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Environment

Biodiversity forgotten

- IV Online magazine - 2012 - IV452 - September 2012 -

Publication date: Monday 17 September 2012

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And they sawed the branches on which they were sitting, all the while shouting their experiences to one another so as to saw more effectively. And they fell into the depths. And those who watched them nodded their heads and continued sawing vigorously. (Bertolt Brecht, 1954)

The concept of biodiversity defended by the entomologist Edward Wilson at the Rio Summit (1992) is probably the most interesting idea that will remain from this forum. This concept goes beyond the classical view, where species are considered separately or as forming of composite populations. What was necessary was to "protect the species" sometimes restricted to a few rare, emblematic or spectacular animals and plants.

The concept of biodiversity is based on an integrated vision, taking into account the interactions of organisms with each other and with the environment. There is no hierarchy in the networks of living organisms, but interactions. It is a question of defending species without any ideological or cultural a priori and of considering the entire ecosystem of the Earth which is being endangered by one of its species: human beings. Despite the acuteness of the problem, anti-capitalist currents are reluctant, unprepared or argue that there is no urgency to take up the issue of biodiversity, which concerns the survival of human populations, in addition to other struggles, against barbarism, for a socialist horizon.

Seeing the disappearance of species

In the twentieth century, motorists had at their disposal in petrol stations a bucket of water and a sponge to clean the marks of insects on their windscreens. As the insects became rarer and rarer in the 1990s, motorists stopped cleaning their windscreens so often and buckets disappeared from the petrol stations. In the Mediterranean region, the inhabitants had equipped the doors and windows of their houses with fine mesh screens to prevent the intrusion of insects. It was a compromise between the nuisance caused by the intruders and good natural lighting of the rooms. Since 2000, the inhabitants have been dismantling these protective screens because the insects are less of a nuisance.

Associations of naturalists have rewritten records of collections of insects on the basis of studies carried out a hundred years earlier exactly in the same way. The fabulous collections of nineteenth-century observers are no longer possible. Many species have become rare or are confined to certain localities! Spontaneous observations by inhabitants, farmers or foresters, confirm the seriousness of the phenomenon on land and in fresh water (we are not dealing here with the oceans). Farmers have noted the disappearance of the once common cornflowers and corn-cockles, and also of cockchafers and earthworms in soil that has been treated with chemical fertilizer. Fishermen observe the scarcity of minnows, bullheads, perch, wild trout and pike in polluted rivers (60 per cent of the rivers in France); gardeners no longer see many mole crickets or cockchafer larvae. Endangered populations are maintained in areas protected by local conditions or protected in reserves. People are surprised by the arrival of "new" plants like the Jussies from Brazil, plants that were introduced to embellish the basins of the botanic gardens of Montpellier... and which now clutter up canals, lakes and rivers because their natural parasites and predators did not follow them.

Naturalists report more detailed observations and speak of "breaks in trophic chains" when a predator no longer finds its usual prey. Starting in 1970, there have appeared in scientific publications comments such as "has not been seen since...", "has become rare", "seems to have disappeared", "disappeared". The effects of pesticides began to be

noticed. In 1966, near the city of Sedan, the Green-veined White butterfly "Pieris napi" was so abundant that I could find several individuals with abnormal morphology while crossing a field of lucernes." In the course of one day's collection, I had created a beautiful collection of individuals with an anomaly of development of the wing (teratological forms). Forty years later, the same fields, still covered with lucernes and revisited by myself, provided scarcely more than one White butterfly per hectare! The situation is similar for other species that I had been able to observe in considerable number in the 1960s. In a very short time, the land has lost insects whose usefulness the farmers did not see... until the bees, major providers of pollen, began to disappear in their turn. The possible prospect of the disappearance of pollinators is a disturbing idea that has fortunately made its way into the public domain! This suggests the need to act.

