

Impacts of Herbicides on Biodiversity

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百草枯 Paracquat



500g

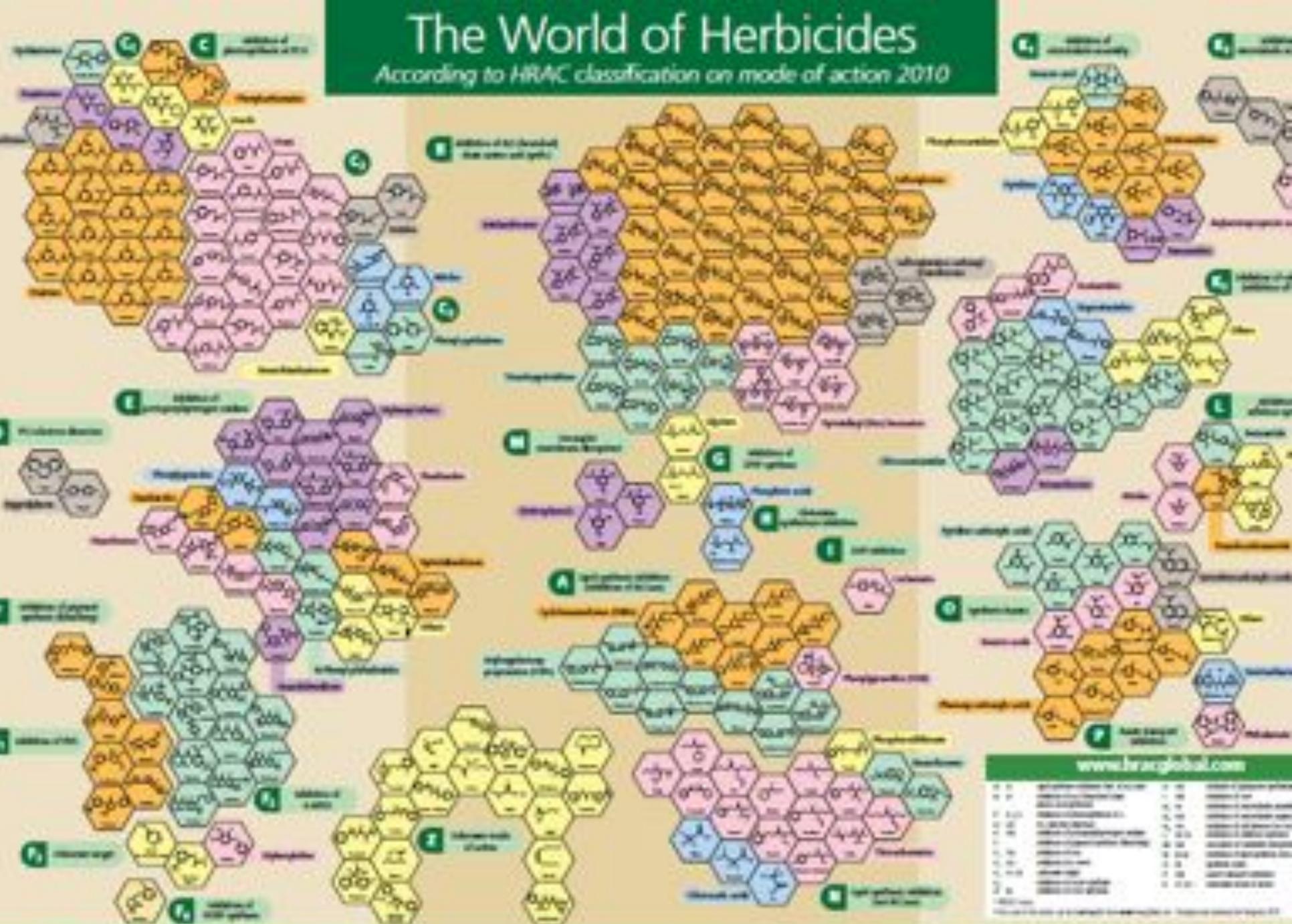
百草枯是一种快速灭生性除草剂，对多种一年生和多年生杂草具有特效。使用时，将药液兑水均匀喷洒于杂草上，即可达到除草目的。本品不含有机磷，对人畜安全，对环境友好。请严格按照说明书使用，切勿误食。





