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# CROP PESTS AND DISEASES IN THE SAHEL

## THE POTENTIAL IMPACT OF CLIMATE CHANGE

### CONTEXT

Most climate models project that temperatures will increase throughout the Sahel as a result of climate change. Conversely, there is significant uncertainty around the effects of climate change on precipitation, though, on average, models suggest there will be a slight increase in annual rainfall in the central Sahel and a decrease in the west. Climate change may also affect the onset of the rainy season and cause an increase in extreme events. These changes may affect the risks associated with diseases and pests that afflict agricultural crops.

### FINDINGS

The report, “Agricultural Adaptation to Climate Change in the Sahel: Expected Impacts on Pests and Diseases Afflicting Selected Crops,” catalogs the current prevalence and impact of pests and diseases on 16 of the most important crops grown in the Sahel. Peer-reviewed scholarly journals identify and describe about 100 diseases and pests that currently affect these 16 crops. The full report includes profiles of each pest and disease. It lists the damage caused by each (by phenological stage, whenever possible), the mode of transmission, the overall impact of the pest or disease, and the environmental conditions that affect its spread. While these environmental conditions most often are related to climate, other factors, such as soil moisture, shade, wind, or other vectors, also have effects. Where possible, the effects of intra-annual events on pests or diseases are noted. The study also identifies how projected future conditions may affect each pest or disease.

Given the high uncertainty around future rainfall, this study uses two simplified scenarios for climate conditions for 2025 — hot and wet, and hot and dry — to make rough projections concerning the possible effects of climate change on the risk factors for those pests and diseases.

As noted, changes unrelated to climate will also affect the risks of pests and diseases in the Sahel. In addition, farmers will adapt new techniques for managing pests and diseases and will likely adopt varieties and crops with different levels of resistance to certain pests and diseases. Expansion into other types of land may also affect risks.

A sample entry, on the cotton aphid, is included on the following page.

| FIBER CROPS   |   |
|---|---|
| COTTON  |   |
| COTTON PESTS  |   |
| <p><b>COTTON APHID</b></p> <p><i>Aphis gossypii</i></p> <ul style="list-style-type: none"> <li>• <b>Damage:</b> Initially leaves will yellow, and with an increasing number of aphids, the leaves will begin to curl. Continuing infestation can cause stems to become stunted and twisted. Leaves can be damaged to such an extent that they wilt and fall off. The effects of chlorosis and heavy sap loss through sucking severely reduce plant growth and health. The honeydew forms a sticky film on the leaves and supports sooty mold growth. This action impairs photosynthesis, weakening the plant even further. It may render fruits unmarketable.</li> <li>• <b>Mode of transmission:</b> Infestation depends on environmental conditions that favor population development and migration to favorable places.</li> <li>• <b>Impact:</b> Like most aphids, <i>A. gossypii</i> is an important virus vector; it can transfer about 70 different types, some of which may cause more damage than the aphid itself.</li> </ul> |   |
| Environmental Conditions  | Climate Change Impacts  |
| <p>In temperate regions, <i>A. gossypii</i> is partly holocyclic; but in warmer areas, it will always reproduce asexually.</p> <p>Significant damage appears more likely when environmental conditions such as dry weather are already stressing cotton growth.</p> <p>It is unusually resistant to summer heat for an aphid. The generation time can be reduced under favorable conditions, so that it can produce up to 60 generations per year.</p>  | <p>Hot/Wet</p> <p><b>Low risk of infestation of Cotton Aphid</b></p>  |
|   | <p>Hot/Dry</p> <p><b>High risk of infestation of Cotton Aphid</b></p> |

## ADDITIONAL INFORMATION

This brief highlights key conclusions from Del Rio, A. (2014). *Agricultural Adaptation To Climate Change in the Sahel: Expected Impacts on Pests and Diseases Afflicting Selected Crops*. USAID. Interested readers are invited to review the full paper at <http://community.eldis.org/ARCC/>.