In 1987, a team of German naturalists published a large book in order to sound the alarm over the endangered butterflies, which was immediately translated into French by Gérard-Christian Luquet [1]. Illustrated and with an effective didactic content, the book presents evidence on practices widely in use, such as burning embankments and other brushwood fires in spring, and the systematic use of chemical products, unnecessary and disastrous for species that had taken refuge outside the zones of cultivation. This indictment provoked no reaction on the part of political organizations and governments. As for biodiversity as a whole, it is economic, genetic, scientific, aesthetic and cultural capital that we are destroying. Butterflies, those emblems of futility, innocence and peace are disappearing because "butterflies can only exist in an opulent natural environment" (Luquet). The noisy laughter of the ignorant - and sometimes of activists - will be echoed by the hollow laughter of humans deprived of insects for their pollination-dependent plants!

The end of the cockchafer hunt

A characteristic event of the new and increasingly human-centred world in which we live appeared in the 1970s. We are speaking of the little-known and never-mentioned fate of the common cockchafer "Melolontha melolontha." This large beetle was historically feared by framers, nursery cultivators and gardeners, because it attacked almost all crops. The grievances of the peasants against the beetles have been known since the development of agriculture in the Middle Ages. Its larvae often referred to as "grubs" develop in light soil that is not subject to flooding and is rich in organic matter. They eat the tender plant roots, full of sweet nutrition, and kill herbaceous plants. Pupation occurs near the surface and the adults emerge from the earth between the months of April and June. They attack leaves and buds in the spring. They eat the pistils of the flowers which precede the fruit, or nibble at the first fruits in May-June, making them unfit for marketing and good conservation. The activity of the common cockchafer was so great that it influenced the cultural practices of the peasants.

To combat the grubs, cultivated land was ploughed deeply, because the larvae go 60 centimetres underground to hibernate. This practice required powerful traction, with two- or four horse-drawn ploughs. It led to other problems, such as greater soil erosion and the useless mixture of fertile land with a substratum less rich in organic matter. It became necessary increase the amount of fertilizer used. The land that could not be ploughed was scratched before winter to destroy the eggs that had been laid and to injure the loosely buried young larvae. But the common cockchafers were so numerous that this practice, developed after 1945 with the introduction of tractors into the countryside, did not change the obsessive presence of these insects. Nor did it remove the "grub years", where these insects were able to proliferate in abundance, without anyone knowing why. To limit their abundance, the most effective solution remained the collection of adult insects by massive actions of the population.

It was the time of the cockchafer hunt: great popular and festive activities took place in the villages concerned, from France to Hungary (there were weddings). Available people, including schoolchildren, took part in the struggle. At break of day, when the cockchafers were numbed by the cold and the humidity of the night, men hit the branches with large poles and insects fell to the ground. All that remained was to collect them quickly, there were so many of

them. Considerable quantities of collected insects ended up in a trench or were used as fertilizer in gardens.

The common cockchafer typically represented a "pest" or "vermin". For centuries, everything was used to destroy the grubs, without ever reducing their population before the late 1970s - which if it had been done would have signaled earlier the end of the cockchafer hunt, perhaps without harming other species. Since the creation in France of the National Institute of Agronomic Research (INRA) in 1946, different laboratories tackled the problem of the eradication of the grub, without immediate success. First generation chemical insecticides such as DDT did not reach the buried larvae in the first years of being used. It was during the 1960s that the first observations of reduced populations of cockchafers were made, with the accumulation of pesticides in soil, water and organisms. Throughout the 1970s, the depletion of the grubs was confirmed. In the 1980s, cockchafer hunts disappeared in Western Europe.

In the twenty-first century, the cockchafer hunt is just a nice bit of folklore that grandparents tell their grandchildren children about.

With the collapse of the populations of cockchafers, it is actually a long list of invertebrates living in the soil which is disappearing. Rose chafers (the larvae consume dead wood or decomposed mulch) and ground-beetles (which are carnivorous in all their phases), to mention the most spectacular insects, are no longer seen in gardens and have disappeared in regions of large-scale farming. There are now country people who have never seen cockchafers or rose chafers, and do not recognize them when a specimen is put before them. The invertebrates are suffering the same fate in an ecocidal dynamic [\[2\]](#) that is extending to all fauna. This phenomenon is resulting in an impoverishment of the common vocabulary as far as the environment is concerned, because we only name what we know. The empirical knowledge of farmers, based on a proximity with nature, which could tell the difference between disagreeable insects and those that were harmless, has been replaced by generic terms with negative connotations, such as "flies", "mosquitoes", "wasps", "vermin", "smellies", "dirt", etc., encouraged by advertising, the media, hunting clubs... This evolution has been accompanied by many phobias, and even, among people still living in the cities, by a syndrome of "fear of all animals".

