

# Research of Allergic Rhinitis in Health Geography

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## Introduction

The group of allergic illnesses was called 'social disease' for the first time by the European Federation of Allergy and Airways Diseases (EFA). The EU has been tackling air pollution since the 1970s, and the European Commission has formed collaboration with the World Health Organization (WHO) Regional Office for Europe. So The European Commission has declared 2013 as the year of air. Ragweed pollen is the common cause of pollinosis in many parts of Europe. The pollen allergy (hay fever, rhinitis allergica) belongs to the illnesses influenced by the environment, and its presence is higher in the South Great Plain Region of Hungary - than in other parts of it - due to the pollen of *Ambrosia artemisiifolia*, the quality of air in the cities and dust itself. Hrubíško confirms that *Ambrosia artemisiifolia* is one of the strongest allergenic plants of Slovakia in 1998. The first description of ragweed was from Komárno (Southwest Slovakia) in 1949 (S. Makovcová 1998)<sup>1</sup>. Currently the occurrence region of ragweed in Slovakia is Žitný ostrov (Csallóköz) that is the plain of Danube and Eastern Slovakia. In Slovakia the most prevalent ragweed species are *Ambrosia artemisiifolia*, *Ambrosia trifida* and *Ambrosia coronopifolia* (J. Dostál– M. Červenka 1992)<sup>2</sup>.

## AIMS

The focus of this research was primarily to summarize the most important Hungarian and foreign studies about the examination of the geographical regional distribution of rhinitis allergica. In addition, it was necessary to mention the epidemiological surveys of the allergic disease in this study.

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- 1 S. Makovcová–J. Zlinká–V. Mikolász–D. Salát–V. Krio 1998: *Ragweed in Slovak Republic*. Satellite Symposium Proceedings: Ragweed in Europe. 6th International Congress on Aerobiology, Perugia, Italy, 31.08.- 5.09. 1998. 27-28.
  - 2 J. Dostál– M. Červenka 1992: *Big key for determination of vascular plants 2 (in Slovak)*. Bratislava, Slovenské pedagogické nakladateľstvo p. 783

## Studies on the Incidence of Rhinitis Allergica in Given Geographical Areas

Dr. J. Bostock<sup>3</sup> (Fig. 1.), a geologist-doctor got the description of hay fever for the first, lasted for a classic, according to the present terminology in 1819. He was a sufferer himself. Bostock summarized the typical symptoms of a seasonal allergic cold. The first national allergy research can be bound to his name in the course of which he registered 28 individuals with similar symptoms of ‘catarrhus aestivus’ in England.

Nine years later, on 22<sup>nd</sup> April, 1828 the results of his examination were published, his study indicates that the cause of the disease shows a context affected by the socio-economic situation of the patient.



Fig. 1. Dr. John Bostock<sup>4</sup>

In 1862 Dr. P. Phoebus<sup>5</sup> made an extensive questionnaire examination, and he published the possible reasons of illnesses, its symptoms, the geographical and ethnological incidence of his procession, its frequency. His data originated mainly from England and Germany (Fig. 2.).

3 J. Bostock 1828: *Of the catarrhus aestivus, or summer catarrh*. <http://www.pubmedcentral.nih.gov/picrender.fcgi?artid=2116490&blobtype=pdf>

4 <http://www.rsm.ac.uk/welcom/feature-bostock.php>

5 P. Phoebus 1862: *Der typische Frühsommer-Katarrh, oder das sogenannte Heufieber, Heu-asthma* <http://www.archive.org/stream/dertypischefrhs00phoegoog#page/n4/mode/1up>

