

Camelina sativa [简体中文](#) [正體中文](#)

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Plantae	Magnoliophyta	Magnoliopsida	Capparales	Brassicaceae

Common name false flax (English), Siberian oilseed (English), Oljedodre (Norwegian), big-seed false flax (English), Lin bâtard (French), Sæd-Dodder (Danish), German sesame (English), gold-of-pleasure (English), Ruistankio (Finnish), Cameline cultivee (French), Leindotter (German), camelina (Portuguese), camelina pilosa (Spanish), Huttentut (Dutch), Saatdotter (German), large-seeded false flax (German), caméline ciliée (French)

Synonym *Camelina parodii* , Ibarra & La Porte
Myagrum sativum , L. (basionym)

Similar species *Camelina microcarpa*

Summary *Camelina sativa* can prosper in many different climates and soils. Its ability to survive in a diverse range of habitats enables it to be introduced fairly easily into new environments. It is considered a common weed in many areas, but other areas embrace it for the use of its oils as a food, fuel or for its possible medicinal value. This is a hermaphroditic species, which contains seeds after pollination that are known for the oils that they produce.



[view this species on IUCN Red List](#)

Species Description

C. sativa is an annual or winter annual that reaches heights of 30 to 90cm (Mirek, 1981 in Putnam *et al.*, 1993). It can have smooth (glabrous) or sparsely hairy stems that become woody at maturity, and is simple or sometimes branched (Klinkenberg, 2008). If hairy, the starlike hairs are more numerous than simple hairs. Leaves are 2-8cm long and are arrow shaped and sharp-pointed with smooth edges (Mirek, 1981 in Putnam *et al.*, 1993). They are unstalked or have short stalks and are usually glabrous or only slightly hairy (Klinkenberg, 2008). It produces prolific small flowers defined as racemes which are white, pale yellow (Klinkenberg, 2008) or greenish yellow (Mirek, 1981 in Putnam *et al.*, 1993) in colour. Flowers have four petals which are 4-5mm in length. Sepals are 2-3mm in length, styles are 2-2.5mm in length and flower stalks are 10-25mm in length (Klinkenberg, 2008). Fruits are pear shaped pods known as silicles; 7-9mm long, 5-6mm wide with a squared off tip (Klinkenberg, 2008). Seed pods are 6-14mm long and superficially resemble the bolls of flax. Fruits produce 10-25 tiny seeds (Schuster & Friedt, 1998) (0.7mm x 1.5mm), which are pale yellow-brown in colour and oblong in shape with a ridged surface (Mirek, 1981 in Putnam *et al.*, 1993).

C. sativa var. *sativa* grows in the open it has a wide-branching growth habit. However, in the presence of flax the weed takes on a taller, less branched form which closely resembles a flax plant. This is a classic example of crop-weed coevolution or crop mimicry (Radosevich *et al.*, 1997). Baker (1974, in Radosevich *et al.*, 1997) suggests that *C. sativa* is in fact one of the best examples of crop mimicry. In some areas where flax cultivation is very intensive *C. sativa* var. *sativa* is replaced by var. *linicola* which has a lifecycle even more aligned with flax. The seeds are so similar that they are not readily separated and must be sown together.

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Notes

It is believed that this species was initially cultivated as an oilseed crop (Radosevich *et al.*, 1997). Seed oil content averages at 37 percent by weight.

Lifecycle Stages

C. sativa has a short lifecycle of just 85 to 100 days (Putnam *et al.*, 1993). Each plant can produce between 100 and 1000 seeds. Seeds are very tiny with the 1000-seed weight just 1g on average (Schuster & Freidt, 1998). Seeds do not exhibit dormancy (IENICA, 2002; Robinson, 1987 in Putnam *et al.*, 1993).

