	-	-	2	34		34
V / 39	RAVNE NA KOROSKE							0	10	-	-	-	1	11		11
V / 40	DRAVOGRAD							0	15	-	-	-	2	17		17
V / 41	RADLJE OB DRAVI							0	3	-	-	-	1	4		4
V / 43	SLOV. KONJICE							0	3	-	-	-	-	3		3
V / 44	CELJE							0	7	-	-	-	1	8		8
V / 55	MURSKA SOBOTA							0	1	-	-	-	1	2		2
V / 56	LENDAVA							0	1	-	-	-	-	1		1

YUG CONTINUED

LOCATION CODE	NAME	DOMESTIC ANIMALS DOG	CAT	CATTLE	HORSE	SHEEP GOAT	OTHERS	TOTAL	WILD ANIMALS FOX	BADGER	OTHER MUSTEL	DEER	OTHERS	TOTAL	HUMAN CASES	TOTAL
VI / 26	SMED. PALANKA							0	1	–	–	–	–	1		1
VI / 29	POZAREVAC	1	–	–	–	–	–	1						0		1
VI / 55	BAJINA BASTA	1	–	–	–	–	–	1						0		1
VI / 69	NOVI PAZAR	1	–	–	–	–	–	1						0		1
VI1/ 1	NOVI SAD	–	1	–	–	–	–	1	3	–	–	–	–	3		4
VI1/ 4	ZABALJ	1	–	–	–	–	–	1	2	–	–	–	1	3		4
VI1/ 5	TEMERIN	–	1	–	–	–	–	1	2	–	–	–	–	2		3
VI1/ 6	VRBAS							0	5	–	–	–	–	5		5
VI1/ 7	BAC. PETROVAC							0	1	–	–	–	–	1		1
VI1/ 12	RUMA							0	1	–	–	–	–	1		1
VI1/ 16	ZRENJANIN							0	2	–	–	–	–	2		2
VI1/ 19	PANCEVO							0	2	–	–	–	–	2		2
VI1/ 24	PLANDISTE							0	1	–	–	–	–	1		1
VI1/ 26	ZITISTE							0	1	–	–	–	–	1		1
VI1/ 30	BECEJ							0	6	–	–	–	–	6		6
VI1/ 32	ADA							0	1	–	–	–	–	1		1
VI1/ 35	BAC. TOPOLA							0	1	–	–	–	–	1		1
VI1/ 36	MALI IDJOS							0	1	–	–	–	–	1		1
VI1/ 37	KANJIZA							0	2	–	–	–	–	2		2
VI1/ 38	NOVI KNEZEVAC							0	1	–	–	–	–	1		1
VI1/ 43	BAC							0	1	–	–	–	–	1		1
VI2/ 22	LEPOSAVIC							0	1	–	–	–	–	1		1
TOTAL		5	2	0	0	0	0	7	175	0	0	0	18	193	0	200
PER CENT		2.5	1.0	0.0	0.0	0.0	0.0	3.5	87.5	0.0	0.0	0.0	9.0	96.5	0.0	100.0

USR	UNION OF SOVIET SOCIALIST REPUBLICS (EUROPEAN PART)	R A B I E S C A S E S IN ANIMALS		1. 1.80 - 31. 3.80
LOCATION CODE NAME	D A T E S			T O T A L
	1. 1. - 31. 1.	1. 2. - 29. 2.	1. 3. - 31. 3.	
01 RSFSR				
011 REGIONS OF THE NORTH AND THE NORTH-WEST	-	-	-	0
012 REGIONS OF THE CENTRE	13	17	22	52
013 REGIONS OF THE NORTH CAUCASUS	15	13	12	40
014 REGIONS OF THE POVOLJE AND THE URALS	10	15	7	32
02 THE MOLDAVIAN SSR	1	1	1	3
03 THE UKRAINIAN SSR	29	38	37	104
04 THE BYELORUSSIAN SSR	8	15	5	28
05 THE LITHUANIAN SSR	2	3	2	7
06 THE LATVIAN SSR	3	4	7	14
07 THE ESTONIAN SSR	2	1	3	6
TOTAL	83	107	96	286

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WHO Coll. Centre
Tuebingen / DEU
Rabies Cases Europe
2nd Quarter 1980
4071 cases reported
NOR
(15)
(on Island of Svalbard)
FIN
(rabies free)
SWE
(rabies free)
DEN
(11)
IRE
(rabies free)
GBR
(rabies free)
NET
(0)
BEL
(23)
(1)
(1329) DEU
DDR
(461)
POL
(183)
CZE
(301)
FRA
(381)
AUT
(288)
HUN
(142)
SWI (238)
RUM
(10)
(without data for April)
ITA
(2)
YUG
(200)
BUL
(0)
POR
(rabies free)
SPA
(0)
ALB
(no data)
GRE
(0)
TUR
(486)
0 50 100 km