

## Current changes in agriculture in Southern Brazil: *Lolium* and polinosis in “a new vision”

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Dear Editor,

*Lolium multiflorum* (LOM), called annual ryegrass, is an exotic grass, native to the European Mediterranean region. It has adapted perfectly to the geo-climatic conditions of southern Brazil, serving as an excellent pasture and forage, especially in the autumn/winter period.<sup>1</sup>

When cultivated, it maintains a seed bank in the soil, which grows spontaneously over the years, with natural reseeding.

LOM, also referred to as ryegrass, is characterized by making a prodigious allergenic pollen production. When dispersed in the air, it produces rhinoconjunctivitis and/or seasonal bronchial asthma, during spring, in previously sensitive individuals.<sup>2</sup>

Such grass was initially selected in some regions of southern Brazil as winter pasture, following its use for another purpose, the so-called “direct planting in straw”, a new conservationist agricultural practice.<sup>1</sup> It was considered one of the bases for covering the soil without its revolving (maintaining physical, chemical and biological properties) essentially in summer crops, such as soybeans and corn.

LOM can also be ecologically considered an invasive grass, which can exist on the outskirts of cities, in abandoned land, along highways, among other places. It has an anemophilous pollen, highly allergenic which affects the atopic population especially in the spring period, in southern Brazil.<sup>2,3</sup>

It was previously characterized through epidemiological studies, which associated agriculture/soybeans with the presence of ryegrass. In Santo Ângelo (Missions region – RS), a 22.1% prevalence of pollinosis was obtained in the

adult population.<sup>4</sup> In parallel and identical methodology, through a written questionnaire (International Study of Asthma and Allergies in Childhood), validated in Curitiba, a population of Brazilian Army soldiers ( $n= 3,028$ ) was studied in two large regions (Missões and Pampa - RS). A prevalence rate of 21.6% was obtained in the region of Missões, where extensive soy farming (summer), intercropped with ryegrass (winter) predominated. In the Pampa region, there was a prevalence of 3.2%, with a predominance of extensive cattle raising (borders with Uruguay and Argentina), in natural vegetation.<sup>5</sup> It is assumed that there are no skin tests for grass pollen and/or quantification of grass pollen specific IgE, which would confirm the diagnosis, however, the similar prevalences of pollinosis (22.1% and 21.6%) would not simply be a matter of chance.

Modifications in agricultural practices, including wheat cultivars with high genetic improvement and productivity, and high consumption in the Brazilian market, reactivated its cultivation by agricultural producers in extensive areas in southern Brazil, in the winter period. It was found that that could replace ryegrass with the advantage of also producing straw for soil protection in soybean crops. The same happens with black oats (*Avena strigosa*), a type of grass that has characteristics of self-pollination, that is, without pollen dispersion. The ryegrass is now “unwanted” because, through a bank of residual seeds in the soil, it behaved like a “weed” competing with summer crops such as soybeans and corn and/or also with wheat itself in the following year.<sup>6</sup> In addition, ryegrass has become resistant to herbicides in some areas, including glyphosate, an important fact for farmers.

One consideration, from an ecological point of view, is that there would be a potential for the growth of various types of vegetation, including ryegrass, in fallow areas (without crops), during the winter period, waiting for the land to be later planted with soybeans or corn in the summer. Current agronomic information invalidates this hypothesis, as farmers have machines and land to use for an extra gain with winter crops such as wheat, eliminating all kinds of “weeds” before cultivation.

In 2019, the state of Rio Grande do Sul (RS) was the largest wheat producer in Brazil, responsible for more than 42% of production (Source: *Radiografia da Agropecuária*

Gaúcha, 2020). These facts are similarly verified in the State of Paraná, a great producer of wheat and soybean, often surpassing RS.

We had the opportunity to observe new changes in the cultivation of wheat, in personal contact with rural producers in the region of Missões, on field days, adding a route of approximately 300 km on inland roads, bordering crops.

Although, from an ecological point of view, we have the opportunity to relate this to the possible decrease in the prevalence of pollinosis and pollen dispersion in wheat areas, previously taken up with ryegrass, there is no aerobiological data that could be analyzed together to confirm the hypothesis.

Doctors, especially allergists, with the current changes in wheat agriculture, would have some “good news” associated with pollinosis sufferers, not only because of sensitization to grass pollen, but mainly because of the intensity and incidence of symptoms. A practical visit to the field could be “planned” together with agronomists or rural producers.

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