The World of Herbicides

According to HRAC classification on mode of action 2010



See what advertisements say



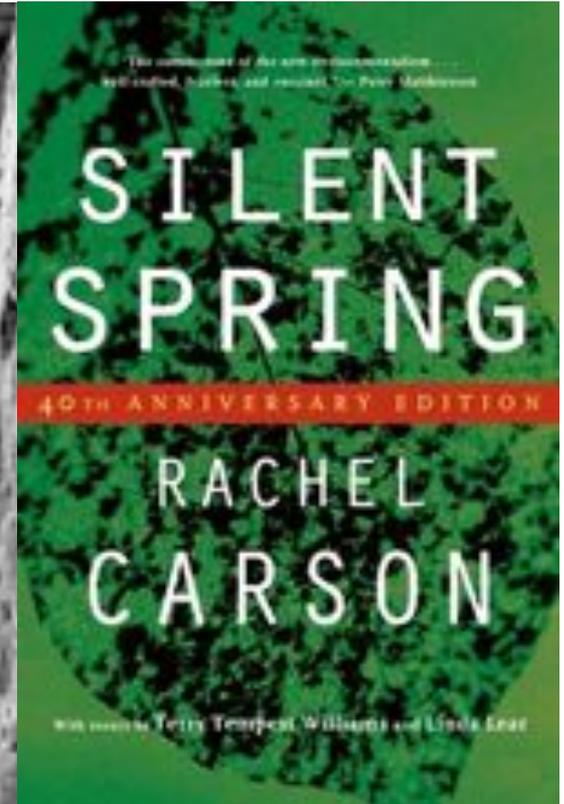
- Paraquat is one of the most widely used herbicides.
- Paraquat is used in over 100 countries;
- Paraquat is an essential tool for use in sustainable agriculture;
- Paraquat is poorly absorbed after oral administration
- Paraquat can not readily be absorbed through the skin
- Paraquat does not accumulate in soil
- Paraquat poses no risk to earthworms or soil microorganisms
- Paraquat poses no significant hazard to wildlife
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As a pessimistic observer,

- Paraquat is quick-acting and non-selective, killing green plant tissue on contact. It is also toxic to human beings and animals
- More than **20** countries banned the use of paraquat.
- In third world countries, paraquat is a major **suicide** agent
- Pure paraquat, when ingested, is **highly toxic** to mammals, including humans
- In 2011, a US National Institutes of Health study showed a link between paraquat use and **Parkinson's disease** in farm workers

Rachel Carson and *Silent Spring*

- Published in 1962.
- The book is widely credited with helping launch the environmental movement
- The book documented detrimental effects of pesticides on the environment, particularly on birds.
- It inspired widespread public concerns with pesticides and pollution of the environment



Why it's time for China to take action on herbicides management?

- 🌐 **EU** cancelled the register of **450** pesticides through reassessment procedure.
- 🌐 **USA** lists **64** Pesticides and adjusts the scope of certain Pesticides during the reregistration process.
- 🌐 **China** lists **18** banned pesticides and severely restricts the use of certain pesticides.

Death Villages in China



Yesterday's vision, Tomorrow's reality (motto of Goddard Center)