Uses

C. sativa is economically important as a human food due to its oil. It has an oil content of 40% and is rich in essential acids and omega-3 fatty acids including linolenic, linoleic, oleic and eicosenic acids (Ryhänen *et al.*, 2009). Byproducts left over after oil extraction from seeds (known as *Camelina* meal or expeller) (Cherian *et al.*, 2009; Ryhänen *et al.*, 2009) may also have importance as animal fodder. They been used to increase nutritional content of chicken eggs (Cherian *et al.*, 2009), rabbit (Peiretti *et al.*, 2007), pig (Flachowsky *et al.*, 1997), cattle (Moloney *et al.*, 1998) and chicken meat for commercial consumption (Ryhänen *et al.*, 2009). Seeds of *C. sativa* have also been used as food for caged birds (Putnam *et al.*, 1993).

Further economic importance includes its potential as a petroleum substitute/alcohol and as a potential seed contaminant (USDA-ARS, 2008). In addition, *C. sativa* together with other oilseed crops, have garnered interest as potential sources of biodiesel (WSSA, 2008). *C. sativa* has attracted interest as an oil crop because of its ability to grow in various climatic conditions, low nutrient requirements and resistance to disease and pests (Francis & Warwick, 2009). Furthermore, the cultivated seed oil from this species was previously used as a food or lamp oil, and sometimes it was used for soap and dye production. It was formerly used for medicinal purposes, and today it is still sometimes applied in the veterinary medicine (Hanelt, 2001).



Habitat Description

C. sativa can exist in a wide variety of habitats including prairies, fields (grain, flax, alfalfa), open woods, lakeshore, dry sandy soils, around elevators, roadsides, railways and waste places or weedy places (CBIF, 2003). *C. sativa* prefers well-drained soils (GISP, 2008).

Reproduction

The propagule of reproduction of *C. sativa* is the seed. This species has an unspecialized mode of dispersal. It uses mixed mating as its system of breeding. The sex of this species is hermaphroditic. The fruit type is called a silicle (API, 2008). The seeds result from either self-pollination, or cross pollination by visiting insects.

General Impacts

C. sativa has been described as an allelopathic crop affecting other crops (Kohli *et al.*, 2001). In addition, it has been considered an agricultural weed, environmental weed, and a naturalized weed (GCW, 2007) in addition to an economic weed (API, 2008). However, *C. sativa* is primarily a minor weed in flax and not often a problem in other crops (Putnam *et al.*, 1993).

Management Info

Chemical: Sulfentrazone, a PRE herbicide, completely eliminated *C. sativa* from treated plots regardless of rate in an experiment conducted in Montana in 2006 and 2007. The PRE herbicides reduced the *C. sativa* stand 15 to 56% at the half rate and 17 to 70% at the full rate. The results of the experiments indicate that there are several herbicides that have the potential to be utilized for *C. sativa* control (WSSA, 2008).

Principal source:

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ALIEN RANGE

[1] AUSTRALIA

[1] IRELAND

[1] MEXICO

[39] UNITED STATES

[10] CANADA

[1] JAPAN

[1] SOUTHWESTERN ASIA

BIBLIOGRAPHY

36 references found for *Camelina sativa*

Management information

[Carlson, Matthew L. and Michael Shephard., undated. Is The Spread of Non-Native Plants in Alaska Accelerating? Meeting the Challenge: Invasive Plants in Pacific Northwest Ecosystems. General Technical Report GTR-694](#)

Summary: Available from: http://edit.uaa.alaska.edu/enri/publications/upload/GTR-694_MLC_MS.pdf [Accessed 8 December 2008]

Hanson, B.D., Park, K.W., Mallory-Smith, C.A. & Thill, D.C. 2004. Resistance of *Camelina microcarpa* to acetolactate synthase inhibiting herbicides. *Weed Research* 44: 187-194.

[Harrington, Timothy B.; Reichard, Sarah H., tech. eds. 2007. Meeting the challenge: invasive plants in Pacific Northwest ecosystems. Gen. Tech. Rep. PNW-GTR 694. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 166 p.](#)

Summary: Available from: http://www.fs.fed.us/pnw/pubs/pnw_gtr694.pdf [Accessed 8 December 2008]

[March, Ignacio J. & John M. Randall, 2005. The Invasive Species Initiative: A workplan for Mexico \(Second version; June 29, 2005\). The Nature Conservancy \(TNC\)](#)

