

## **POLAND**

### **Report on activities undertaken by Poland over the period 2005-2008 pursuant to article 9 of the Montreal Protocol on Substances that Deplete the Ozone Layer**

As a member of the European Union from 1 May 2004 Poland has to comply with regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer with adequate changes and internal Polish act of 20 April 2004 on substances that deplete the ozone layer, supplemented with ministerial regulations resulting from that act.

Complying with the said EU regulation Poland was obliged to send to European Commission among others adequate data as regards 2006 and 2007 which meet requirements concerning article 9 of the Montreal Protocol.

#### **Public awareness and exchange of information**

Implementing GEF Project "Total Sector Methyl Bromide Phase out in Countries with Economies in transition", which started in 2005, Poland launched a public awareness campaign with respect to methyl bromide (MB) users and schoolchildren. An objective of the campaign was to transmit adequate knowledge concerning use of alternatives to MB. Special courses for users were conducted and certificates were given. It is worth to mention that among others Plant Protection Inspection actively participated in the campaign. With respect to children, in cooperation with schools, competitions on e.g. utilizing biological method of plant protection, instead of MB, were organized and the most active participants were awarded.

With respect to halon Ministry of the Environment and Ozone Layer Protection Unit monitored the functioning of the system established in 2005 under which 3 companies were authorized to store halons, including equipment containing halons, designated for satisfying the critical uses, with the option of storage for the purpose of either exporting halons outside the EC territory or destruction. In general, the system worked well. Halons which had been obtained from decommissioned systems and stored in the premises of former non-critical users were continuously being transferred to the above mentioned authorized companies, and those companies were selling them to the critical users. The Ozone Layer Protection Unit informed the authorised institutions collecting halons about stocks existing in the facilities where the halon installations had been decommissioned, what facilitated the contact between the suppliers and receivers of stored halons.

In that context, it should be mentioned that the routine controls carried out in 2007 by the Regional Inspectorates for Environmental Protection confirmed decommissioning of all non-critical halon installations in petrochemical sector and cultural heritage objects, which were disclosed during the checks carried out in 2006.

One has to note that every year the environmental inspectors carry out extended actions focused on checking the fulfillment by the Polish entities of European Union and Polish law concerning the ozone layer protection.

In 2007 random checks were made by the environmental inspectors in 604 entities covered by the Regulation 2037/2000 and by the ODS Act, including both the ODS importers/exporters/dealers and the servicing companies, the companies using ODS in their business activities, (including companies using ODS as process agents

or for laboratory and analytical purposes and using methyl bromide for critical and QPS applications) as well as in the companies using the ODS-containing equipment. In total, 315 violations of ODS legislation were recorded, and further inspections conducted later revealed that more than 90% of them have been dealt with successfully.

In the context of international exchange of information two Polish scientific institutes, making ozone and UV measurement, should be quoted. Institute of Meteorology and Water Management (IMWM) and Institute of Geophysics of the Polish Academy of Sciences (IGfPAS) have been sending adequate data to international centers for many years.

Regarding information to the public:

- since 2006, an operational monitoring of UV Index from the IMWM network consisting of 6 stations has been published on [www.imgw.pl](http://www.imgw.pl)
- since 2000, the UV Index forecast for Poland has been available from May to August on the IMWM home page.

Regarding public awareness Ministry of the Environment, Chief Inspectorate for Environmental Protection and the Ozone Layer Protection Unit should be mentioned too. It concerns for example various documents, articles, booklets explaining issues with respect to relations between ozone layer protection and climate change.

## **Research and development**

### **1) Ozone and UV**

The ozone research studies focus continuously on the long term changes in ozone profile. Moreover the ozone research activities mainly focus on statistical analyses (trends) on local and global scale, and methodology of ozone measurements. The changes in the ozone layer over middle altitudes are examined in connection with changes in the dynamic factors characterizing the atmospheric circulation in the troposphere, the lowermost stratosphere, and the stratospheric overworld. The problem of the gradual recovery of the ozone layer in the atmosphere is also investigated. The study is focused on the role played by the dynamical factors in ozone variability, because natural dynamical processes in the Earth's atmosphere can perturb the recovery of the ozone layer.