If invertebrates are disappearing from the farming areas, they are also disappearing from land that is not in use "at whatever distance from farms". Terrains sprayed with pesticides are so many traps laid for moths, dragonflies, beetles and birds, all of which fly. The molecules that are poisoning the biosphere are the famous POPs or persistent organic pollutants. They establish themselves in the fat of animals and are concentrated along the trophic chains, especially in top predators such as the polar bear and...humans. Herbivores accumulate them by grazing on polluted grass. In humans, contamination is through milk and fish. The pesticides used on the continents also poison the seas.

Cockchafers do not move around very much and their general population can only have been eradicated in areas not treated by chemical fertilisers by a natural movement of POPs (by wind, rain, or the movement of contaminated animals). A consequence of this observation is that if the products used on some crops are enough to affect by simple aggregation vast surrounding territories, it means that the amount used was over-calculated and poorly applied, like the clouds of pesticides spread by aircraft, particularly in the USA, which form a formidable mist that is dangerously carried by the wind.

In the course of a human generation, the dispersal of POPs, frantically diffused by humans, has spread across the planet and no one is immune to their effects. The Inuit women of the far North, who traditionally eat only meat, (seal, fish), are advised not to consume local products when they are pregnant, despite the total absence of toxic spills in these huge areas! On the threshold of the third millennium, a blood sample taken from no matter what European reveals the presence of several different toxic substances, including dioxins! While we are more or less familiar with the effects produced by each pesticide on its own, we have at present no certain knowledge of the effect they produce in synergy. The growing dispersion throughout the world of millions of tonnes of biocides, antibiotics and substances which perturb the endocrine system form a cocktail that is uncontrollable and confronts biodiversity and human populations, which are vulnerable!

Despite the knowledge of the effects of persistent pollutants on the living, the amount of these agents was not reduced. They have permeated the soil ever more massively since 1945 and threaten sustainable groundwater with artificial molecules that nature does not know how to degrade, as confirmed by the extraordinary capacity of retentivity of POPs. Quite logically, capitalists encourage their consumption, and generate anxiety among users by demagogic propaganda and dishonest "scientific" communications! Farmers and gardeners reassure themselves by increasing even more the doses used, although the doses recommended by the sellers are already excessively large in relation to the expected effect. Such practices are quite incredible when the parasites they are used against have already disappeared. As for the capitalists who flood the market with products that are harmful for living organisms, their policy is summarized as follows: "after me the deluge." They also pollute spirits by spreading the idea that agricultural land must be as bald as a billiard ball between cultivated plants and the environment completely free from "vermin".

When crops are sprayed over large surfaces, we can consider in the light of the samples taken that it is the entire region that is being sprayed, including its urbanized zones and their inhabitants who breathe and ingest "high-performance multi-targeted" products. The present erosion in the species of cicadas - emblematic of the fables of La Fontaine - is evidence of the widespread influence of pesticides used in agriculture. Cicadas do not often frequent cultivated areas where there are no trees and which are too noisy for their long-living larvae. As adults, several species gather on trees in cities, which are in principle not sprayed. But pesticides are reaching them everywhere, since they are disappearing.

Denounced for a long time by scientists, some of whom were repressed because of it, the impact of toxic agents on human health is beginning to be recognized. In February 2012, the guilt of the Monsanto Company in the contamination of a farmer exposed to one of its herbicides was accepted by the High Court in Lyons. In May, the French State was ordered to compensate a farmer exposed to pesticides in the course of his work. May 7, 2012 will remain in history longer than May 6 (the election of François Hollande) because of the entry into force of a French decree establishing, for the first time, a link between exposure to pesticides and Parkinson's disease, which is now recognized as an occupational disease in agriculture, subject to a period of ten years exposure! This bureaucratic restriction ignores the intensity of exposure and its hazard for farmers. The decree includes agricultural products, the case of inhalations or contact with crops, surfaces and animals that have been treated with pesticide (against parasites). So those who live near agricultural land, hikers and children circulating in a natural environment which we now know to be polluted everywhere, are exposed to the same pathologies as those that are beginning to be identified for farmers. Instead of recognizing occupational diseases after long conflicts, we would be well advised to stop the flow of cocktails of pesticides that generate these diseases.