Summary: Available from: [http://conserveonline.org/library/Mexico%20TNC%20Invasives%20workplan%20\(June29,%202005\).doc/](http://conserveonline.org/library/Mexico%20TNC%20Invasives%20workplan%20(June29,%202005).doc/) [Accessed 8 December 2008]



GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Camelina sativa*

[Mito, Toshikazu and Uesugi Tetsuro, 2004. Invasive Alien Species in Japan: The Status Quo and the New Regulation for Prevention of their Adverse Effects. *Global Environmental Research*. 8\(2\)/2004: 171-191](#)

Summary: Available from: <http://www.airies.or.jp/publication/ger/pdf/08-02-08.pdf> [Accessed 8 December 2008]

Radosevich, Steven R., Holt, Jodie S., and Ghersa, Claudio. 1997. *Weed Ecology: Implications for Management*. Edition 2, illustrated, revised. John Wiley and Sons, 1997.

[The Global Invasive Species Programme \(GISP\), 2008. Assessing the Risk of Invasive Alien Species Promoted for Biofuels](#)

Summary: Available from: <http://www.gisp.org/whatsnew/docs/biofuels.pdf> [Accessed 8 December 2008]

[Weed Science Society of America \(WSSA\), 2008. WSSA Meeting Abstract: King, S. R. Montana State University, Huntley, MT *Camelina sativa* Tolerance to Preemergence and Postemergence Herbicide Applications.](#)

Summary: Abstract: *Camelina (Camelina sativa)* together with other oilseed crops have garnered interest as potential sources of biodiesel. Experiments were conducted in 2006 and 2007 to determine herbicide tolerance of camelina. Two rates of eight preemergence (PRE) and ten postemergence (POST) herbicides were applied to camelina. PRE herbicides evaluated included: acetochlor, trifluralin, ethalfluralin, pendimethalin, triallate, metolachlor, sulfentrazone, and EPTC. POST herbicides evaluated included: fluroxypyr, bromoxynil, clopyralid, MCPA, 2,4-DB, bentazon, clethodim, sethoxydim, thifensulfuron, and tribenuron. PRE herbicides were applied prior to planting and POST herbicides were applied on 6 to 10 inch tall camelina plants. Camelina was seeded at 3 lb/A and treatments were replicated four times. The entire experiment was conducted weed-free in order to focus on herbicide tolerance. Treatments were compared to two nontreated controls. PRE herbicide injury typically was evident as stand reduction, while POST herbicide injury was recognizable as stunting/chlorosis. In both years at 6 weeks after preemergence treatment, stand reduction was less than 6% when trifluralin, ethalfluralin, pendimethalin, and triallate were applied at the full rate. Sulfentrazone completely eliminated camelina from treated plots regardless of rate. The other PRE herbicides reduced camelina stand 15 to 56% at the half rate and 17 to 70% at the full rate. In 2006, camelina seed yield, with the exception of sulfentrazone, did not differ from the nontreated controls regardless of rate. This result occurred because plants in plots treated with PRE herbicides that did survive became larger and produced more seed per plant compared to plants treated with herbicides that did not cause stand reduction. In 2007, camelina yield from plots treated with trifluralin, ethalfluralin, and pendimethalin were higher than yield from plots treated with acetochlor or triallate. In both years, stunting/chlorosis caused by applications of clopyralid, 2,4-DB, clethodim, and sethoxydim at 6 weeks after postemergence treatment was less than 6%. In both years, applications of either rate of thifensulfuron or tribenuron controlled camelina greater than 70%. Applications of MCPA controlled camelina from 56% with the half rate to 84% with the full rate. The other POST herbicides controlled camelina 8 to 40% at the low rates and 18 to 73% at the high rates. In both years, camelina in plots treated with clethodim, sethoxydim, and the low rate of bromoxynil produced yields equivalent to the nontreated controls. Plants in plots treated with clopyralid were essentially sterilized and did not produce seed. Results indicate that there are several herbicides that have the potential to be utilized in camelina for weed control, however additional research needs to be conducted to confirm these results. Available from: <http://www.wssa.net/Meetings/WSSAAbstracts/abstractsearch.php> [Accessed 8 December 2008]