Regarding UV in last years UV research activities were directed mainly on UV reconstruction within COST 726 Action 'Long term and variability UV radiation over Europe'. The IMWM reconstruction model participated in comparison of UV reconstruction models from EU and showed very good results. Reconstructed UV series over Poland have shown a significant increase of daily UV doses since the 1960s.

- Investigation on UV radiation weighted with action spectra: erythemal, previtamin D3, SCUP-H against total ozone and solar zenith angle.
- The UV Measurements on the Henryk Arctowski Polish Antarctic Station with SL501 have been analyzed for the 2005-2007 period.

It should be noted that Polish scientists participated in preparation of the Scientific Assessment of the Ozone Depletion 2006.

## 2) Methyl bromide phase-out

With respect to new methods of plant protection without methyl bromide the following R&D activities were carried out in Poland:

Name of alternative: Pheromone technique	Date research commenced:	2004
Name of agency undertaking the research: Warsaw Agricultural University ul. Nowoursynowska 166 02-787 Warszawa, Poland	Date research will finish:	Already finished (2008)
	Expected date for commercialisation of alternative:	-
Title of Project: Eradication of wood infesting insects by fumigation with chosen inert gases	Commodity:	Various wood products
	Target pest or disease:	longhorn borer beetle, ( <i>Hylotrupes bajulus</i> L.), furniture beetle ( <i>Anobium punctatum</i> De Geer), <i>Ptilinus pectinocornis</i> L. and <i>Tenebrio molitor</i> L.
Name and address of key researcher: Piotr Jakub Boruszewski - Warsaw Agricultural University ul. Nowoursynowska 166 02-787 Warszawa, Poland		
Email address of key researcher: <a href="mailto:piotr_boruszewski@sggw.pl">piotr_boruszewski@sggw.pl</a>		

A trial was undertaken to determine the utility of nitrogen and argon for pest control of the longhorn borer beetle (*Hylotrupes bajulus* L.), furniture beetle (*Anobium punctatum* De Geer), *Ptilinus pectinocornis* L. and mealworm (*Tenebrio molitor* L., which is an ancillary species). The fumigation of wood infesting insects was conducted on the larvae embedded in wood and beyond wood. Furthermore, a research was undertaken to present how the inert fumigants influenced xylophage's beetles. Not only larvae, pupae but also adults were treated with modified nitrogen or argon atmosphere with low oxygen concentration. The experiments were undertaken in different temperature conditions and in different time intervals for each species. The xylophage's larvae embedded in a pine's (*Pinus sylvestris* L.) or fir's (*Abies alba* Mill.) samples were used to determine the role of wood in the limitation of the gas diffusion. The fir wood (*Abies alba* Mill.) was chosen due to the fact that it is considered to be a difficult material to saturate with impregnates. In connection with that, it was presumed that time needed to achieve the full mortality of insects might be longer than in the case of pine. In addition to that fumigation with nitrogen and argon were carried out on the construction elements containing natural pasture – ground of *Ptilinus pectinocornis* L.

Results obtained indicate that the most tolerant pest to inert gases was the mealworm, *Tenebrio molitor*. A complete mortality of the furniture beetle (*Anobium punctatum*) in the atmosphere of nitrogen was found after 8 days at 21°C and 30°C, whereas argon killed the pest after 2 days. Larvae of *Ptilinus pectinocornis* were found dead after 10 days in nitrogen and argon atmosphere at 21°C. An increase of temperature up to 30°C caused the complete mortality after 4 and 6 days, respectively.

Larvae of the longhorn borer beetle, *Hylotrupes bajulus*, isolated from the wood material, so called "naked" larvae, were found to be susceptible to low concentration of oxygen in the atmosphere of nitrogen or argon. A complete larval mortality was noted after 24 days at 21°C and 30°C. Larva of the pest present in the wood were tolerant to the treatment. After 32 days of fumigation with nitrogen, a complete mortality was not achieved.

Reports (author, year, title, citation reference): Boruszewski P. 2008. Eradication of wood infesting insects by the fumigation with chosen inert gases. Ph. D. Thesis, Warsaw Agricultural University.