Land ( oder Länder )					
	dem die Eltern angehören	in dem Pat. geboren	in dem der erste Access stattfand	wo Pat. mit der Krankheit lebt oder gelebt hat	
England	81	83	80	78	
Deutschland	36	34	34	36	Vgl. Note 172.
Frankreich	17 $\frac{1}{2}$	16	14	15	
Belgien	7	7	9	8	Vgl. Note 172 u. S. 103.
Schweiz	4	3	4	6	Vgl. Note 172 u. S. 103.
Schottland	3	2	2	2	Vgl. S. 101.
Italien		3	1	1	Vgl. S. 103.
Russland	1	1	1	1	Vgl. S. 102.
Irland	1	1			Vgl. S. 102.
Nord-America	1	1			Vgl. S. 103.
Dänemark	$\frac{1}{2}$			1	
Ungarn				1	
China				1	
Bombay				1	
Madras				1	

Fig. 2. Part of the Results of Dr. Philip Phoebus<sup>6</sup>

The prevalence of hay fever was mostly followed in Switzerland from European countries. In 1926 according to Rechsteiner<sup>7</sup> from 77000 adults 0.82% showed similar symptoms to hay fever. In 1958 E. Batschelet et al. examined 8246 people in Zurich and 4.8% of them were involved in the illness. In 1985 Prof. B. Wüthrich examined 2524 individuals and 9.6% of them showed similar symptoms.

Observed of the epidemiology of the allergic diseases remained in the background until the end of the 1970s in Hungary. In the next decades, the analysis of questionnaire surveys was made on a large study group in a few centres both in Hungary and abroad. The exactitude of prevalence data of allergic disorders are heavy to calculate, even though it was examined on different cohorts and a several population. The hospital discharge statistics and the morbidity data do not reflect reality because the announcement of allergic illnesses is not obligatory.

As a result of this, the prevalence of the seasonal allergic rhinitis appeared between wide borders 3% and 42%, while the prevalence of the perennial rhinitis was between 1.14% and 13%.

6 <http://www.archive.org/stream/dertypischefrhs00phoegoog#page/n4/mode/1up/99.oldal>  
 7 U. Müller-A. L. de Weck-R. Bodmer-J. Guttersohn-S. Longoni-G. Müllner-D. Olgiati-M. Pletscher-T. Schweri-W. Thürlimann 1995: *Good Allergy Practice*. [http://www.ria.insel.ch/fileadmin/ria/ria\\_users/Pdf/Pdf-allergologie/GoodAllergyPractice.pdf](http://www.ria.insel.ch/fileadmin/ria/ria_users/Pdf/Pdf-allergologie/GoodAllergyPractice.pdf)

In 1987 I. Bittera and K. Gyurkovits<sup>8</sup> examined the prevalence between the ages of 6 and 14 year-old children in Hungary. Nine hundred and three children were interviewed and the prevalence rate of the illness was found 8.1%. They repeated the examination in the same circumstances in 1997 then in 2002. They experienced an increasing trend of allergic diseases, at this time the prevalence of rhinitis allergica was found already 14% then 17% in childhood.

In 1993 the prevalence of rhinitis allergica was established with a questionnaire survey by E. Kadocsa<sup>9</sup> in Szeged. The study group consisted of all patients aged 5–75 years. The estimated prevalence of rhinitis was 11%, in which one third did not have an allergic origin.

Among 160 school children aged (6-15 years old) wanted to elucidate the prevalence of pollenosis in such an environment devoid of industrial emission in Tatranská Strba and Strbské Pleso<sup>10</sup>. Skin tests showed sensitization to pollen allergens in 50 boys (60.2%) and 35 girls (45.5%).

Between 1995 and 1999, L. Endre<sup>11</sup> made a survey in Budapest, while L. Józsa and E. Papp in Hajdúböszörmény and its peripheral area, G. Páll et al. in Debrecen and finally Szalai and Nagy in Mosonmagyaróvár in 2003.

Z. Medveczki<sup>12</sup> justified the growing frequency of allergic rhinitis among military study group with his epidemiological survey in 1999. He analyzed the data of cohorts and he declared that allergic rhinitis is frequent in the young man population in the age group for military service.

The international comparison surveys of the rhinitis allergica, and other allergic disorders based on a geographical aspect were made only in the last 10 years. They were ECRHS, Isaac, APRES.

