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Presenter Information

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Stability of alpine meadow ecosystem on the Qinghai-Tibetan Plateau

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Key words : alpine meadow , stability , coefficient of variance , ecosystem diversity , net primary production , precipitation , temperature

Introduction The stability of grassland ecosystem is one of the most important topics in modern ecology (Bai et al .2004 ; Tilman & Downing 1994) . However , little relevant information is available for the alpine meadow on the Qinghai-Tibetan Plateau (Zhao & Zhou , 1999) . In this paper , we examined the ecosystem stability and its sensitivity to environmental variations in an alpine meadow using the quantitative methods .

Material and methods In this study , air temperature and precipitation were measured by regular meteorological methods . The above-ground net primary production was measured by the harvest method . The annual variations of precipitation and mean air temperature from 1957 to 2000 , and the above-ground net primary production of the *K . humilis* meadow from 1980 to 2000 were collected .

In this paper ,

$$E = \left| \frac{\overline{\Delta y}}{\overline{\Delta x}} / \left(\frac{\overline{y}}{\overline{x}} \right) \right| = \left| b / \left(\frac{\overline{y}}{\overline{x}} \right) \right|$$

which can measure the stability of grassland ecosystem . When E does not change with x or time (t) in a given period , the E is constant . The constant E means the measurement of system stability of abiotic factor . Furthermore , it is easy to compare each other because the parameters are dimensionless .

Results and discussion Comparison of alpine meadow ecosystem stability with other five natural grassland ecosystems in Israel and southern Africa indicates that the alpine meadow ecosystem on the Qinghai-Tibetan Plateau is the most stable ecosystem . The alpine meadow ecosystem with relatively simple structure has higher stability , which indicates that community stability is not only correlated with biodiversity and community complicity but also with environmental stability . The high stability of the alpine meadow ecosystem may be resulted also from the adaptation of the ecosystem to the alpine environment .

Conclusions In this study , we use the coefficients of variation (CV) and stability (E) obtained from the Haibei Alpine Meadow Ecosystem Research Station to characterize the ecosystem stability . The results suggest that the net primary production of the alpine meadow ecosystem was more stable (CV = 13 .18%) than annual precipitation (CV = 16 .55%) and annual mean air-temperature (CV = 28 .82%) . The net primary production was insensitive either to the precipitation (E = 0 .0782) or to air temperature (E = 0 .1113) . In summary , the alpine meadow ecosystem on the Qinghai-Tibetan Plateau is much stable .

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