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INVASIVE APPLE SNAILS (*POMACEA* SPP.) IN MYANMAR: CURRENT DISTRIBUTION, DAMAGE AND MANAGEMENT

Invasive apple snails (*Pomacea maculata*, and perhaps also *Pomacea canaliculata*), were first introduced to Northern Shan State, Myanmar, from the People's Republic of China in the early 1990s as food for humans. Aside from their deliberate introduction as food for humans, and for biological control of aquatic weeds in lakes, other pathway for their spread are river floods during the rainy season. However, a few years after the introduction, these non-native apple snails quickly spread to many parts of the country, through irrigation canals, irrigated fields, rivers, waterways, and waterlogged areas, and has become a major pest of rice damaging nurseries, direct-seeded rice (see picture on the left) and newly transplanted rice. The exact area infested by invasive apple snails is not known, because of the lack of systematic field surveys. However, during the rainy season, 100% damage to rice nurseries and young seedlings are not uncommon, and thus farmers are reluctant to grow rice. In the literature, many *Pomacea spp.* have commonly been referred to as golden apple snails, or GAS, often without clarifying specifically which species, was involved, or indeed simply assuming it to be *Pomacea canaliculata*. For clarity, this article avoids this ambiguous common name designation. Therefore, it is very difficult at this time to pinpoint the exact number of *Pomacea* species that have been introduced to Myanmar, unless preserved specimens are examined using molecular and morphological approaches. Correctly identifying the invasive species is one of the most fundamental prerequisites when attempting to control it.

Majority of the farmers resort to hand picking of snails and egg masses. Molluscicides application was the second most popular choice, followed duck herding and cultural measures.

Two kinds of synthetic molluscicides active ingredients are registered in Myanmar. The cost for molluscicides, hand pickings, and replanting ranged from 15,814 to 79,488 kyats/acre. More international, regional collaboration efforts are needed to develop sustainable, easy to-do, cost-efficient, and environment-friendly management techniques to reduce crop losses from invasive apple snail invasions in the changing climate.

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ISHS VITH INTERNATIONAL SYMPOSIUM ON TOMATO DISEASES

We are pleased to invite scientists, technicians, teachers, students, tomato producers and others with an interest in tomato diseases to the ISHS VIth International Symposium on Tomato Diseases in Taichung, Taiwan from 6-9 May 2019. Held every three years, this symposium brings together about 150 to 200 international experts from different fields to disseminate their progress and facilitate the exchange of research and ideas.

Symposium presentations on the theme of managing tomato diseases in the face of globalization and climate change will illuminate how higher temperatures, more intense heat waves and longer periods of drought, change in precipitation patterns, more frequent wildfires, and an increase in the number, duration and intensity of tropical storms are fostering the development and spread of tomato diseases and altering pest behavior and distribution.

Explore the latest advances in research on diseases of the world's most popular fruit vegetable in one of Asia's most well-developed and vibrant agricultural economies.

Expect plenary lectures, invited papers, and oral and poster presentations in the following categories:
1. Genetics and breeding for resistance
2. Food safety and postharvest diseases
3. Host - pathogen interaction
4. Ecology and epidemiology
5. Disease management

Invited speakers:
Prof. David M. Francis | Ohio State University
Dr. Moshe Lapidot | Institute of Plant Sciences, Israel
Prof. Shyi-Dong Yeh | National Chung Hsing University, Taiwan
Prof. William Earl Fry (Emeritus) | Cornell University
Dr. Kai-Shu Ling | USDA-ARS, U.S. Vegetable Laboratory
Dr. Nemo Peeters | INRA-CNRS, France

Registration is now open: https://whova.com/portal/registration/tomat_201805/
Registration includes access to all sessions; all lunches and coffee breaks; two dinners; field trip lunch, snacks, and transportation; gift bag; copy of the symposium proceedings published as a

volume of *Acta Horticulturae*.

For more information, check our web site https://2019tomato.org/

On behalf of the organizers:

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FIRST RESISTANT CACTUS ECOTYPES TO THE WILD COCHINEAL IDENTIFIED IN MOROCCO

Cactus is an important food and feed crop for small holder farmers in several countries in North Africa and Middle East (MENA). Cactus pear (*Opuntia ficus indica* L.) is a plant that is well adapted to drought and is largely grown in arid and semi-arid regions of the world. An important and drought tolerant crop, cactus has various and beneficial uses with both the fruits and the pads being used. The fruit is used for human consumption, as a dye, and in cosmetic products, while the pads are used as animal feed predominantly in the arid zones on degraded lands where shortages of water and feed resources are limiting factors for animal production. Cactus is also used as fuel by poor farmers in many countries and has an important role in soil and biodiversity conservation, and as an alternative source of flowers for bee keeping during droughts.

Unfortunately, this very popular crop is now threatened by a new invasive cochineal species, *Dactylopius opuntiae* that has been reported for the first time in Morocco in September 2014, in Saniat Berguig, region of Doukkala. This pest has spread to several other regions of Morocco and devastated large cactus plantations, inflicting heavy economic losses for the whole value chain. As part of the control strategy of *D. opuntiae* set by the Ministry of Agriculture, Marine Fisheries, Rural Development and Water and Forest in Morocco, a joint team of scientists from the National Institute of Agronomic Research (INRA) and the International Center for Agricultural Research in the Dry Areas (ICARDA) screened 249 ecotypes of cactus for resistance to this pest. These genotypes are of different cactus species from the

collection maintained at INRA, Morocco. The screening was carried out in the field under natural and artificial infestations. Eight ecotypes were found very resistant to the cochineal. These eight resistant ecotypes have been registered in the national cactus catalog under the names of *Marjana*, *Belara*, *Karama*, *Ghalia*, *Angad*, *Cherratia*, *Melk Zhar* and *Aakria.* Also, a timber park (picture above) with these resistant ecotypes to *D. opuntiae* was established. The use of these resistant cactus ecotypes through Pillar II of the Green Morocco Plan would re-establish cactus plantations in places where the pest has wiped out this crop and contribute greatly to the overall control strategy of the cochineal.

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IAPPS Mission: to provide a global forum for the purpose of identifying, evaluating, integrating, and promoting plant protection concepts, technologies, and policies that are economically, environmentally, and socially acceptable.

It seeks to provide a global umbrella for the plant protection sciences to facilitate and promote the application of the Integrated Pest Management (IPM) approach to the world's crop and forest ecosystems.

Membership Information: IAPPS has four classes of membership (individual, affiliate, associate, and corporate) which are described in the IAPPS Web Site www.plantprotection.org.

The *IAPPS Newsletter* welcomes news, letters, and other items of interest from individuals and organizations. Address correspondence and information to:

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