The first internationally multicentral survey with universal criteria was the ISAAC program (International Study of Asthma and Allergies in Childhood). Since 1995 ISAAC study has proceeded to an epidemiological survey and data collection with a uniform method in 155 centres of 56 countries. Hungary joined the survey with two centres in 2003.

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- 8 I. Bittera–K. Gyurkovits 1990: *A gyermekkori rhinitis allergica epidemiológiai és kórtörténeti adatainak elemzése*. *Gyermekgyógyászat*, 41. sz. pp. 401–407.
- 9 E. Kadocsa 1994: *Az allergiás eredetű nátha prevalenciájának meghatározása Szegeden (1993)*. *Fül-Orr-Gégegyógyászat*. 40. évf. 3. sz. pp. 182–188.
- 10 M. Soukupová–S. Makovcová–J. Vokal 1994: *Pollenosis in children in the Tatra Mountain region*. *Cas Lek Cesk*. Vol. 133 Iss. 20. pp. 633–636.
- 11 Dr. L. Endre–M. Kirkovits–A. Vámos 2004: *A gyermekkori asthma prevalenciájának növekedése Budapesten 1995 és 2003 között a légszennyezettségi adatok tükrében*. In: Szabó T.– I. Bártfai– J. Somlai 2004: *Környezeti Ártalmak és a Légzőrendszer*. XIV. kötet. *Levegőszenyezés Által Veszélyeztetettekért Alapítvány, Hévíz*, pp. 59–71.
- 12 Z. Medveczki–D. Kollár 1999: *Az allergiás nátha gyakorisága a sorozott állománynál*. *Honvéderos*, 51. sz. pp. 211–222.

In 2003 related to the Isaac survey, the questionnaire data of approximately 10,000 pupils were registered in two age groups in the Komárom–Esztergom and Csongrád counties<sup>13</sup>. The incidence rate of allergic disorders was found higher in Csongrád county than Komárom–Esztergom county, it was based on the analyses of the answers of 13 and 14 year-old pupils. Summarising the data of the two centres, the asthma prevalence was found 7.75%, the rhinitis allergica prevalence was 9.93% and the atopy dermatitis prevalence was assessed 11.92% in Hungary.

In 2002, a similar result was presented based on the total population by K. Balog et al.<sup>14</sup> in Budapest. The epidemiological examinations proved that the allergic rhinitis generally begins in childhood or young adulthood. Furthermore the study reported on the prevalence of asthma and allergic rhinitis increase with aging. In 2003, ten out of a thousand five year-old children, while 14 out of 1000 17 year old children were asthmatics. Seven out of thousand kindergarten children were with allergic rhinitis and forty out of 1000 eleventh class pupils were with allergic rhinitis.<sup>15</sup>

F. Harangi et al.<sup>16</sup> made a comparative examination among children between Pécs and Veszprém according to Isaac's protocol. Based on questionnaires approximately 2600 answers were estimated in three age groups. During the latest 12 months, hay fever symptoms appeared 34% and the prevalence of the hay fever diagnosed was 14% by the doctor. The prevalence was the lowest at the age of 6 and 7 and it was the highest in the group of the 17 and 18 year-olds. The prevalence was higher among boys in all three age groups, than among girls, while there were no significant differences among cities.

ECRHS<sup>17</sup> (The European Community Respiratory Health Survey) measured the frequency of symptoms of allergic rhinitis, asthma and asthma-like symptoms in 30 regions of 15 countries in the European Union. Moreover Switzerland, Estonia, Algeria, India, Australia, New Zealand and the USA joined to the survey in 1994. The study group consisted of 1500 adults aged between 20 and 44 from each region.