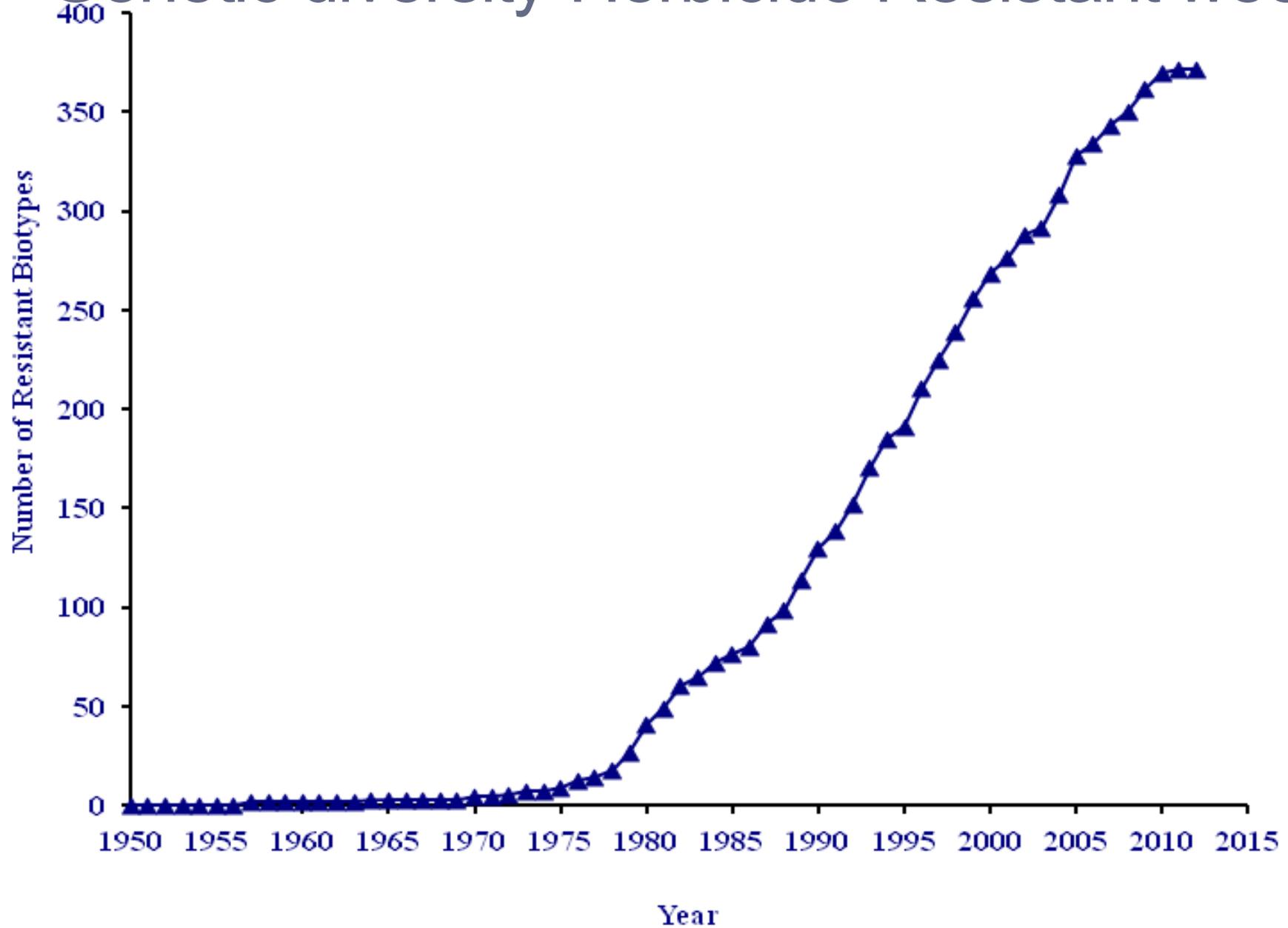
What did scientists find 50 years ago?
(*Silent Spring* written by Rachel Carson)

- **Attitude to nature:** narrow (have not changed till now)
- “If we see any immediate utility of a plant we foster it otherwise we destroy it, merely because they happen to be in the wrong place at the wrong time.”
- “**Weed killer” industry:** soaring sales and expanding uses mark the production of plant-killing chemicals.
- The earth's **vegetation** is part of a web of life in which there are intimate and essential relations between plants and the earth, between plants and other plants, between plants and animals.
- Such vegetation is also the habitat of wild bees and other pollinating insects.

Biodiversity

- Genetic diversity
- Species diversity
- Ecosystem diversity
- Landscape diversity
- Cultural diversity

Genetic diversity-Herbicide Resistant weeds



Monsanto-Roundup-Resistant Weeds

Invasion of superweeds



- “We are back to where we were 20 years ago,” said Mr. Anderson, who will plow about one-third of his 3,000 acres of soybean fields this spring, more than he has in years. “We are trying to find out what works.”
- To fight them, Mr. Anderson and farmers throughout the East, Midwest and South are being forced to spray fields with more toxic herbicides, pull weeds by hand and return to more labor-intensive methods like regular plowing.

Species Diversity

My Research and Experiment in Cibeiyu Village, Changping District, Beijing

- Why choose this village?

