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# **THE DYNAMIC STRUCTURE OF PLANT COMMUNITIES IN DRY STEPPES, CENTRAL MONGOLIA**

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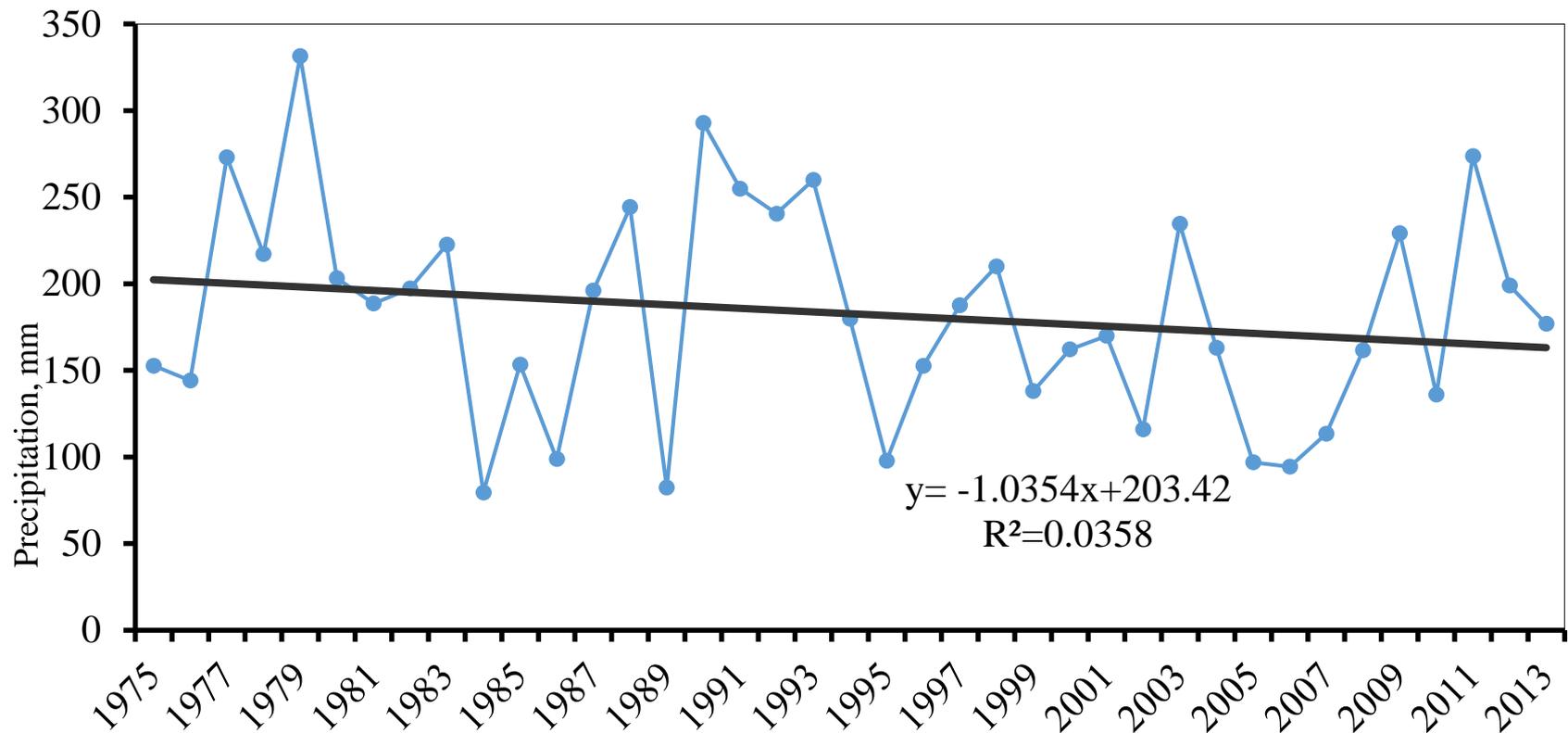
**Abstract:** The dynamics of any given plant community are closely related to the population ecology of the principal plant species, but these had hardly been studied in Central Asian plants. The outcomes of long-term studies in the dry steppes of Central Mongolia have shown that the simplification of steppe communities has taken place over recent decades. Annually since 1976, the detailed research of Pascual ecosystems in the main natural zones of Mongolia is carried out here within the framework of the Russian-Mongolian Biological Expedition's program. Changes of dominant and co-dominant species of pasture plant communities occur corresponding to a dried steppe type. The estimation of the present state of natural grasslands was given. The area of different degrees of anthropogenic disturbance was discovered. Steppes and dry steppes of Mongolia are characterized by highly dynamic and extreme natural conditions.