General information

[Alien Plants in Ireland, 2008. *Camelina sativa* \(L.\) Crantz s.s.](#)

Summary: Available from: http://www.biochange.ie/alienplants/result_species.php?species=253&volg=i&lang=latin&p=i [Accessed 8 December 2008]

[Bennett, B.A., May 2008. Introduced Plants of the Yukon - Source Cody, 1996 Cody et al 1998, 2000, 2001, 2002, 2003, 2004, 2005\) revised by B.A. Bennett May 2008 - this is a tentative list for review purpose only](#)

Summary: Available from: <http://environmentyukon.gov.yk.ca/wildlifebiodiversity/documents/YukonIntroducedPlantsSept08-byrank.pdf> [Accessed 8 December 2008]

[Camelina Ltd., Springdale Crop Synergies Ltd. & John K. King and Sons Limited. Gold of Pleasure \(False Flax\). Last updated: September 20, 2002.](#)

Summary: Available from: <http://www.ienica.net/crops/goldofpleasure.pdf> [Accessed 8 December 2008]

[Canada Biodiversity Information Facility \(CBIF\), 2003. Brassicaceae of Canada. Scientific name: *Camelina sativa* \(L.\) Crantz Stirp. Austr., ed. 1, 1: 17. \(1762\).](#)

Summary: Available from: http://www.cbif.gc.ca/pls/spec/brasslist?p_bd_id=144 [Accessed 8 December 2008]

Cherian, G., Campbell, A. & Parker, T. 2009. Egg quality and lipid composition of eggs from hens fed *Camelina sativa*. *Journal of Applied Poultry Research* 18: 143-150.

[Cox, George W., 2001. An Inventory and Analysis of the Alien Plant Flora of New Mexico. *The New Mexico Botanist*. Number 17 January 16, 2001](#)

Summary: Available from: <http://web.nmsu.edu/~kallred/herbweb/17pdf.pdf> [Accessed 8 December 2008]

Flachowsky, G., Langbein, T., Böhme, H., Schneider, A. & Aulrich, K.K. 1997. Effect of false flax expeller combined with short term vitamin E supplementation in pig feeding on the fatty acid pattern, vitamin E concentration and oxidative stability of various tissues. *Journal of Animal Physiological and Animal Nutrition* 78:187-195.

Francis, A. & Warwick, S.I. 2009. The Biology of Canadian Weeds. 142. *Camelina alyssum* (Mill.) Thell.; *C. microcarpa* Andr. ex DC.; *C. sativa* (L.) Crantz. *Canadian Journal of Plant Science* 89(4): 791-810.

[Global Compendium of Weeds \(GCW\), 2007. *Camelina sativa* \(Brassicaceae\)](#)

Summary: Available from: http://www.hear.org/gcw/species/camelina_sativa/ [Accessed 8 December 2008]

Hanelt, Peter, Bötner, R., Mansfeld & Rudolf, Kilian. 2001. Mansfeld's Encyclopedia of Agricultural and Horticultural Crops. Edition: illustrated. (p. 1427). Springer, 2001.

[Hartman, R. L. and B. E. Nelson, 2000. Working List of Invasive Vascular Plants of Wyoming With Vernacular Names from Major Works Compiled by R. L. Hartman and B. E. Nelson Source material in part from R. D. Dorn, W. Fertig, C. C. Freeman, J. Kartesz, and P. M Rice December 2000](#)

Summary: Available from: <http://www.rmh.uwyo.edu/wyinvasives/wyweeds.pdf> [Accessed 8 December 2008]

[Interactive European Network for Industrial Crops and their Applications \(IENICA\), 2002. Gold of pleasure \(false flax\).](#)

Summary: Available from: <http://www.ienica.net/crops/goldofpleasure.pdf> [Accessed 28 February, 2010]



GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Camelina sativa*

[ITIS \(Integrated Taxonomic Information System\), 2005. Online Database *Camelina sativa* \(L.\) Crantz](#)

Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.

Available from: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=22600 [Accessed 8 December 2008]

Johnson, Christopher, B. & Franz, Chlodwig, 2002. Breeding Research on Aromatic and Medicinal Plants. Edition: illustrated. (p 314). Haworth Press, 2002.