Collective Forest Tenure Reform
Property disorder and not clear
What farmers do

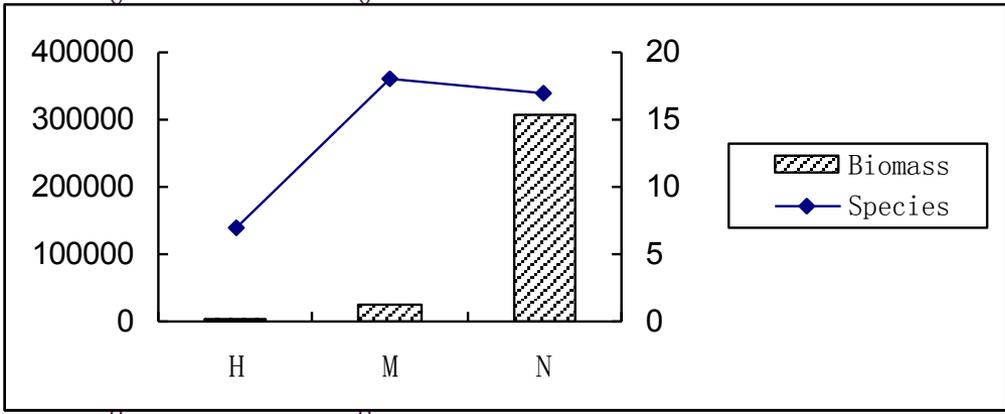
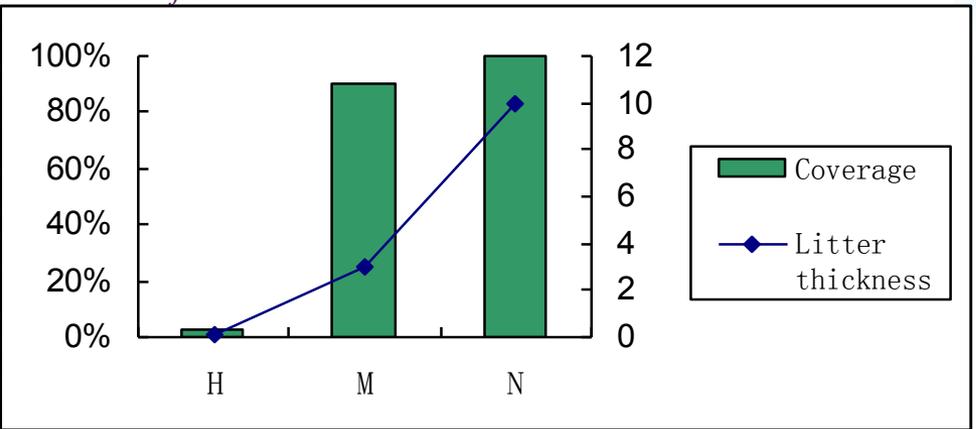


	Species	nature	hand	herbicide
1	<i>Artemisia argyi</i>	0	2	0
2	<i>Rumex patientia</i>	1	0	0
3	<i>Chrysanthemum morifolium</i>	0	2	0
4	<i>Imperata cylindrica</i>	0	6	0
5	<i>Chelidonium majus</i>	2	0	0
6	<i>Ixeris chinensis</i>	0	1	0
7	<i>Bidens biternata</i>	0	0	0
8	<i>Hemiphragma multiflorum</i>	0	0	0
9	<i>Cirsium japonicum</i>	0	0	0
10	<i>Rumex crispus</i>	0	0	0
11	<i>Aster ageratoides</i>	0	0	0
12	<i>Oxalis corniculata</i>	0	0	0
13	<i>Polygonatum sibiricum</i>	2	0	0
14	<i>Thalictrum flavum</i>	0	0	0
15	<i>Taraxacum officinale</i>	0	0	0
16	<i>Polygonatum sibiricum</i>	2	0	0
17	<i>Platycodon grandiflorus</i>	6	0	0
18	<i>Ixeris chinensis</i>	0	1	0
19	<i>Pennisetum alopecuroides</i>	0	6	0
20	<i>Lysimachia barystachys</i>	0	0	0
21	<i>Gueldenstaedtia multiflora</i>	0	0	0
22	<i>Taraxacum mongolicum</i>	9	0	0
23	<i>Rhaponticum uniflorum</i>	0	0	0
24	<i>Capsella bursa-pastoris</i>	6	0	0
25	<i>Euphorbia exumla</i>	3	0	0
26	<i>Scorzonera sinensis</i>	0	0	0
27	<i>Potentilla chinensis</i>	2	0	0
28	<i>Lagopsis flava</i>	8	0	0
29	<i>Allium macrostemon</i>	10	0	0
30	<i>Flos Chrysanthemi Indici</i>	5	1	0
31	<i>Artemisia annual L.</i>	0	0	3
32	<i>Polygonatum odoratum</i>	1	0	0
33	<i>Viola prionantha</i>	10	0	0
34	<i>Viola philippica</i>	0	0	2

Results

Management Activity Affects Biodiversity And Biomass

H: herbicide
M: manual weeding
N: nature without disturbance



Photos of different plots



Cultural diversity

- Tradition of eating wild plants is fading.
- Farmers become lazier.
- No worry when damage the environment.

Good news::China to restrict the production and use of Paraquat

- 1 May 2012, the Ministry of Agriculture (MoA), the Ministry of Industry and Information Technology (MIIT) and AQSIQ have published a joint notice 1745 to place restrictive administration measures on the production and use of Paraquat in China.

Acknowledgement

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Thank You For Listening!