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- 13 Gy. Zsigmond–Z. Novák–K. Berényi 2006: *Gyermekkori allergiás betegségek nemzetközi epidemiológiai felmérése – az ISAAC-vizsgálat Magyarországon*. Gyermekorvos Továbbképzés, 5. sz. pp. 67–72.
- 14 K. Balogh–M. Augusztinovicz–J. Koppány 2003: *Az allergiás rhinitis prevalenciája Budapesten és Pest megyében 2002-ben*. Allergol. és Klin. Immunol. Vol. 6. pp. 23–29.
- 15 E. Szauer 2003: *A magyar gyermekek egészségi állapotának jellemzői*. [http://www.demografia.hu/Demografia/2005\\_1/Szauer%20Erzsebet\\_tan.pdf](http://www.demografia.hu/Demografia/2005_1/Szauer%20Erzsebet_tan.pdf)
- 16 F. Harangi 2007: *A gyermekkori asztma prevalenciájának alakulása Baranya megyében 2003 és 2006 között*. [http://real.mtak.hu/514/1/38227\\_ZJ1.pdf](http://real.mtak.hu/514/1/38227_ZJ1.pdf)
- 17 E. Carlos Baena–Cagnani 2001: *The global burden of asthma and allergic diseases: The challenge for the new century*. In: Current Allergy and Asthma Reports 2001. Vol. 1. Num. 4. pp. 297–298.

The highest peak of nasal allergy and the hay fever prevalence was not registered in European centres, more typically it was documented in Australia, the USA or New Zealand, e.g. Melbourne 40.9%, Portland 39.4%, Auckland 35.1%.

The lowest rate of nasal allergy and hay fever prevalence was not registered in European centres, it was rather reported in Algeria and in India. In Europe the highest rate of allergic rhinitis prevalence was reported from French and British centres, e.g. in Montpellier 34.4%, in Paris, 30.2%, in Bordeaux, 29.2% and in Cambridge, 28.3%. Nasal allergy and hay fever prevalence was conspicuously low in Spanish and Italian regions, e.g. 12.1% in Albacete, 12.5% in Pavia, 13.1% in Barcelona.

Both ISAAC and ECRHS studies suggested main questions about regional differences of prevalence, for this purpose the identification of many new hypotheses was required to be examined in the future. WAO (World Allergy Organization) carried out the third international scientific investigation in 2005. Data of 5482 adults were registered by the APRES<sup>18</sup> (Allergy Prevalence Survey), which measured prevalence of allergic rhinitis and asthma as well as atopic eczema, drug allergy, hymenoptera hypersensitivity and food allergy.

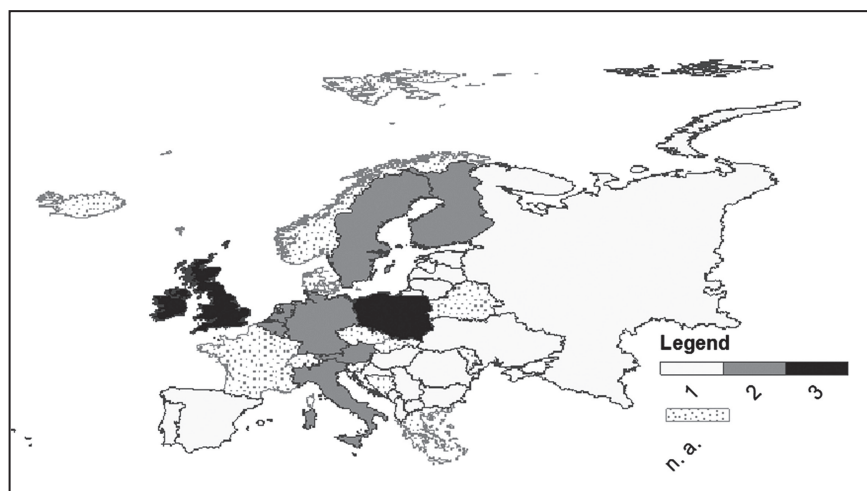


Fig. 3. The Prevalence of Allergic Rhinitis by APRES<sup>19</sup>

The results of the questionnaires (Fig. 3.) reported about allergic disorders prevalence, the highest rates were published from Ukraine (40%) and the United Kingdom (32%), while the lowest were in Azerbaijan (3%). This survey and figure

