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POTENTIAL EFFECTS OF CLIMATE CHANGE ON CROP POLLINATION

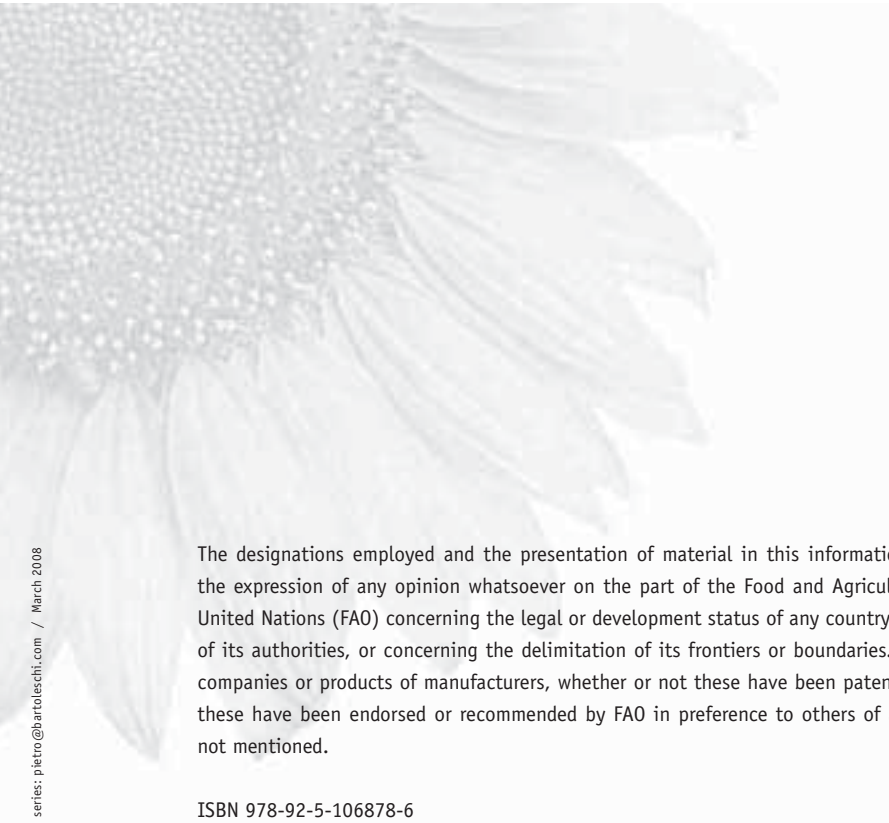




POTENTIAL EFFECTS OF CLIMATE CHANGE ON CROP POLLINATION

Mariken Kjøl, Anders Nielsen and Nils Christian Stenseth

Centre for Ecological and Evolutionary Synthesis (CEES),
Department of Biology, University of Oslo, Norway



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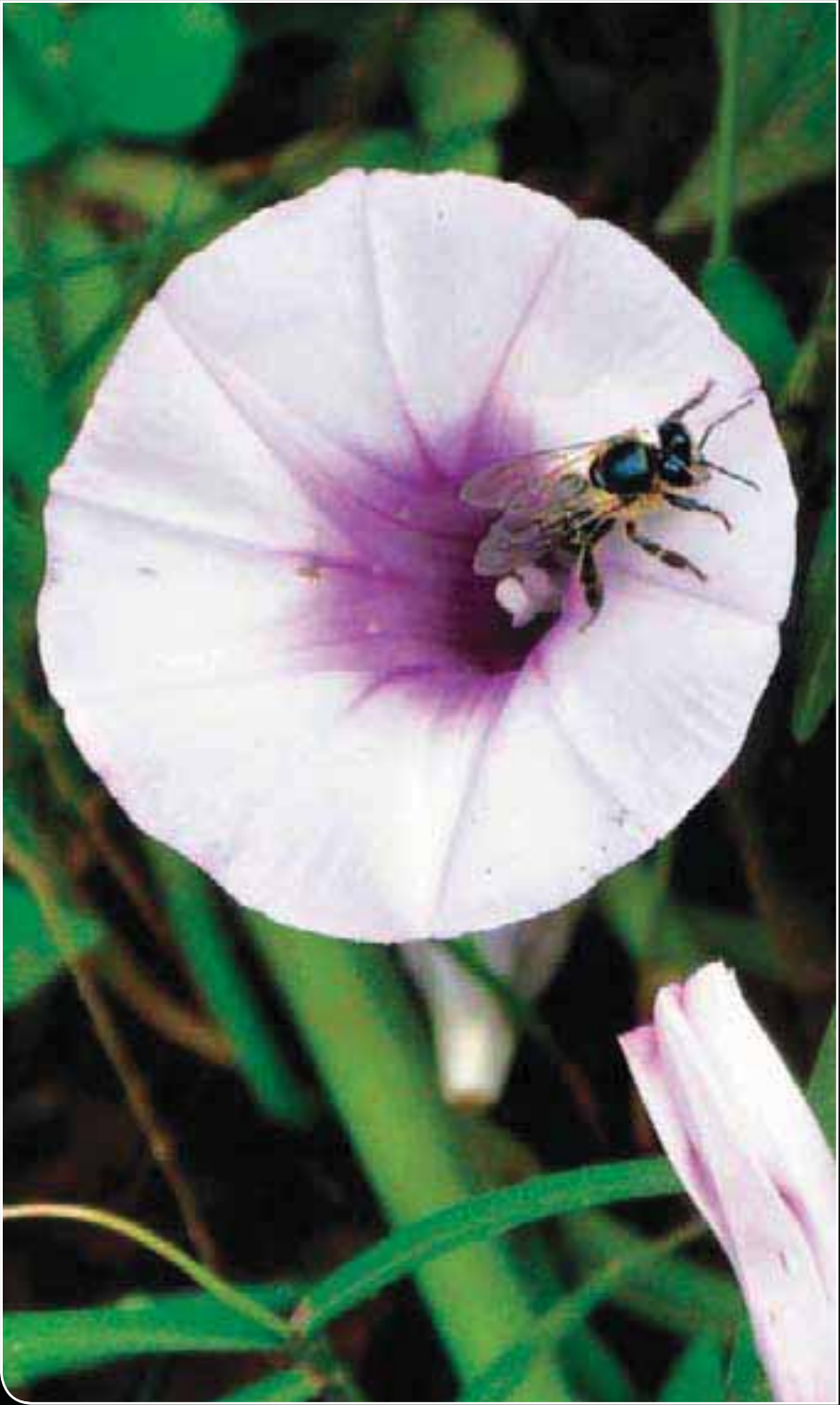
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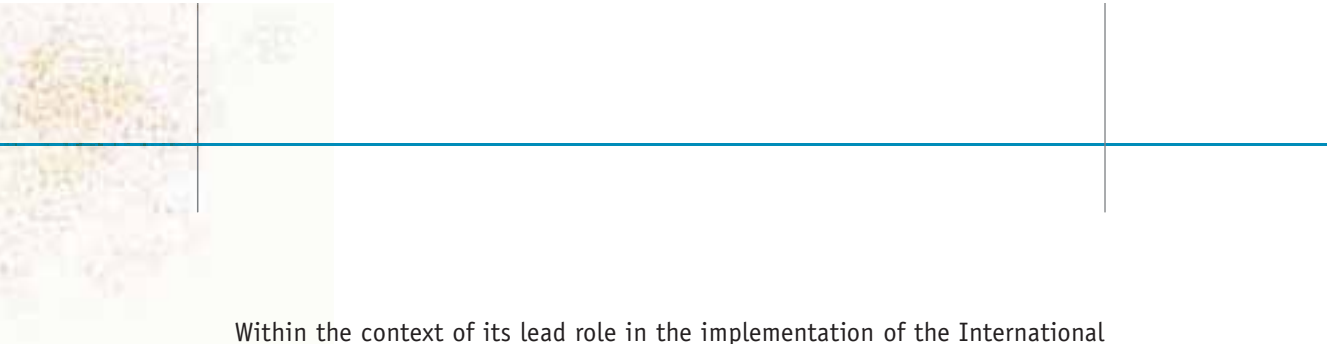




