

Push-pull-Technologie

Push-pull-Technologie ist eine Methode zur biologischen Schädlingsbekämpfung. Dabei werden innerhalb der Kultur Pflanzen mit abstoßender, um die Kultur solche mit anziehender Wirkung verwendet um die Insekten von den Nutzpflanzen zu vertreiben (push) bzw. zu locken (pull).

Entwicklung

Der Befall durch Stengelbohrer, einen Verwandten des europäischen Maiszünslers, führt zu erheblichen Ernteverlusten für die Kleinbauern Ostafrikas. Weitere Probleme sind das parasitische Strigakraut und der niedrige Nährstoffgehalt der tropischen Böden. Pestizide und Dünger sind für die Subsistenzbauern unerschwinglich. Zur Bekämpfung des Stengelbohrers wurde am International Centre of Insect Physiology and Ecology (ICIPE) unter dem Leiter Hans Rudolf Herren in Zusammenarbeit mit dem Kenyan Acriculture Research Institut (KARI) und Rothamsted Experimental Station die Push-pull-Technologie entwickelt. Dabei wurde entdeckt, dass Desmodium nicht nur die Motten des Stengelbohrer abstößt, sondern auch das Striga abtötet^[1].

Wirkungsweise

Desmodium als Repellent wird zwischen die Reihen von Getreide gepflanzt, während Napiergras (*Pennisetum purpureum*), auch *Elefantengras* genannt, als „Falle“ in einem Gürtel um das Feld gepflanzt wird. So werden die Stengelbohrermotten vom Getreide weg zum Napiergras hin gelockt, um dort ihre Eier statt auf den Blättern des Getreides abzulegen. Abstoßende als auch anziehende Wirkung beruhen auf so genannten Blatt-Volantilen, die mit Geruchsstoffen verglichen werden können und den Insekten zur Orientierung und zum Auffinden der Wirtspflanze dienen. Napiergras als auch Desmodium sind mehrjährig und können problemlos über zehn Jahre bestehen bleiben. Ist das Getreide geerntet, werden die Getreidereihen gehackt oder gepflügt, während die Reihen von Desmodium und Napiergras vor der erneuten Aussaat lediglich zurückgestutzt werden.

Bekämpfung des Stengelbohrer

Während das Desmodium Volatile ausstößt, die Stengelbohrer abstoßen, produziert das Napiergras einen Volantil-Mix, der dem des Getreides gleicht. Allerdings in viel größeren Mengen als dies beim Getreide der Fall ist, so dass das Stengelbohrerweibchen seine Eier vorzugsweise auf den Blättern des Napiergrases ablegt. Wenn die daraus schlüpfenden Larven in den Stängel des Grases einzudringen versuchen, produziert dieses eine schleimige Substanz, die den Schädling abtötet.

Bekämpfung von Striga

Das parasitische Striga keimt, wenn der Samen die Gegenwart von so genannten Wurzelexsudaten wahrnimmt, die von den Maiswurzeln abgegeben werden. In der Folge heftet es sich an diese und entzieht der Maispflanze Zucker. Das Desmodium produziert Wurzelexsudate, die ebenfalls die Keimung des Strigasamens anregen, gleichzeitig aber auch Stoffe, die den Keim sogleich abtöten. So werden die Samen nicht nur an der Entwicklung gehindert, sondern aktiv aus dem Boden entfernt. Das ist wichtig, da eine einzige Striga-Pflanze bis zu 20.000 Samen produziert, welche im Boden bis zu 20 Jahre keimfähig bleiben.^[1]

Verbesserung der Bodenfruchtbarkeit

Wie alle Leguminosen kann *Desmodium* atmosphärischen Stickstoff organisch binden und so für sein Wachstum und das der umliegenden Pflanzen verfügbar machen. Bei den Forschungsarbeiten am ICIPE wurde festgestellt, dass die frei gesetzte Menge von Stickstoff ziemlich genau der entspricht, die Mais für ein optimales Wachstum braucht. Außerdem wird durch absterbende Blätter und Wurzeln des *Desmodium* dem Boden organisches Material zugeführt, was die Bodenorganismen fördert und die Nährstoffverfügbarkeit erhöht.

Versorgung mit Viehfutter

Napiergras ist sehr schnell wachsend und wird bis zu vier Meter hoch. Teile des Napiergras-Gürtels können geerntet werden, ohne die Schutzfunktion zu beeinträchtigen und dienen als Viehfutter. Auch das *Desmodium* kann, wenn es nach der Ernte zurück geschnitten wird, als Futter dienen. Das Gemisch der beiden Pflanzen ist nährstoffreich und steht in der Trockenzeit zur Verfügung, wenn andere Futterquellen versiegen.

Weitere positive Effekte

Durch die Bodenbedeckung des *Desmodium* wird der Boden vor Erosion geschützt. Außerdem ist die Verdunstung durch die erhöhte Beschattung gehemmt und der Wasserrückhalt verbessert. Die Samen des *Desmodium* können geerntet und verkauft werden. Der Erlös von 600KSh^[2] (rund 6,50 Eur pro Kilogramm) ist eine willkommene Bargeldquelle.

Einzelnachweise

[1] Khan ZR, Hassanali A, Khamis TM, Overholt WA, Hooper AM, Pickett JA, Wadhams LJ, Woodcock CM. 2002. Control of the witchweed, *Striga hermonthica*, by intercropping with *Desmodium* spp., and the mechanism defined as allelopathic. *Journal of Chemical Ecology* 28: 1871-1885.

[2] pers. komm. Western Seeds Company

Weblinks

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- Homepage des International Center for Insect Physiology and Ecology (in Englisch) (<http://www.icipe.org/>)
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