18 E Compalati–M. Penagos–M. Henley– G.W Canonica 2007: *Allergy prevalence survey by the World Allergy Organization*. <http://verlag.hanshuber.com/ezm/index.php?ezm=ACI&la=e&ShowAbstract=21523&IssueID=2056>

19 [www.who.int/entity/respiratory/gard\\_launch\\_s2\\_wg4c.pdf](http://www.who.int/entity/respiratory/gard_launch_s2_wg4c.pdf) (2012. 10.15)

1. show that the highest allergic rhinitis prevalence was registered in Ukraine (40%) and Portugal (37%), while the lowest rate was in Bangladesh (5%). The survey informed about relevant public health problem because of rhinitis allergica.

## Air Pollution Affects Prevalence

Epidemiological surveys established that air pollution promoted allergic development. Zs. Fodré et al.<sup>20</sup> studied the trigger factors of industrial and traffic origin including chemical pollution of air related to geographical differences and prevalence.

In 1982, the number of respiratory illnesses of child population was examined in 3 districts with different levels of air contamination in Szeged. The monthly number of respiratory diseases followed the monthly values of sulphur dioxide and temperature in all three places.

In Slovakia, also child population was examined in "Epidemic Investigation of Allergic Diseases among Children in the Slovak Republic" project. The observation was extended onto 8 different polluted Slovak regions (by metallurgy, chemical industry, agriculture and rural region on Fig. 4.).<sup>21</sup>

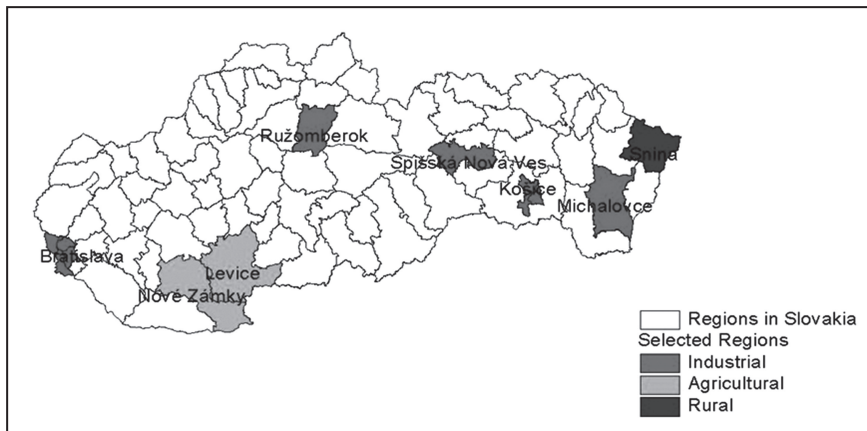


Fig. 4. Observation Regions in Slovakia (1996)<sup>22</sup>

20 Zs. Fodré–M. Juhász–S. Lajos 1995: *A levegő pollenszennyezettsége és a rhinitis allergica Szegeden*. *Medicina Thoracalis*, 48. pp. 29–39.

21 P. Čižnár–E. Reichrtová–L. Palkovičová–S.J.N. McNabb–A.L. Dunlop–K. Rausová–A. Adamčáková–Dodd: *Environmental Risk Factors for Allergy Development in Children* [http://isee.zuova.cz/past\\_balaton/Bal\\_06.pps](http://isee.zuova.cz/past_balaton/Bal_06.pps)

22 P. Čižnár–E. Reichrtová–L. Palkovičová–S.J.N. McNabb–A.L. Dunlop–K. Rausová–A. Adamčáková–Dodd: *Environmental Risk Factors for Allergy Development in Children* [http://isee.zuova.cz/past\\_balaton/Bal\\_06.pps](http://isee.zuova.cz/past_balaton/Bal_06.pps)

Among Slovak Infants, allergic diseases were diagnosed 13.9% at 1-year of age. While 5 out of 1326 children were rhinitis allergica (0.4%). Consequently, the prevalence of IgE positivity in neonates was greater in agricultural regions if compared to rural and industrial regions.