The results of our survey have shown degradation of vegetable communities for 35-45 years period in connection with overgrazing and strengthening of climate aridity in the last decades.

**Keywords:** Central Mongolia, dry steppe, the dynamic structure, plant community, desertification.

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# Results and Discussion

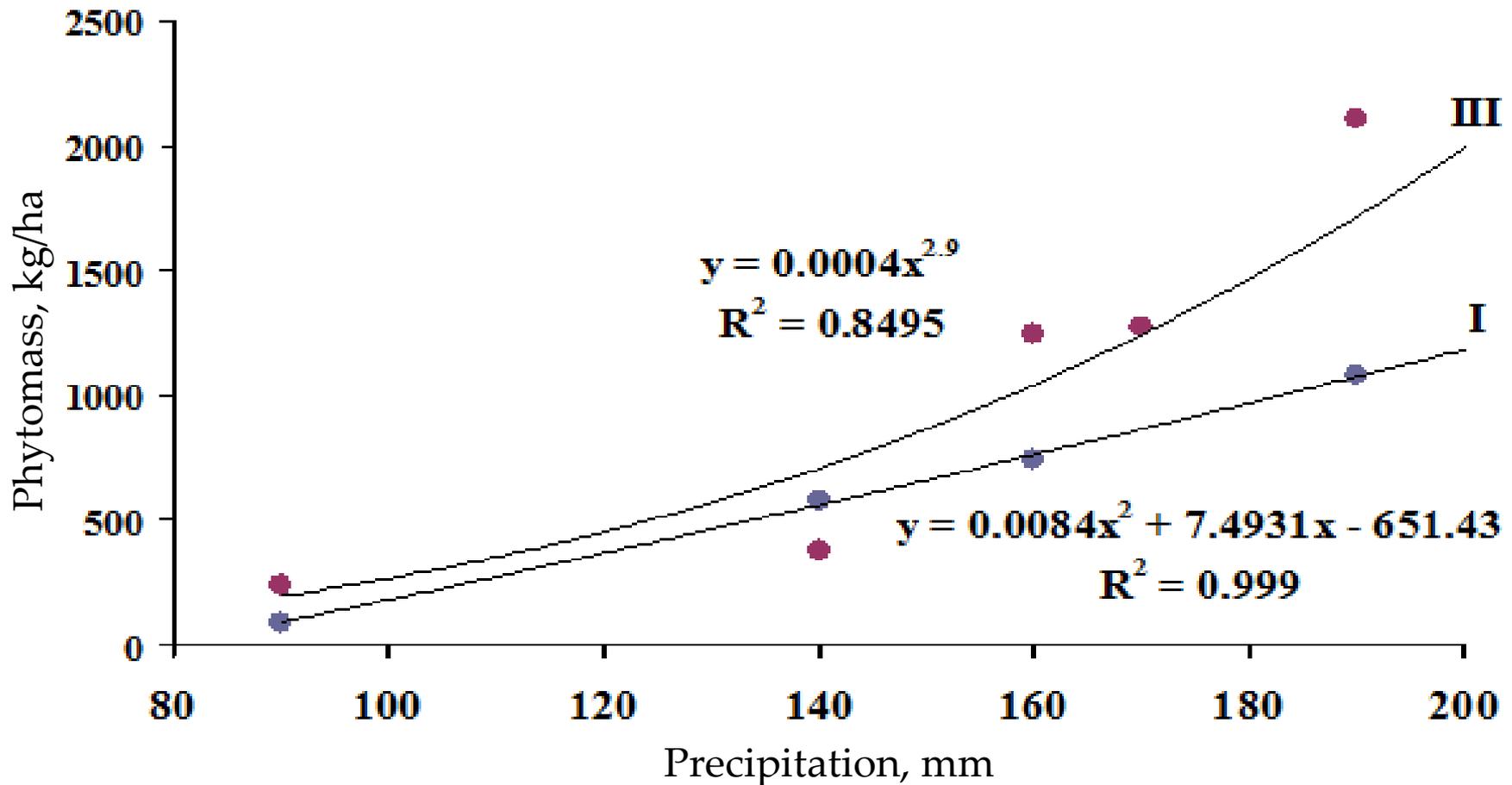


The dry steppes of Mongolia are in a zone of insufficient moisture. According to the Bayan-Undzhul weather station, the average annual precipitation from 1975 to 1999 was 192 mm, of which about 70% fell on the summer season (June-August). For the period from 2000 to 2013, there was a decrease in the average annual amount by 26 mm, i.e. a negative trend is evident in the dynamics of precipitation.

