WEED SCIENCE SOCIETY OF AMERICA
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October 5, 2016

Docket ID: **EPA-HQ-OPP-2013-0266**

Environmental Protection Agency Docket Center (EPA/DC)
(28221T)
1200 Pennsylvania Ave, NW
Washington, DC 20460-0001

Re: **Atrazine: Draft Ecological Risk Assessment.**

The Weed Science Society of America (WSSA) is very concerned about the potential loss of atrazine and simazine as integrated weed management tools and appreciates the opportunity to submit comments on EPA's draft ecological risk assessment. The WSSA was founded in 1956 as a non-profit professional society that fosters an awareness of weeds and their impact on our environment. We provide science-based information to the public and government policymakers while promoting research, education, and outreach activities.

The WSSA is aware of concerns raised by various stakeholders relative to the Agency's draft ecological risk assessment for the triazines. These concerns include:

- errors in endpoint data and the water monitoring database
- use of models that are not validated with field data
- estimates of inflated hypothetical risks (e.g. atrazine applications resulting in 36% bird mortality) that have not been observed in over 55 years of atrazine use
- use of data or findings not conducted in accordance with EPA's scientific guidelines required under FIFRA
- ignoring the advice and findings of previous Science Advisory Panels on atrazine

The WSSA stresses the importance of addressing these concerns in order to maintain stakeholder confidence in the Agency's science-based regulatory framework. However, our main concern, based on the current ecological draft risk assessment, is that atrazine and simazine would be restricted to less than 0.25 lbs a.i./A and 0.5 lbs a.i./A, respectively. At these low rates, atrazine and simazine would not provide efficacious weed control (Armel et al., 2007; Bollman et al., 2006; Johnson et al., 2005; Liu and O'Connell, 2003; Yu and McCullough, 2016). In addition, using sub-lethal rates of atrazine or simazine is not an effective option for resistance management as it has been shown that this practice is likely to result in weeds with multiple-site or polygenic resistance (Busi et al., 2016; Norsworthy et al., 2012) which would make it more difficult to control these weeds.

The importance and value of atrazine in integrated weed management programs cannot be overstated (Johnson et al. 2005). Atrazine is used on approximately 60% of corn, 65% of sorghum, 70% of sugar cane, and 70% of sweet corn acres in the United States and is a critical and economical weed management tool, particularly for herbicide resistance weed management. Sweet corn production may actually be most impacted by the loss of atrazine because sweet corn has fewer registered herbicides and is a weaker competitor with weeds due to limited seedling vigor and lower seeding rates compared to conventional field corn (Williams II et al., 2010). **Most of our extension weed scientists have expressed that the loss of atrazine would be devastating from an integrated weed management perspective.**

Simazine is an important management tool for weed control in vineyards, citrus, fruit, and nut orchards, and other perennial crops because of its relatively low price, reliable control of several problem weeds including horseweed (*Conyza canadensis*), hairy fleabane (*Conyza bonariensis*), and junglerice (*Echinochloa colona*), and strong residual activity (Abit et al., 2012; Kadir and Al-Khatib, 2006; Liu and O'Connell, 2002; Tworkoski et al. 2000). The continued use of simazine in these perennial crops where herbicide options are limited is essential to maintaining herbicide diversity and mitigating weed resistance.

Simazine is also an important herbicide treatment in the fall prior to planting corn in the southern Corn Belt for control of glyphosate-resistant horseweed and other winter annual grass and broadleaf weed species (Krausz et al., 2003; Monnig and Bradley, 2008). Fall herbicide applications target winter annual weeds at their vulnerable seedling stage, allow growers and applicators to better manage their spring workload and reduce tillage operations in the subsequent spring. Fall applications may also eliminate or reduce the need for a burn-down herbicide application before planting no-till corn.

Atrazine and simazine have been important for increasing conservation tillage and no-till farming. Atrazine helps farmers reduce aggregate soil erosion by up to 85 million tons per year and saves them 18 million gallons of fuel due to reduced tillage requirements (Mitchell, 2011). Banning atrazine and simazine would greatly diminish the vital conservation efforts of farmers by increasing both soil erosion and the use of fossil fuels. It is estimated that the net economic benefits generated by triazine herbicides exceeds $3 billion per year in the United States (Bridges, 2011, Mitchell, 2014).

While weeds with triazine resistance (WSSA Group 5, Photosystem II inhibitors) have been reported since the 1970's, the occurrences per year, area infested and severity of infestations have declined since 1984 (LeBaron, 1998). In addition, many of the agronomically important triazine-resistant weeds **demonstrate a significant fitness penalty.** For example, Ahrens and Stoller (1983) demonstrated that triazine-resistant smooth pigweed (*Amaranthus hybridus*) produced less shoot biomass and seed dry weight under competitive conditions and exhibited a significantly lower relative growth rate and net assimilation ratio compared to a triazine-susceptible biotype. Thus, many triazine-resistant weeds are not as competitive within integrated crop production systems (Holt et al., 1993; Owen, 2011, Parks et al., 1996; Williams II et al., 1995). Conrad and Radosevich (1979) concluded that triazine-resistant redroot pigweed (*Amaranthus retroflexus*) and common groundsel (*Senecio vulgaris*) were less fit than their respective wild types under both competitive and non-competitive conditions. They concluded that triazine resistance was only a benefit to plants where triazine herbicides are used repeatedly.

Triazine-resistant weeds may differ not only in their fitness and vigor, but also in their sensitivity to herbicides compared to their triazine-susceptible biotypes (Owen and Gressel, 2001; Parks et al., 1996). If the resistant biotype is easier to control with alternative herbicides, this phenomenon is referred to as **negative cross-resistance**. For example, Gadamski et al. (2000) reported that atrazine-resistant horseweed (*Conyza canadensis*) and barnyardgrass (*Echinochloa crus-galli*) were significantly more sensitive or negatively cross-resistant to 11 of 18 herbicides that were tested. The continued use of atrazine as a principle tactic for weed management in corn, sorghum and sugarcane production is testament to the fact that triazine-resistant weeds do not have a major economic impact and can be effectively managed (Owen, 2011).

In closing, **WSSA supports the continued use of atrazine and simazine with appropriate provisions to steward their safe use and provide for their continued efficacy.** Careful consideration should be given to whether a decision to further restrict or ban triazine herbicides will inadvertently exacerbate other ecological risks and issues surrounding other herbicides and products. Atrazine and simazine are critical for integrated weed management programs and mitigating resistant weeds. WSSA encourages EPA to find a balance between the environmental effects and the benefits triazine herbicides provide because no alternative herbicides with equal economic and agronomic attributes are available at this time. WSSA appreciates the opportunity to comment on this critical weed management issue and gladly offers the expertise of our members to answer any questions the Agency may have as it proceeds.

Sincerely,

Dr. Kevin Bradley
President
Weed Science Society of America

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