The prevalence of allergic diseases was examined in a cohort of preschool children in Slovakia. In industrial Bratislava (n=86) and rural region Snina (n=140), the influence of regional factors on the development and manifestation of allergy was investigated. Children were clinically examined every year and their parents were interviewed with questionnaires focusing on exposure to risk and the protective factors of allergy. The prevalence of allergic diseases in 5 year-old children was 17.7%. Prevalence of allergic diseases was significantly different, accordingly Bratislava 24.4% and Snina 13.6%.<sup>23</sup>

The biological trigger factors of allergic rhinitis can be pollens and fungi spores. The regional measurement opportunity of the atmospheric pollen concentration appeared as a social claim through pollen traps. In 1995, the dominant aero-allergenic plants were defined in Hungary by M. Juhász and E. Kadocsa<sup>24</sup>, among which one of the most important is ragweed. The results of the analysis showed, that 35.5% of the Hungarian population was sensitive to ragweed. The data of cities were examined and the largest sensitisation was measured (57%) among the total population and 68% among the child population of Kecskemét.

In Hungary, ragweed is the most important allergic agent plant, furthermore it gives half of the pollen count of all the other different plants. As a result of this, many Hungarian studies examined the geographical differences and its effects on the ragweed pollen. L. Makra and M. Juhász<sup>25</sup> published the connection between the pollen concentration of ragweed and the meteorological elements on the Southern Plain.

23 A. Hlavatá–P. Čížnár–L. Palkovičová–K. Rausová–M. Ursínyová–T. Hlavatý–E. Reichrtová–M. Benedeková–O. Červeňová 2008: *Prevalence and Risk Factors of Allergic Diseases in Preschool Children from Industrial and Rural Region of Slovak Republic*. Čes-slov Pediat Vol. 63. Iss. 12. pp. 668–676.

24 E. Kadocsa–M. Juhász 1995: *Pollennaptár alapján végzett allergénkutatásunk eredményei szezonális rhinitis allergicás betegeken*. MTA Szegedi Területi Bizottságának kiadványai, V. kötet, pp. 59–68.

25 L. Makra–M. Juhász–A. Gál–B. Vitányi 2003.: *A parlagfű pollenkoncentráció és a meteorológiai elemek kapcsolata a Dél-Alföldön*. In: A földrajz tanítása, 11. évf. 3. sz. pp. 9–16.

## Migration According to Allergy

I. Nánási<sup>26</sup> investigated the process of migration. She experienced that the environmental factors play a role in migration. They are on the 3<sup>rd</sup> place after living conditions and services. Out of environmental factors, air pollution is considered the most important one, which may play a role in migration, because of its health damaging effect. She found migration quite controversial in terms of environmental factors, considering its directions, its processes. Delicate sand, dust deriving from environmental pollution, sulphur dioxide and low humidity cause respiratory diseases, allergy. Families with children, where children are more sensitive to these environmental factors, moved into a region with clearer air and more favourable microclimate (e.g. Mór, Sopron).

## “Pollen Allergy Project”<sup>27</sup>

The Health Geography studies how the complex geographical environment influences the health conditions of the population of a given geographical area, health culture, the interaction between people and nation as well as the social phenomena which are bound to them. As a matter of fact, students of the Teacher Training College influence healthy lifestyle of children. Since 2001, school education of knowledge connected to illnesses influenced by the environment received an emphasis, and claim it was mooted that the educator candidates should turn into sensitive one, the environmental and onto health harms, handling pollen allergy with great emphasis. Due to the complexity of trigger causes, the reduction of environmental pollution can be put through by the help of public cooperation in an effective way. In order to achieve this, we have to develop our attitude to protect our environment, which is the best and the most powerful method, but – on the other hand – it is a rather time-consuming way as well.