To stop using pesticides will be a long battle, like the struggles to prohibit the industrial use of asbestos and to compensate its victims. But if for asbestos it took three decades of struggles in France, how long will it take to close the much more complex case of pesticides, which are multifaceted and used all over the world, when we know that we will need to relearn how to work the land, to rediscover the ecosystems and to reorient state aid?

Towards a world without wild animals

Severely affected by the loss of their prey, birds, bats, reptiles and amphibians are declining in their turn, and this movement appears to be accelerating at the global level. Counts of amphibians in the primal forests of Central America, large zones where there is no agriculture and no cities, show a deficit in the number of individuals per species of batrachian by as much as 90 per cent over 25 years. Populations of all these species are declining and conditions of famine are increasing along food chains. In these situations of famine, some predators are changing their diet by attacking new prey, as witness the stunning predation of cicadas by sparrows that naturalists have observed for several years in Europe.

Other strange and disturbing phenomena appear in large animal populations, such as pandemics with no known precedent that occur in various species: African herbivores, American bats, fish, European crayfish and freshwater molluscs on the continents. We have seen the disappearance of entire groups of batrachians on several continents, without the cause being clearly known. These disasters seem related to the dispersal of violent products acting in concert: dioxins, furans, PCBs, organochlorines, organophosphates, endocrine disruptors, etc. The considerable dangerous effects of this cocktail operating in synergy are strongly suspected. Endocrine disrupting chemicals, commonly used with great naivety, act in infinitely small doses and deregulate the delicate hormonal balances that determine reproduction in insects, but also in vertebrates, by causing spectacular deregulation of the reproductive system, leading to infertility. Their impact on our species is likely, as suggests, for example, unprecedentedly early puberty in teenagers and ongoing degradation of the quality of human sperm.

To all these agents whose functions are lethal, there should now be added pharmaceutical products and those for veterinary use: antibiotics, estrogen, anti-inflammatory drugs, etc. Human and animal organisms degrade only a small part of the drugs they receive, the rest are found in nature, because water purification plants do not know how to eliminate drugs. Antibiotics are used all over the world to encourage the growth of cattle. The use of antibiotics, added in large quantities to their food over a period of years, contributes to the selection of antibiotic-resistant bacteria. In this way we have selected pathogenic bacteria resistant to all known antibiotics by evolutionary adaptation! Medicine now finds itself disarmed in the face of some antibiotic-resistant bacteria. In the case of DDT, the fact that is dangerous for human beings has been known since the 1960s. Yet the World Health Organization and the United Nations Programme for the Environment, controlled and funded by liberal governments, only envisage the total abandonment of DDT from the year 2020! Little used in Europe, DDT is still manufactured to be sold under at least 25 brand names, in Africa, South America and Asia! But the basic molecule remains DichloroDiphenylTrichloroethane (DDT). Few Governments are clearly opposed to this, following the adage: "there is no such thing as a small profit."

The mechanism of the collapse of populations of swallows and swifts (of which there are respectively five and three species in Europe) must be made known. These birds feed on the insects they catch in flight. Respected by farmers, they took advantage of work in the fields causing many insects to take to the air to catch them by hedge-hopping. With the advent of spraying, insects that take flight as the machine passes are impregnated with concentrated poison. It is in this state that the birds catch them and poison themselves, at the same time taking toxic food back to their brood. Their populations are in regression: a drop of 41 per cent in twenty years for the common house martin in France, (source: LPO, France). But over the whole period of the introduction of pesticides since 1945, this population has collapsed by 60 per cent. The Trogne and Pagano waltz "The return of the swallows", a classic for accordion virtuosos, will no longer have the same resonance if those who listen to it have lost the memory of the wonderful swallows.