PREFACE

Crop production must meet the demands of feeding a growing population in an increasingly degraded environment amid uncertainties resulting from climate change. There is a pressing need to adapt farming systems to meet these challenges. One of agriculture's greatest assets in meeting them is nature itself: many of the ecosystem services provided by nature – such as nutrient cycling, pest regulation and pollination – directly contribute to agricultural production. The healthy functioning of these ecosystem services ensures the sustainability of agriculture as it intensifies to meet growing demands for food production.

Climate change has the potential to severely impact ecosystem services such as pollination. As with any change, both challenges and opportunities can be expected. Recognizing that the interactions between climate, crops and biodiversity are complex and not always well understood, the Plant Production and Protection Division of FAO has coordinated this review of the potential effects of climate change on crop pollination. By taking a comprehensive, ecosystem approach to crop production, it may be possible to build in greater resilience in farming systems, and to identify broader options for crop production intensification through the deliberate management of biodiversity and ecosystem services.



Within the context of its lead role in the implementation of the International Initiative for the Conservation and Sustainable Use of Pollinators, also known as the International Pollinators Initiative (IPI) of the United Nations Convention on Biological Diversity, established in 2000 (Conference of Parties decision V/5, section II), FAO has developed a Global Action on Pollination Services for Sustainable Agriculture. This report serves as a contribution by FAO's Global Action on Pollination Services to the objectives of the IPI, specifically its first objective to "Monitor pollinator decline, its causes and its impact on pollination services".

Shivaji Pandey

Director, Plant Production and Protection Division
Agriculture and Consumer Protection Department
Food and Agriculture Organization of the United Nations

INTRODUCTION

Objectives of the report

One of the most important ecosystem services for sustainable crop production is the mutualistic interaction between plants and animals: pollination. The international community has acknowledged the importance of a diversity of insect pollinators to support the increased demand for food brought about by predicted population increases. Insect pollination is threatened by several environmental and anthropogenic factors, and concern has been raised over a looming potential pollination crisis.

The Intergovernmental Panel on Climate Change (IPCC) reports an approximate temperature increase ranging from 1.1-6.4°C by the end of this century. Climate change will exert great impacts on global ecosystems. A recent review has emphasized that plant-pollinator interactions can be affected by changes in climatic conditions in subtle ways. Data on the impacts of climate change on crop pollination is still limited, and no investigation has yet addressed this issue. This report aims to:

- provide a review of the literature on crop pollination, with a focus on the effects of climate change on pollinators important for global crop production;
- present an overview of available data on the temperature sensitivity of crop pollinators and entomophilous crops; and
- identify data needs and sampling techniques to answer questions related to effects of climate change on pollination, and make recommendations on the recording and management of pollinator interactions data. This includes important environmental variables that could be included in observational records in order to enhance the knowledge base on crop pollination and climate change.



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