Another aspect of environmental education was supported by non-governmental organizations. Moreover, *Körlánc Society* for environmental education made a “Pollen Allergy Project” for teachers and for children of different ages - from kindergarten to university. This module can be integrated into the initial and in-service training programmes of kindergarten teachers, teachers and special needs teachers. The module can fit into pedagogy courses, anatomy,

26 I. Nánási 2002: *A környezeti tényezők vándormozgalmat befolyásoló szerepe*. [http://www.demografia.hu/Demografia/2002\\_2-3/Nanasi%20Iren\\_tan.pdf](http://www.demografia.hu/Demografia/2002_2-3/Nanasi%20Iren_tan.pdf)

27 Andrea Ovárdics: “Pollen Allergy Project”. In: Ádám. F. (szerk): *Parlagfű Pedagógiai Kalauz*. [http://www.korlanc.hu/parlagfu\\_cd/index.htm](http://www.korlanc.hu/parlagfu_cd/index.htm) (03.03.2013)

psychology or environmental studies to reform environmental education. This material includes 5 modules aiming at providing basic concepts, information and resources on teaching.

Educational aims: Knowledge about ragweed pollution, the recognition of a complex phenomenon: economic, hygienic, spiritual. The historical analysis of ecological questions, discussion and examination. Analyzing local environmental modification from the aspect of ragweed. Examining the local health system and local ecological properties by making a map.

The focus of competence development: complex, the practice of orienting in coherent systems, individual, the development of the feeling of civic responsibility and autonomy.

Personal competence: The participant's health-conscious-, or environmental behaviour-developing him with the highlighting of health care motives, creativity, self-evaluation.

Cognitive competence: Context handling ability, the environmental problems economic, ecological and the knowledge of social consequences, problem-solving ability, systematising ability, ability of logic, text understanding.

Social competence: Supporting group handling ability, the result of common champing, in a healthy and clear environment reducing the number of allergic diseases. It appears in developing assistance, empathy, patience, verbal communication, tolerance.

Content of project packages: After a generally overview section of environmental problems in the context of sustainable development (1), ragweed focus on medical (2); (3) ragweed in social aspect and social interactions; (4) educational matters. It also provides some working tools (5) supporting design activities and external links to web sites where the student can find useful resources such as lesson plans, articles, video and so on. The educational materials integrate themes of health with geography issues in school settings.

### **The topics of the module for teachers:**

*1. Factors defining the development of pollen allergy, the opportunities of prevention*

1. Why and how is pollen allergy created?
2. The primary, secondary, tertiary opportunities of prevention.
3. Let us recognize the life of ragweed. About ragweed (*Ambrosia Artemissifolia*) life cycle
4. Life conducting suggestions for people with pollen allergy

## II. How to live together with pollen allergy?

5. The opportunities of ragweed clearing
6. The individual-social commitment to a task of health care
7. Councils for educators

Every material pertains with issues about teaching and learning reading skills and competences. It introduces the reader into the key concepts related to this area of media competence and then provides some working tools which can be used or adapted for other situations. These needs must be addressed in the development of teacher education programs. It would ensure that strategies appropriate to regional needs are implemented.

## Conclusion/ Summary

In the European Union, allergic respiratory diseases that do not threaten life represent a significant social, economical and public health care issue. As for pollen concentration, Hungary belongs to the most affected countries in Europe. My study is focused on the examination of the geographical frequency of the morbidity of rhinitis allergica (hay fever) from a historical aspect.

In conclusion, the results of this study supported that teachers promote considerably more information related to allergic diseases. The additional research may assist the strategy of the development of environmental education, which would be implemented to address the stated needs of teachers in different regions.

The modules of the "Pollen Allergy Project" can be integrated into the initial and in-service training programmes of teachers.

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2. J. DOSTÁL– M. ČERVENKA 1992: *Big key for determination of vascular plants 2 (in Slovak)*. Bratislava, Slovenské pedagogické nakladateľstvo p. 783
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[http://www.ria.insel.ch/fileadmin/ria/ria\\_users/Pdf/Pdf-allergologie/GoodAllergyPractice.pdf](http://www.ria.insel.ch/fileadmin/ria/ria_users/Pdf/Pdf-allergologie/GoodAllergyPractice.pdf)
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