

Chemical regulation of plant hormone functions and their cross talk: SL, GA, BL and Et

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Plant hormones are biosynthesized and perceived by their receptors and then elicit their activity to regulate plant life cycles. Various steps in the life cycles of plants can be modulated by each of hormones, sometimes in a synergistic fashion, suggesting physiological redundancy and/or crosstalk between the different pathways. As small molecules can be used to unravel these plant hormone functions, many chemicals that can dissect plant hormone functions have been developed and accelerate our understanding of plant hormone signaling. In this context, we developed several chemical regulators for plant hormone functions, such as biosynthesis inhibitors, catabolism inhibitors, receptor inhibitors and mimics. Here, we will talk about the development and/or characterization of known or new chemical regulators mainly for GA and SL from the viewpoint of the reduction of crop damage by root parasitic weeds.

1. AC94377 is a GID1 agonist that preferentially binds a specific GID1 to activate the GA signal in Arabidopsis.
2. Debranones are SL functionally selective mimics.
3. KUT15 is an ethylene mimic that partially activates ethylene signal.

These chemicals can control damage by root parasitic weed such as Striga.

- AC94377 can reduce SL production in rice.
- Debranones reduce SL production maybe by feedback regulation.
- KUT15 can induce suicidal germination of Striga and can reduce the seedbank of Striga.