October 4, 2024

Dr. Joshua King
University of Central Florida
Biology Department
4110 Libra Drive
Orlando, Florida 32816 USA

To whom it may concern,
I am writing regarding concerns that I have about the ongoing red imported fire ant (*Solenopsis invicta*) plan as conceived and currently being carried out by the National Management Group's *National Fire Ant Eradication Program* and the Queensland Government and Biosecurity Queensland's *Fire Ant Suppression Taskforce* in Queensland and potentially other areas (e.g. New South Wales) in eastern Australia. As a point of reference, I and my research group have one of the most active, continuously (US) federally-funded research programs in the world with the specific aims of understanding the biology and ecology of fire ants and how fire ants interact with species in the ecosystems they invade. We work to translate our understanding of fire ant ecology into effective, real-world management solutions to problems associated with fire ant invasion. As such, I have also developed the only non-toxic management technology for fire ants that is currently in use in the US managing fire ant populations in sensitive environments (Environmentally safe insect control system. U.S. Patent No. 10,716,302. Inventor: Joshua R. King. Issued July 21, 2020) and in defense of threatened and endangered wildlife affected by fire ants. In short, I bring decades of experience with real-world interactions with fire ants in a variety of natural and human-modified environments in a region (the southeastern US) that has been entirely invaded by fire ants for more than 50 years.

My concerns with the fire ant eradication programs that are ongoing and developing in Queensland and New South Wales are focused on two issues:

1) Excessive, potentially ecologically harmful over-application of toxic baits.
2) Lack of alternative management approaches and tools, other than widespread application of (surface) broadcast baits.

I address each of these issues below and make specific suggestions for expanding the options for management of fire ants in the areas of concern.

<u>Excessive, potentially harmful over-application of toxic baits</u>

Underlying the entire eradication program, as currently being carried out, seems to be the assumption that eradication is feasible and ultimately justifies the methods being used to attempt to eradicate and prevent further invasion of Australia by the fire ant. It is very important to note that, in the face of ongoing introductions, no eradication program has ever succeeded in preventing fire ant establishment and spread over larger areas and longer time spans. This is not anecdotal but has unfortunately been repeatedly demonstrated. The clearest example is, of course, the successful invasion of the southern US, in the face of one of the largest invasive insect eradication programs in history. Ultimately, the attempts at eradication and prevention of further invasions by fire ants have not only failed but the very actions taken to eliminate the fire ant ultimately hastened its establishment and spread. Given the reality of this extremely challenging invasive species, and the lessons that failed eradications have taught us, it is extremely important that the *National Fire Ant Eradication Program* consider the costs and benefits of enacting widespread toxic baiting program. It is especially important that the potential

ecological costs (and other non-target impacts) of enacting such an eradication program in areas that are not yet invaded be weighed against the actual outcome of an invasion.

One of the specific issues of concern is that the toxic, prophylactic baiting is being conducted across the landscape, ignoring the reality of where fire ants are most likely to occur. The distribution of fire ants across the landscape is very predictable and ignoring what is known of their dispersal patterns and behavior during dispersal risks wasting time and resources (baiting in areas where fire ants are likely to never occur) as well as increasing the likelihood of non-target impacts. Fire ants thrive in early successional habitats (roadsides, suburban, and urban habitats created by human activity) with moist soils (maintained naturally or through irrigation). Queens actively seek out and found colonies in these areas (their dispersal is NOT random). They also thrive in a few kinds of agroecosystems, especially in ranching systems with ample soil moisture and little to no tree canopy and some types of irrigated row-cropping systems with some natural rainfall. Natural systems that are arid, have a complete or nearly complete tree or shrub canopy cover, or agroecosystems with similar features are unlikely to support fire ants, especially at densities that would be of economic or pest concern.

Of particular concern is that the widespread and prophylactic use of toxic broadcast baits may impact non-target ants (both pyriproxyfen and (S)-methoprene are insect growth regulators) as none of the bait products in use are "fire ant specific." Reduction of native ant communities has repeatedly been shown to be a factor in hastening, not slowing, the invasion of fire ants as any potential biotic resistance is removed, and fire ants are especially good at dispersing into ant-free successional habitats. Additionally, the potential for other non-target impacts on aquatic and terrestrial arthropods and wildlife is not trivial. In sum, there seems to be little justification for a prophylactic baiting program that has great potential for non-target impacts and that may, in fact, hasten the establishment of fire ants over time. The projected costs of fire ant establishment (largely extrapolated) will be more quickly realized if a widespread prophylactic baiting strategy is conducted without any regard to the known ecology of the invader. This seems incredibly short-sighted and ultimately runs counter to the goals of the entire program.

Lack of alternative management approaches and tools

The practical difficulties of slowing an invasion of fire ants are decidedly challenging. While use of toxic baits and contact insecticides (if used correctly and according to label instructions) are some of the best available tools, it is important that the *National Fire Ant Eradication Program* consider that there are significant shortcomings of a "pesticide only" approach to managing fire ants. Of particular concern, is the lack of inclusion of any approaches that mitigate non-target pesticide impacts in school yards, recreational areas, human food production agroecosystems, hay production agroecosystems, in close proximity to aquatic ecosystems of all types, certified organic agroecosystems, and in sensitive ecosystems where pesticide applications are neither desirable or (in some cases) not permitted. Through my work on the method and technology required to make the system effective, low-pressure hot water mound injection has now become an effective, entirely non-toxic alternative to pesticide applications for fire ant management that can be used as a stand-alone management tool or as a complement to baiting programs to help reduce the pesticide burden as needed. I encourage the program to consider the supporting materials I am providing and to work to integrate the technology and method into the broader fire ant management tool-kit.

Hot water is in increasing use here in the US to manage fire ants in sensitive wildlife areas and organic farming systems where pesticides cannot be used. It is a viable management

tool, ready for use, and I look forward to helping the *National Fire Ant Eradication Program* adopt the method and technology for use in their program. In summary, I strongly disagree with the current prophylactic approach to fire ant management and suggest that alternative approaches, like the hot water method, to fire ant management be considered. The current approach is not sustainable, excessively costly, and ultimately may hasten fire ant spread and establishment. This outcome runs directly counter to the goals of the Australian government's fire ant management program.

Kind regards,

Joshua King

Dr. Joshua King
Professor

email: joshua.king@ucf.edu
voice: (407) 988-5992