VEGATATIVE PROPAGATION OF COMMON WATERHEMP. Christopher L. Schuster and Reid J. Smeda, Graduate Research Assistant and Assistant Professor, Agronomy Department, University of Missouri, Columbia, MO 65211.

Common waterhemp, a dioecious plant, exhibits broad genetic diversity. Identification of herbicide resistance in a mixed population of resistant and susceptible plants may not be possible without several generations of selection for resistant only plants. Identification of specific resistant plants and asexual propagation of those plants may permit studies to determine the extent and basis for resistance. Experiments were conducted in a controlled environment to determine an optimal procedure to asexually propagate common waterhemp. Shoot cuttings were taken from the tips of vegetatively mature common waterhemp plants. Vegetative propagation of plants was accomplished by water-based culture (hydroponics), mist chamber with plants rooted in vermiculite, and traditional transplanting methods (shoot cuttings placed in soil). The hydroponics methods of propagation included solutions of softened tap-water and of a nutrient enriched Hoagland's solution placed in black polypropylene containers. The bottom 4 cm of shoot cuttings was immersed in solution. The container was aerated by use of an aquatic pump. Mist chamber methods consisted of polypropylene trays containing vermiculite, placed into a mist chamber with a misting frequency of 30 seconds every 12 minutes. Shoot cuttings were placed upright in the vermiculite trays, with the bottom 5 cm covered. Prior to placement in the vermiculite trays, half of the shoot cuttings were dipped into a rooting hormone powder, Rootone®. The four methods of propagation were compared to a control, in which cuttings were placed directly into an artificial soil. Treatments were harvested at 4, 8, 12, 14, and 16 days after propagation, with root length, root weight, shoot length, and shoot weight recorded. At each harvest date three plants from each treatment were also placed into an artificial soil for 2 weeks to determine transplant efficiency. The emergence of shoot-borne roots was first recorded on day 8 for cuttings placed into the hydroponics solutions or mist chamber, and on day 12 for the shoot cuttings propagated in artificial soil. Root formation occurred around the circumference of the stem, and along the interveining length of the first internode. By day 16, root growth in Hoagland's solution was 5 to 9-fold greater than cuttings propagated by other methods. The cuttings propagated in Hoagland's solution obtained 32, 87, and >89% more shoot weight gain than other treatments at days 12, 14, and 16, respectively, in the transplant efficiency study. Entire plants can be obtained within 8 days of propagating shoot cuttings in water culture. These results indicate that the optimal procedure to propagate waterhemp cuttings is to use a water culture technique with a Hoagland's solution.

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