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Perennial Dicot Weed Species that Occur in Bean (*Phaseolus Vulgaris*) Fields and Cause Damage

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Citation: Muminovna T. N., Jumanazar qizi R. F. Perennial Dicot Weed Species that Occur in Bean (*Phaseolus Vulgaris*) Fields and Cause Damage. American Journal Of Biodiversity 2026, 3(5), 1-5.

Received: 05th Feb 2026

Revised: 10th Mar 2026

Accepted: 15th Apr 2026

Published: 11th May 2026



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Abstract: This work analyzes perennial dicotyledonous weed species found in bean (*Phaseolus vulgaris*) fields and their negative impact on crop productivity. The study examines the biological characteristics, distribution conditions, and effects on bean growth of major weed species such as field bindweed, creeping thistle, broad-leaved dock, hoary cress, spiny caper, and common vetch.

Keywords: Bean (*Phaseolus Vulgaris*), Perennial Dicotyledonous Weeds, Field Bindweed (*Convolvulus Arvensis*), Creeping Thistle (*Cirsium Arvense*), Broad-Leaved Dock (*Rumex Confertus*), Hoary Cress (*Cardaria Draba*), Spiny Caper (*Capparis Spinosa*), Common Vetch (*Vicia Sativa*), Weed Competition, Crop Productivity, Weed Control, Agricultural Fields.

Introduction

Beans (*Phaseolus vulgaris*) are among the widely cultivated leguminous crops in agriculture and play an important role in human nutrition. The seeds are distinguished by their high nutritional value, particularly due to their rich protein content and other beneficial nutrients. In addition, bean cultivation is also important for maintaining and improving soil fertility, as this crop contributes to the accumulation of nitrogen in the soil [1].

However, obtaining high and quality bean yields is not easy. Various agrobiological factors influence its growth and development. Among them, weeds are considered one of the most serious problems. In particular, perennial dicotyledonous weeds are characterized by high resistance and rapid spread [2].

These weeds possess strong and well-developed root systems, enabling them to absorb water and nutrients from deeper soil layers. As a result, bean plants do not receive sufficient resources, and their growth becomes slower. Moreover, these weeds persist in fields for a long time and are capable of regenerating every year.

Perennial dicotyledonous weeds not only reduce bean productivity but also decrease the efficiency of agricultural practices [3]. Therefore, studying their biological characteristics and developing effective control measures is one of the urgent tasks in agricultural practice [4].

Materials and Methods

In order to control them effectively, it is first necessary to identify the weed species present in the field. Each weed species differs in its biological characteristics, reproduction methods, and distribution patterns. Therefore, control measures should be selected according to the specific species.

Among the perennial dicotyledonous weeds commonly found in bean fields, species that reproduce through rhizomes and have deep root systems are particularly significant. These weeds are capable of regenerating from even small root fragments remaining in the soil, which makes their elimination much more difficult.

Some species can also regrow rapidly through their root system even after the above-ground parts are removed. Therefore, superficial field cultivation alone is not effective. In such cases, deep agronomic practices and appropriate herbicide application are required. In addition, identification of weed species is also important for assessing the phytosanitary condition of fields. This, in turn, contributes to preserving and increasing bean yield.

Herbicides are absorbed through the stems and leaves of weeds and inhibit the activity of the enzyme acetolactate synthase (ALS) found in their tissues. When soil moisture is sufficient, herbicides act more quickly. The main indicator of herbicide effectiveness is that 2–3 hours after application, weeds stop growing. As they compete with crops for water, air, nutrients, and sunlight, the weeds begin to turn yellow and start to wither completely within 2–3 weeks. This process becomes clearly noticeable within 10–15 days.

Result and discussion

The results of the conducted experiment show that the following weeds were the most widely spread:

Caper plant (*Capparis spinosa* L.) is a plant that grows along the ground and usually reaches a length of 10–25 cm. Its leaves are simple, round in shape, and are distinctive in appearance. The flowers are large and are usually white or whitish-pink in color. The fruits are berry-type and turn reddish when ripe [5]. The plant mainly flowers in May–June and produces seeds during this period.

The prickly caper is drought-resistant and is widely distributed in cultivated fields as well as in neglected and abandoned lands. Due to its strong root system, it firmly establishes itself in the soil and competes with cultivated crops, including beans, for nutrients and moisture [6].



Figure 1. Common sorrel (*Rumex confertus* Willd.).

Common sorrel (*Rumex confertus* Willd.) is an upright-growing plant with faint grooves on its stem surface. The plant typically reaches a height of 85–120 cm, and its stem is relatively thick and strong. The root system is well-developed, thick, and branched. This allows the plant to efficiently absorb nutrients from the soil. Common sorrel mainly flowers in May–June, and its seeds ripen gradually during the summer, from June to September. Due to its strong root system and tall growth, this weed limits the availability of light and nutrients for beans, negatively affecting their growth and productivity [7], [8].



Figure 2. Field bindweed (*Convolvulus arvensis* L.).

The stem of the plant is thin and flexible, often twining around other plants as it grows. Its length usually ranges from 30 cm to 100 cm. The fruit is a dry capsule with a smooth (hairless) surface and an ovoid shape. The tip is slightly pointed. Field bindweed has a very high seed production capacity: a single plant can produce tens of thousands of seeds, sometimes more than 90,000. Its seeds can germinate at relatively low temperatures, starting from about 4–6°C, while the optimal growth conditions are around 18–24°C. They can successfully germinate from soil depths of 10–15 cm and retain their viability for several years (up to 5 years). The plant typically flowers from June to October, during which it produces seeds [9].



Figure 3. Hoary cress (*Cardaria draba* (L.) Desv.).