Seeking salvation from famine, species are turning to urbanized areas to take advantage of the crumbs of our civilization. Magpies are becoming people-friendly and settling in the suburbs. Foxes live in the interstices of European cities. Crows are proliferating in the capital of Japan. These species, emblematic in all cultures, which have taken refuge in the cities of their worst enemies, are defeated! Human pressure will make itself increasingly felt by these species declared "harmful": they will disappear.

Who would have thought that our untiring sparrows, always attached to an urban environment, would see their numbers drop so sharply in our time? These elves of the cities do not appear to be affected by toxic spraying, since they live in urbanized areas. This misconception is based on the belief that spraying only acts locally. However, the sparrows must reproduce, and their young are insectivorous. The process that led to the decline of swallows is being repeated. The number of individuals reaching sexual maturity in good health has collapsed. Villages without sparrows are appearing in the wine-growing regions. We are entering the era predicted by Rachel Carson in her book "Silent Spring", published in 1962 in the United States [3], whose relevance led to the banning of DDT in the United States in 1972, to the chagrin of American industrialists, who denounced Rachel Carson as a "Communist".

On the surface of the planet, there are vast agricultural regions devoid of wild animals, which we starved or exterminated by hunting and the destruction of biotopes. We are now discovering that our species is affected, that our bodies are accumulating carcinogenic or neuro-toxic molecules. Bees, selected and looked after by humans, and all the insects that participate in the pollination process, show a worrying decline. Their disappearance opens a new chapter, with the prospect of the loss of plant species which are dependent on a pollinator for their reproduction. What is surprising about that, since wild animals are dying en masse from poisoning and that this was the sought-after objective!

Political parties, which are not reacting to this generalised poisoning of the planet where we are confined, will face social mobilizations, whose motivations they fail to understand. New contradictions are appearing with the existence of various pesticide-resistant insects and wild plants with acquired resistance to glyphosate (the brands Roundup, Grassane...) making progressively pointless crops of patented plants that are tolerant to herbicides. The catastrophes of Minamata [4] and Bhopal [5] occurred in a situation of total unpreparedness of governments and social organizations. Nothing prevented these dramatic events from being planned for and countered – nothing except the pressure from governments in the service of powerful lobbies. In a documentary on Minamata at the time, we see scientists forced to testify, with their faces hidden, to the strong density of mercury in the flesh of the fish that poisoned the population! We often find that such facts about the health of populations are hidden or treated as "state secrets", sometimes without any logical reason, as in the case of the "Chernobyl cloud" whose existence the French government blandly denied!

Since these disasters, and others confined to one region, the diversity and the tonnage of harmful agents in the biosphere has grown steadily. The emergence of new pathologies in our species (greater occurrence of diseases that were formerly rare, degradation of human sperm quality, asthma...) foretell the occurrence of Minamata-type disasters on a large scale. We have seen that this is already the case for many animal species newly suffering from mass pathologies. I said that a blood test conducted at our time on any human being indicates the presence of toxic substances that have been introduced into the environment or the products of their degradation, which are just as dangerous (such as DDE for DDT). We also find in the blood of humans natural toxic products. These products (radio-isotopes, arsenic, mercury) were locked in rocks where they were neutralized and kept safe for life, without danger for living species and groundwater, until geological and industrial activities carried out without precaution put them in contact with humans, wildlife and flora.

Poisoning and artificialization of the soil, urbanization...

The poisoning and the artificialization of soils are an essential chapter, not understood by the public, and by associations and administrations which increasingly build housing estates, car parks and warehouses at the expense of valuable agricultural land. In France, about 6 per cent of the territory is artificialized, i.e. urbanized, paved, tarred or covered with ballast treated with herbicides. This permanently sterile artificialized area has doubled in 20 years! The major industrialized countries are heading towards 10 to 12 per cent of artificialization in the same time frame. Finally, roads, brick walls, ditches and canals lead to innumerable sealed-off plots of earth which block the circulation of living organisms of life and genetic exchanges in soil.

The volume of biomass found in the earth is not less than that on the surface. These organisms, which come from many animal and vegetable groups, interact with plants, to which they provide essential elements (carbon, trace elements and major nutrients such as nitrogen). Earthworms recycle organic matter trapped in the soil and take it to the surface. Many invertebrates that we do not see, with predator-prey relations, are active in the environment; they enrich it and ventilate it, avoiding excessive compression of the soil.

