

The potential suitability of Jiangsu Province, east China for the invasive red imported fire ant, *Solenopsis invicta*

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Abstract The red imported fire ant *Solenopsis invicta* Buren (RIFA), an invasive pest that has diverse detrimental impacts on the communities it invades, was recently discovered in China and has the potential to colonize numerous other regions. Using the model of Korzukhin et al. as modified by Morrison et al. and the biological and ecological characteristics of RIFA, we show that Jiangsu Province is a potentially suitable establishment area of RIFA. An isotherm map made by ArcMap, a Geographic Information System, indicated that several regions of Jiangsu Province (Changzhou, Liyang, Wuxian Dongshan, Nanjing and Lvsi) are at higher risk of *S. invicta* infestation, especially from late July and early August. Quarantine officials should be vigilant for any accidental introductions of this pest in the susceptible regions and time.

Keywords *Solenopsis invicta* · Suitability · Isotherm · GIS · Jiangsu Province of China

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Introduction

Increased global trade and travel have increased the risks of introducing exotic pests. Increased air temperatures resulting from global warming may alter the biogeographical range of such species, particularly ants (Morrison et al. 2005; Roura-Pascual et al. 2004). Exotic ants are among the most problematic invaders. Many ant pest species can be easily transported around the world by human commercial activities, especially for ants originating from tropical and subtropical regions (McGlynn 1999). Some of them have wide ranging deleterious impacts on the native fauna of invaded regions (Holway et al. 2002; Williams 1994; Human and Gordon 1997; Vanderwoude et al. 2000). They not only create ecological catastrophes but also cause great economic loss because of their aggressive nature and damage to crops (Shatters and Vander Meer 2000), cattle (Jetter et al. 2002), wildlife (Allen et al. 1997; Vinson 1997), species diversity (Mann 1994; Gotelli and Arnett 2000) and people (Caldwell et al. 1999; deShazo et al. 1999; Schuman et al. 2001).

Like many other ants, the red imported fire ant (RIFA), *Solenopsis invicta* Buren is a polyphagous, soil-inhabiting ant. It is thought to have originated from the Parana River drainage area of South America (Allen et al. 1995; Ross and Trager 1990; Mescher et al. 2003). In the mid 1930s, it was introduced into the United States at a port in Alabama