Journal of Agricultural Safety and Health, Vol 4, No 2, May 1998, pp. 77-79

JASH Editorial

Occupational Dermatoses in Agriculture

Radoslaw Spiewak, MD, Dermatologist
Institute of Agricultural Medicine, Lublin, Poland

"My skin is my castle" — one might say and not without reason. Skin is the largest organ of the human body with a surface of 1.5 to 2 m^2 and a thickness of 0.5 to 5 mm, which makes 15% of total body weight. It forms a border between our body and the external world. No other organ is attacked by such a variety of hostile environmental factors. Skin is exposed to physical, chemical, and biological agents — from UV radiation to bacterial and fungal invaders. It is also almost unthinkable that a structure more suitable for the task of protecting the internal organs might be engineered at all. Thanks to its unique structure, skin is capable of defending the body against all these different agents. Every system has its limitations, however.

In the working environment, there are numerous factors hostile to the farmer's skin. Skin diseases constitute more than 10% of all occupational diseases in agriculture, e.g. 13.4% in Poland, and 12.9% in Germany. Among the factors detrimental to the skin, physical, biological, and chemical factors may be listed.

Physical factors include kinetic energy, high and low temperature, and radiation. Aside from major injuries to the skin, kinetic energy may cause microtraumas, often not noticed by farmers. These may be provoked by working with an axe, a rake, or operating any machinery without servo-handling, especially when not wearing protective gloves. The effects of these microtraumas may accumulate and contribute to the development of skin diseases. Skin injuries caused by heat and cold include not only burns and frostbites but prolonged exposure to atmospheric cold or heat during work may induce irreversible changes in the skin. Ultraviolet radiation, another physical factor to which farmers are heavily exposed, accelerates degeneration of skin (so-called photoaging). This condition is so prevalent among farmers that it is referred to as "farmer's skin". The UV-provoked skin degeneration is not rarely an initial phase for skin cancer.

Biological factors may be divided roughly into infectious and non-infectious agents. The elements soil, water, and air to which the farmer is continuously exposed, contain considerable amounts of infectious agents. Fungal infections of the skin are especially typical of agricultural workers. Each day, farmers spend several hours in rubber boots which provide an ideal microclimate for the development of fungal feet infections. Moreover, bacteria, fungi and viruses causing animal disorders in cases of close contact may also invade breeders. These conditions are known as skin zoonoses, and all kinds of pathogens are involved: fungi (e. g. microsporasis and trychophytiasis from infected cattle), bacteria (erysipeloid from swines), and viruses (foot and mouth disease from sheep or "milkers' nodules" from cattle). In hot climates also parasites (e.g. worms) are a real hazard to farmers. In addition, plants may also be hostile to the

farmers' skin, causing inflammation referred to as dermatitis venenata. In North America contact with poison ivy, which may be found on the borders of cultivated areas, results in severe dermatitis. In Europe, meadow weeds, mainly from the family *Umbelliferae*, produce large amounts of photosensitizing agents. Contact with *Umbelliferae* and subsequent exposure to sun rays results in developing so-called meadow dermatitis. Also invisible particles of animal hairs, plant dusts, etc., may provoke allergic and immunotoxic reactions in the skin.

Chemical factors, especially under regular exposure, are capable of causing irritant contact dermatitis. In the case of most farmers, irritant contact dermatitis is caused by petrol, diesel fuel, detergents, and disinfectants, whereas allergic contact dermatitis is mostly caused by technical oils and fats, fertilizers, and pesticides. For example, pronounced allergizing properties are characteristic of the insecticide chlorfenvinphos and the herbicide 2,4-dichlorophenoxyacetic acid. Unlike physical and biological factors, chemicals are quite a new appearance in the evolution of mankind, therefore the skin seems to be less prepared for protecting the body against them.

One of the tasks of occupational medicine is to develop means of avoiding or neutralizing the noxious factors. Basically, there are two methods for preventing skin diseases in farmers: the first one is to reduce (or preferably: remove) sources of detrimental factors, the second relies on decreasing intensity and time of exposure to factors that cannot be removed or avoided.

One method of reducing sources might be changing the technology used for feeding animals. Changing from dry to wet food dramatically reduces the exposure of feeders to organic dusts. Another example may be the appropriate design of machinery preventing formation and propagation of aerosols while spraying pesticides which may cause both allergic or toxic diseases of the skin. Also the science of soil hygiene might be involved in the preventive activities. For example, a wide range of pathogenic fungi was found in soil after dunging with manure.

Reducing exposure may be achieved by decreasing the extent of manual work, when the contact to sources is very close. Mechanization and automation of farm work will certainly contribute to the protection against skin diseases in agriculture. A very important factor in reducing the prevalence of skin cancer in farmers would be the avoidance of exposure to the sun. This may be achieved through avoiding work in open areas at times of the most intensive insolation, implementing UVA and UVB-blocking shields in tractors' and harvesters' cabins, as well as propagation of the regular using of sun-protectives on the skin during work. A very important topic is the development of protective suits. Unfortunately, in contrast to the all-purpose design of the skin, it seems impossible to invent a universal protective suit. Typically, a suit is designed for one specific hazardous activity only, and cannot be used for other purposes. There are some attempts to work out protective ointments for use in working conditions, but again, they are protective against certain agents but may even promote the noxious effects of others.

The understanding of the problem from the farmer's side is as crucial as the efforts of scientists and authorities for reducing the prevalence of occupational

dermatoses in agriculture. Identifying the risk sources and turning the attention of farmers and health services towards them will result in the future reducing of exposure to noxious agents. This may be achieved through work planning, as well as through the introduction of appropriate production methods and safer machinery.

Radoslaw Spiewak, MD
Dermatologist & Senior Researcher
Department of Allergology and Aerobiology
and
Outpatient Department of Occupational Diseases
in Agriculture
Institute of Agricultural Medicine
Instytut Medycyny Wsi
Jaczewskiego 2
20-950 Lublin, Poland