The stem of the plant grows mainly upright, with the upper part being branched, and the total height ranging from about 20 to 50 cm. The leaves located at the base of the stem are lobed in shape, while the middle and upper leaves are oval-shaped and may sometimes grow slightly prostrate [10], [11], [12].

The plant has a high seed production capacity: a single plant can produce up to about 5,000 seeds on average. The seeds also retain good viability and can remain alive for several years (up to approximately 5 years).

The seeds are capable of germinating at relatively low temperatures, with a minimum of 3–4°C, while the optimal conditions are 15–20°C. They can also germinate from soil depths of up to 5 cm [13].



Figure 4. Common vetch (*Vicia sativa* L.).

Has a thin root system, with a thickness of about 1–2 mm. Several stems grow from the main root, and the stems can reach a length of 20–60 cm.

The stem is either erect or slightly ascending. The leaves have short petioles and a trailing structure. The leaf axis is distinguished by being covered with fine hairs. The flowers are usually located in the leaf axils, 1–2 per cluster. The fruit is a pod, often curved and brown in color. The pods are on average 4–5.5 cm long. The seeds are spherical, with a diameter of about 4–6 mm. Their color varies from dark brown to greenish with reddish spots [14].



Figure 5. Canada thistle (*Cirsium arvense*).

Canada thistle (*Cirsium arvense*) has a very strong and highly branched root system that penetrates deep into the soil layers. One of the main characteristics of this plant is its ability to spread quickly and widely through root fragments. Because of this, it can rapidly multiply in fields and occupy large areas [15].



Figure 6. *Vicia sativa*.

In bean (common bean) cultivation fields, various types of weeds are widely distributed, including perennial dicotyledonous species. Among them, field bindweed, creeping thistle (*Cirsium arvense*), common dock (*Rumex confertus*), drabnamo boltirik (*Cardaria draba*), thorny caper (*Capparis spinosa*), spring vetch (*Vicia sativa*), and other plants are particularly common. These weeds are mainly found in and between crop fields, along irrigation canals, foothills, and desert areas, as well as on abandoned lands.

Their main harmful feature is that they strongly compete with cultivated crops for water, nutrients, and light. Due to their deep and well-developed root systems, perennial weeds rapidly absorb moisture from the soil. As a result, the growth of bean plants slows down, their leaves and stems become weaker, and their overall development is reduced.

In addition, some species have a very high seed production capacity, where a single plant can produce thousands and sometimes tens of thousands of seeds. This leads to their rapid spread and long-term persistence in fields. Perennial weeds also negatively affect agricultural practices. Since they

are difficult to eliminate, the costs of field maintenance increase, and the harvesting process becomes more complicated.

Conclusion

In conclusion, perennial dicot weeds found in bean fields represent a serious problem for agriculture. Their high adaptability, strong root systems, and rapid reproduction ability cause significant damage to cultivated crops. To limit the spread of such weeds and effectively control them, it is first necessary to have a good understanding of their species composition, biological characteristics, and growth conditions. Only through integrated agronomic, mechanical, and chemical measures is it possible to reduce their harmful impact and achieve high yields.

REFERENCES

- [1] A. A. Abdurakhmonov, *Weeds and Methods of Their Control*. Tashkent, Uzbekistan: O'qituvchi, 2018.
- [2] Sh. M. Yusupov, *Fundamentals of Agricultural Phytopathology and Agrobiolgy*. Tashkent, Uzbekistan: Fan va Texnologiya, 2020.
- [3] N. Z. Zokhidov, *Biology of Weeds in Agricultural Fields*. Tashkent, Uzbekistan: Mehnat, 2017.
- [4] L. Holm, J. Doll, E. Holm, J. Pancho, and J. Herberger, *World Weeds: Natural Histories and Distribution*. Hoboken, NJ, USA: John Wiley & Sons, 1997.
- [5] N. Turdiyeva, Q. Bababekov, O. Sulaymonov, Y. Buronov, M. Qalandarova, A. Yuldoshev, and G. Yakubov, "Study on the protective measures of agricultural crops from weeds," *E3S Web of Conferences*, vol. 563, p. 03015, 2024.
- [6] R. Labrada, J. C. Caseley, and C. Parker, *Weed Management for Developing Countries*. Rome, Italy: FAO, 1996.
- [7] A. S. Gharde, S. Singh, P. K. Dubey, and P. K. Gupta, "Assessment of yield and economic losses in agriculture due to weeds in India," *Crop Protection*, vol. 107, pp. 12–18, 2018.
- [8] T. J. Monaco, S. C. Weller, and F. M. Ashton, *Weed Science: Principles and Practices*, 4th ed. New York, NY, USA: Wiley, 2002.
- [9] D. Oerke, "Crop losses to pests," *The Journal of Agricultural Science*, vol. 144, no. 1, pp. 31–43, 2006.
- [10] A. R. Martin and F. D. Van Acker, "The biology and management of perennial broadleaf weeds," *Weed Research*, vol. 38, no. 3, pp. 201–209, 1998.
- [11] R. L. Zimdahl, *Fundamentals of Weed Science*, 5th ed. San Diego, CA, USA: Academic Press, 2018.
- [12] S. O. Duke, "Herbicide-resistant weeds and their management," *Pest Management Science*, vol. 68, no. 9, pp. 1323–1331, 2012.
- [13] J. L. Anderson, "Weed competition in bean (*Phaseolus vulgaris*) production systems," *Agronomy Journal*, vol. 95, no. 4, pp. 1054–1061, 2003.
- [14] C. L. Mohler and S. E. Johnson, *Crop Rotation on Organic Farms: A Planning Manual*. Ithaca, NY, USA: Cornell Univ., 2009.
- [15] R. E. Blackshaw, "Weed ecology and management systems in legumes," *Canadian Journal of Plant Science*, vol. 85, no. 3, pp. 627–635, 2005.