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## Review and prospect of forage germplasm resource protection in China

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**Key words** : forage germplasm resource collection protection evaluation

**Introduction** China is characterized by a complex eco-environment with 5 climate zones, vast territory and grassland. It is estimated that China has 0.4 billion hectares of grassland, containing 18 climate-vegetation genres, 53 economic communities, 824 grassland types. More than 6700 species of forage and herbages belong to 5 phylum, 246 families, 1545 genera, accounts for 25% total plant species. Among them, 7 families, 100 genera, 320 species are unique; wild species of main cultivated forages cover 7 families, 61 genera, 102 species.

### 1. Current situation of forage germplasm resource protection and utilization in China

In the last 20 years, under the auspices of MOA and MOST, forage germplasm resource investigation, collection and conservation were conducted and some achievements were obtained in terms of germplasm conservation technology, gene bank construction, germplasm reproduction and identification, stress tolerance evaluation, superior variety screening and utilization, data base and information service system construction, etc. Up to date, 13000 accessions have been collected, 5524 provided for users, 11300 identified with agro-traits, 1500 undertaken stress tolerance evaluation. One central gene bank has been established in Beijing, with more than 60000 accessions capacity and has already collected 9600 accessions belonging to 71 families, 464 genera, 1177 species, which included 6627 grass, 3175 legumes and 1600 other accessions, accounting for 59%, 28% and 14%, respectively. A copy bank for temperate forage germplasm conservation has been established (IMAR) with 30,000 accession capacity, now has 5690 accessions belonging to 36 families, 194 genera, 386 species, among which, 3210 are cultivated, 2174 are wild and 308 are introduced resources. Another copy bank for tropical forage germplasm has collected 4530 accessions belonging to 9 families, 174 genera, 499 species; 3799 from 421 species are wild and 731 from 79 species are introduced. The two gene banks propagated 3142 accessions (1536 grass and 1520 legume) from 13 families, 129 genera, 420 species for the central gene bank in Beijing. Till now, 15 nurseries have been established in Beijing, Jilin, Jiangsu, Hubei, Sichuan, Gansu, Qinghai, Xinjiang, IMAR and Hainan provinces. More than 1000 clones of different species were conserved, 96 new discovered or created accessions were maintained, superior germplasm including 82 grass accessions from 29 genera, 45 species, and 28 legumes from 17 genera were identified and screened. 337 new varieties including 135 breeds, 41 land races, 106 introduced and 55 tamed got registered. All these work formed basis for China forage germplasm resource protection and utilization system.

**Table 1** 1998-2006 forage germplasm resource collection.

| Year  | National collection | International collection | Agro-trait evaluation | Stress tolerance identification |
|-------|---------------------|--------------------------|-----------------------|---------------------------------|
| 1998  | 580                 | 189                      | 256                   | 219                             |
| 1999  | 960                 | 302                      | 762                   | 331                             |
| 2000  | 829                 | 160                      | 928                   | 437                             |
| 2001  | 915                 | 205                      | 738                   | 134                             |
| 2002  | 1042                | 198                      | 712                   | 120                             |
| 2003  | 2501                | 654                      | 1125                  | 195                             |
| 2004  | 2570                | 505                      | 1700                  | 700                             |
| 2005  | 2052                | 897                      | 2084                  | 539                             |
| 2006  | 2630                | 911                      | 2270                  | 370                             |
| Total | 14079               | 4021                     | 10575                 | 3045                            |

### 2. Existing problems

The first problem in forage germplasm resource protection is the limitation in collection; the collected accessions are only 17.6% of national forage resource, the majority has yet been conserved. The shortage of key resource such as those rare, unique and valuable ones in the collection can not meet the needs of breeding and production. Another problem is shortage in systematic identification and research of collected resources, which cause difficulties in utilization.

### 3. Prospect in the future

Due to deterioration of eco-environment, biodiversity protection of grassland resources needs to be strengthened. The forage germplasm resource collection should focus on abroad collection, effective protection, intensive research and innovation to spur harmony development of grassland science and environment protection.