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## Distribution law and utilizable potentialities of three kinds of clover germplasm resources in Xinjiang

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**Key words** : Xinjiang , clover , germplasm resources , distribution law , utilizable potentialities

**Introduction** According to the flora of China , the Xinjiang flora is mainly a forage base utilized as a grassland resource . *Trifolium* reportedly has six wild species or escape species in Xinjiang . By investigation and collection across a series of points , lines , and surfaces , we gathered 95 accessions of important germplasm materials , including 47 accessions of white clover , 34 accessions of red clover , and 14 accessions of strawberry clover . From the accessions of germplasm and collection location , we can determine the basic law of distribution .

**Distribution law and eco-biological characteristics** Through 1998 in the southern part of Xinjiang region , 2002 and 2007 in the northern part of Xinjiang region , field investigation , collection , and related research information of the key forage germplasm resources show : (1) There is no distribution of *Trifolium* in most of southern part of Xinjiang region , mainly distributes in Tianshan Mountains , Altai , northwest of Junggar hilly area and a few adjacent similar mesophytic regions . (2) There are obvious differences in distribution and scope of three kinds of clover . (See table 1) . White clover mainly is distributed in the west and middle of Tianshan , Altai , and can become a dominant species , subdominant or companion species . Red clover is mainly distributed in Yili River valley , Erqis River valley , northern slope of western Tianshan Mountains and Altai , and can become a dominant species or companion species . The upper elevation of distribution of strawberry clover is below white clover and red clover , and the lower level of elevation is similar to white clover or lower . (3) Distribution habitat and eco-biological characteristics vary for the different species . The adaptability of white clover is the widest . Drought tolerance , cold resistance , sterile resistance , acid resistance and alkali resistance of red clover are inferior to white clover . Strawberry clover's characteristics are flood-enduring , waterlogging-resistant , saline-alkali tolerant , drought tolerant ; these are slightly stronger than white clover's .

**Table 1** Comparison of the distribution and eco-biological characteristics of three kinds of clover .

Name	Collected location	Habitat	Elevation(m)	Main characteristics
White clover	Shawan county , Wusu county , Nileke county , etc .	Mountain meadow steppe , Desert oasis , etc .	498-2428	The distribution is the most widespread
Red clover	Nileke county , Xinyuan county , Gongliu county , etc .	Mountain steppe , Riverside , etc .	794-1910	The distribution is widespread
Strawberry clover	Xinyuan county , Tekesi county , Wenquan county , etc .	Valley , Riverside , desert oasis , etc .	498-1617	The distribution is not widespread

**Utilization** White clover and red clover are famous as desirable cultivated forage in the world , are also good turf plants . The history of utilization , the area of cultivation , and the number of varieties are slightly lower than lucerne , a most important Legume . Wild white clover and red clover are widespread in Tianshan Mountains and Altai . They are playing an extremely important role in grassland animal husbandry . However , now white clover and red clover are still in a natural system , and conscious artificial domestication and breeding are extremely weak ; understanding of the preciousness and importance is still inadequate . For example , local lawn producers , still buy foreign clover varieties , rather than focus on domestication , cultivation and utilization of their own wild resources . Positive domesticating and nurturing high-quality , high-yield , desirable varieties resistant to grazing and mowing , and establishing high-quality , stable and high-yielding artificial grasslands , are the main direction for utilization of these findings . Domesticating and cultivating good turf plants is a secondary direction . Since wild strawberry clover is low growing , highly creeping , and roots at the nodes , domesticating and nurturing good turf plants from this species is also an important direction .

**Protection** Clover germplasm resources of Xinjiang in China are not only the most abundant , but also the unique terrain , topography , and climate , make clover germplasm resources produced in Tianshan Mountains and Altai extremely valuable , for exploration and utilization . In recent years , scientists from home and abroad are very concerned about the resource . Many foreign researchers frequently go to Yili grassland and Altai , which has aroused attention of local authorities , and they have taken certain restrictive measures , which is necessary to effectively protect our precious forage germplasm resources . But the more effective countermeasure is a comprehensive collection , and ex situ conservation should be conducted as soon as possible , to establish certain original habitat protection areas or points so that precious forage germplasm resources can be properly protected . This measure has an important role and significance for in-depth study and exploration of the future .

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