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Challenges and opportunities in management of emerging and alien invasive pest in peaches

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Biological invasions is a major threat to biodiversity, ecosystem function, sustainable agricultural production, agricultural cropping patterns, pesticide use, both national and regional economies and public health. Increased goods trading at a global scale, as well as, intensified human mobility that is reported over the last few decades tremendously increased the arrival of harmful organisms into novel areas. Climate change relaxes the barriers of surviving and reproducing into invaded areas substantially contributing to the successful completion of the invasion process. Hence, new pests are emerging as major issues for crop production and trading of agricultural commodities all over the globe. Peach is among the top fruit crops of the temperate zone that is currently phasing several challenges including management of endemic, emerging and alien invasive pests. Commercial peach orchards are intensively managed with frequent use of synthetic pesticides. Ban and use restriction of several insecticide groups, such as organophosphates and neonicotinoids in the European Union and limited availability of alternative plant protection option, is expected to further expose the European peach production to economic burden of unmanaged pest populations. Hence, the whole production system becomes more vulnerable to emerging and alien invasive insects that are frequently arriving in Europe. For example, several fruit flies (Diptera: Tephritidae) are expected to threaten peach fruit production in Europe in the near future. This group of pests include the Mediterranean fruit fly, which in response to climate change expands its geographic range from the coastal orchards of the Mediterranean to northern, cooler, and more continental areas where stone fruits such as peach are produced. In addition, the peach fruit fly, an aggressive invasive species has spread to north east Africa, recently invaded Middle East, and often arrives in Europe via trading of infested fruits. Bringing fruit flies as model organisms, the current paper outlines the challenges that peach production and trading is phasing because of emerging and invasive pest and introduces a strategic approach to manage biological invasions considering novel concepts and approaches.