# Results and Discussion

Life forms	1972	1973	1974	1975	1976	1984	2007	2011
Amount of precipitation, mm	~200	~200	~200	152	140	93	113	273
Shrubs	<u>128</u> 24	<u>113</u> 14	<u>62</u> 6	<u>69</u> 9	<u>63</u> 6	<u>112</u> 19	<u>4</u> 5	<u>17</u> 9
Primitive shrubs	<u>137</u> 26	<u>106</u> 14	<u>290</u> 26	<u>147</u> 20	<u>243</u> 23	<u>19</u> 3	<u>1</u> 1	- -
Perennial herbs:								
- <i>Stipa, Agropyron,</i>	<u>243</u> 45	<u>484</u> 62	<u>627</u> 57	<u>488</u> 65	<u>673</u> 62	<u>356</u> 62	<u>57</u> 71	<u>101</u> 52
- <i>Carex</i>	<u>6</u> 1	<u>12</u> 2	<u>27</u> 2	<u>8</u> 1	<u>13</u> 1	<u>2</u> -	<u>2</u> 2	<u>10</u> 5
- <b>Onion</b>	<u>5</u> 1	<u>17</u> 2	<u>26</u> 2	<u>5</u> 1	<u>20</u> 2	<u>5</u> 1	<u>5</u> 7	<u>20</u> 10
- <b>Herbs</b>	<u>15</u> 3	<u>28</u> 4	<u>34</u> 3	<u>27</u> 4	<u>53</u> 5	<u>44</u> 8	<u>3</u> 4	<u>19</u> 10
one and biennial herbs	<u>1</u> -	<u>17</u> 2	<u>42</u> 4	<u>2</u> -	<u>15</u> 1	<u>38</u> 7	<u>8</u> 10	<u>27</u> 14
<b>Total</b>	<u>535</u> 100	<u>777</u> 100	<u>1108</u> 100	<u>746</u> 100	<u>1080</u> 100	<u>576</u> 100	<u>80</u> 100	<u>194</u> 100

# Results and Discussion



Dependence of the aboveground phytomass of dry steppe communities on the amount of precipitation for March-July of the current year and for August-October of the previous year. I, III - key areas.

## Conclusions

- As a result of periodic monitoring for 45 years (since 1972), the dynamics of phytocenotic indicators and the vital state of plant communities of the dry steppes of the Middle Khalkha in modes of climate fluctuations and increased pasture load have been studied.
- The values of phytomass, as an integral parameter of the vital state of communities, differ greatly in wet and dry years, which is determined not only by the amount, but also by the time of precipitation in the summer season. Rains at the beginning of the growing season promote the germination of youngsters. With a massive renewal, they often hinder the development of turf grasses.
- *Stipa krylovii*, *S. grandis*, *Leymus chinensis*, *Allium bidentatum*, *A. polyrrhizum* are characterized by relatively resistance to arid conditions and strong grazing. In drought, they are able to transfer in a dormant state. Drought-resistant friable bunch grains *Agropyron cristatum*. *Cleistogenes squarrosa* cannot withstand pasture overload.

# Supplementary Materials

Noboru Fujita, Narantsetsegiin Amartuvshin, **Erdenegerel Ariunbold**. Annual Production and Species Diversity of Mongolian Pasture Plants in Relation to Grazing Pressure by Livestock // The Mongolian Ecosystem Network: Environmental Issues Under Climate and Social Changes. Japan, 2013. pp.131-143.

Noboru Fujita, **Erdenegerel Ariunbold**. Plant Diversity and Productivity of Mongolian Nomadic Pasture in Relation to Land Use // Social-Ecological Systems in Transition. Japan. 2014. pp.71-87.

**Ariunbold E.**, Kazantseva T.I., Gunin P.D., Slemnev N.N., Yarmishko V.T., Bazha S.N., Danzhalova E.V. The dynamic structure of plant communities in dry steppes Middle Khalkhi, Central Mongolia // Natural resources and sustainable development in Mongolian plateau. 11<sup>th</sup> International conference. 2016. Ulaanbaatar. pp. 67-69.

Viktor P. Dedkov, E.V. Danzhalova, S.N. Tkachenko, Khadbaatar S., **Ariunbold E.**, Peter D. Gunin, Sergey N. Bazha. The Influence Of Vegetation On Reflected Solar Radiation In Arid And Extra-Arid Zone Of Mongolian Gobi // Geography environment sustainability. 2020. 13(4): pp. 72-80

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**THANK YOU FOR YOUR ATTENTION!**

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