[Klinkenberg, Brian. \(Editor\) 2008. E-Flora BC: Electronic Atlas of the Plants of British Columbia \[eflora.bc.ca\]. Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia, Vancouver.](#)

Summary: Available from: <http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Camelina%20sativa> [Accessed 8 December 2008]

Kohli, R. K., Singh, Harminder Pal & Batish, Daizy. 2001. Allelopathy in Agroecosystems. Haworth Press, 2001. (p 124).

[Lithuanian Invasive Species Database, undated. Species Inventory](#)

Summary: Available from: <http://www.ku.lt/lisd/species.html> [Accessed 8 December 2008]

Moloney, A.P., Woods, V.B. & Crowley, J.G. 1998. A note on the nutritive value of camelina meal for beef cattle. *Irish Journal of Agricultural and Food Research* 37(2): 243-247.

Peiretti, P.G., Mussa, P.P., Prola, L. & Meineri, G. 2007. Use of different levels of false flax (*Camelina sativa* L.) seed in diets for fattening rabbits. *Livestock Science* 107: 192-198.

[Putnam, D.H., Budin, J.T., Field, L.A. & Breene, W.M. 1993. Camelina: A promising low-input oilseed. In J. Janick and J.E. Simon \(Eds.\), *New crops* \(pp. 314-322\). New York: Wiley.](#)

Summary: Available from: <http://www.hort.purdue.edu/newcrop/proceedings1993/V2-314.html#REFERENCES> [Accessed 28 February, 2010]

Ryhönen, E.L., Perttinen, S., Tupasela, T., Valaja, J., Eriksson, C. & Larkka, K. 2007. Effect of *Camelina sativa* expeller cake on performance and meat quality of broilers. *Journal of the Science of Food and Agriculture* 87: 1489-1494.

Schuster, A. & Friedt, W. 1998. Glucosinolate content and composition as parameters of quality of *Camelina* seed. *Industrial Crops and Products* 7: 297-302.

[University of Tasmania, 2008. Key to Tasmanian seed Plants: *Camelina* \(Brassicaceae\) 1:51](#)

Summary: Available from: <http://www.utas.edu.au/dicotkey/dicotkey/BRASSIC/gCamelina.htm> [Accessed 8 December 2008]

[USDA, ARS, 2008. *Camelina sativa* \(L.\) Crantz National Genetic Resources Program. Germplasm Resources Information Network - \(GRIN\) \[Online Database\]. National Germplasm Resources Laboratory, Beltsville, Maryland.](#)

Summary: Available from: <http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?8700> [Accessed 8 December 2008]

[USDA, NRCS. 2008a. *Camelina sativa* \(L.\) Crantz gold-of-pleasure. The PLANTS Database \(<http://plants.usda.gov>, 7 December 2008\).](#)

[National Plant Data Center, Baton Rouge, LA 70874-4490 USA.](#)

Summary: Available from: <http://plants.usda.gov/java/profile?symbol=CASAS2> [Accessed 8 December 2008]

[USDA, NRCS. 2008b. *Camelina sativa* \(L.\) Crantz ssp. *sativa* gold-of-pleasure. The PLANTS Database \(<http://plants.usda.gov>, 7 December 2008\). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.](#)

Summary: Available from: <http://plants.usda.gov/java/profile?symbol=CASAS2> [Accessed 8 December 2008]

[USDA, NRCS. 2008c. *Camelina sativa* \(L.\) Crantz ssp. *alyssum* \(Mill.\) E. Schmid gold-of-pleasure. The PLANTS Database \(<http://plants.usda.gov>, 7 December 2008\). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.](#)

Summary: Available from: <http://plants.usda.gov/java/profile?symbol=CASAA> [Accessed 8 December 2008]

[Villaseñor, Jose L. & Francisco J. Espinosa-Garcia, 2004. The alien flowering plants of Mexico. *Diversity and Distributions*, \(Diversity Distrib.\) \(2004\) 10, 113-123](#)

Summary: Available from: <http://www3.interscience.wiley.com/cgi-bin/fulltext/118807493/PDFSTART> [Accessed 8 December 2008]