The soil receives all the chemical products used by agriculture. The belief in the need to "weed" between rows of vines, fruit trees and various plantations is an unnecessary and harmful practice that increases the amount of pesticides affecting the soil. Ultimately, these agricultural methods are always excessive and inadequate for the conservation of the species (up to 16 sprayings a year in orchards). Therefore, biodiversity is depleted and eventually disappears. This process leads to the necessity of increasing the intake of water and fertilizer. Soils that are badly treated in this way progressively resemble crops that are not rooted in the soil, but based on artificial input instead of the effects of the biodiversity of natural soils.

Polluted, impoverished, the soils accept progressively fewer plants on the surface and become bare. Another irreversible phenomenon then begins: the loss of humus and fine particles eroded by rain, wind and the flow of water. Crops on soil as bare as an egg in major wine- and fruit-producing regions, obtained by applications of herbicide, are contributing to poisoning the biosphere and those who work the land. On these bare and parched soils, the wind becomes full of pesticides and erosion lays bare the roots of plants. In addition, and it is not a secondary point, soils which lose their natural biodiversity cease to fulfil a function of carbon retention, since many organisms linked to the soil produce carbonates or capture the carbon of CO₂ and release oxygen.

These farming methods, which are more and more costly and dangerous for living organisms, result from a lack of information from governments and from normative behaviour among professionals who have been formatted by capitalist agrochemical pressure, because "growth" also concerns the use of pesticides by farmers and the public. Seeking to sell ever more pesticide, poisoning still more the biosphere, for purely capitalist incentives, confirms the profound perversity of the system. These are criminal practices and methods which are situated in the continuity of the "pioneering" disasters of Bhopal and Minamata. It is urgent to put a stop to this. To drive back this alienation is a challenge to all.

This article is a partial transcript of a lecture given in May 2012 on the theme "Biodiversity, pesticides..."

[1] The book was written by Josef Blab and others, and the French edition, adapted by Gérard - Christian Luquet, was published under the title *Sauvons les papillons* (Save the butterflies), Duculot editions, Paris 1988.

[2] An ecocide is defined as the action of destroying species and the relationships that exist between them, the whole forming an ecosystem. The term of ecocide became known with the first edition of the book by Franz Broswimmer, in 2002: *Ecocide, a short history of the mass extinction of species*. A second French edition was published in 2010, revised and completed under the title: Franz Broswimmer, *Une brève histoire de l'extinction en masse des espèces*, with a foreword by Jean-Pierre Berlan, and is available at Agone editions (price 12 euros).

[3] Rachel Carson's book was published in a French edition in 1968. It has just been reprinted: Rachel Carson, *Printemps silencieux*, Wildproject editions, Marseille 2009.

[4] The petrochemical plant of the Chisso company, installed in 1907 in Minamata, in the South of the Japan, began to dump in the sea many residues of heavy metals, including mercury, in 1932. This became concentrated in the flesh of the fish, causing diseases of the nervous system in humans (loss of motor control, for example) as well as births of deformed children and stillbirths. The Chisso company attempted to keep the affair quiet by offering money to the families of the victims. It was only in 1977, after mobilizations of fishermen and residents were violently suppressed and there was a major international scandal, that contaminated sludge was no longer dumped in the sea but treated. As of 2009, more than 13,000 victims had been recognized by the company and the Japanese government, but 25 000 were still awaiting a decision.

[5] The Bhopal disaster (in India) was caused by the release into the atmosphere of 40 tonnes of methyl isocyanate, one of the most dangerous components that goes into the manufacture of pesticides. The Union Carbide (now Dow Chemical) plant at the origin of the disaster was located in a slum! Unprofitable according to its shareholders and American homeowners, necessary maintenance activities were no longer being undertaken in the plant, which was due to be closed. On the night of the tragedy, 4,000 children, women and men were killed by the cloud of isocyanate (3,500

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deaths were officially recognized). According to associations of victims, altogether 20,000 to 25,000 people have died. Executives were able to have the company tried in India and not in the United States, in order to reduce the amount of compensation. Finally the sum obtained by the victim was 715 euros per head!