

# First record of *Crataegus monogyna* Jacq. (Rosales: Rosaceae) in Buenos Aires province, Argentina

Luciano N. Segura \*, Adrián Jauregui and Diego Montalti

Universidad Nacional de La Plata, Museo de La Plata, División Zoología Vertebrados, Sección Ornitología, Paseo del Bosque S/N, La Plata (B1904CCA), Argentina.

\* Corresponding author. E-mail: [lsegura79@yahoo.com.ar](mailto:lsegura79@yahoo.com.ar)

**ABSTRACT:** *Crataegus monogyna* Jacq. (Rosales: Rosaceae) is cited and collected for the first time for Buenos Aires province, Argentina. Its distribution is extended within Argentina and southern South America, since it was only known from Río Negro and Neuquén provinces in southern Argentina until now.

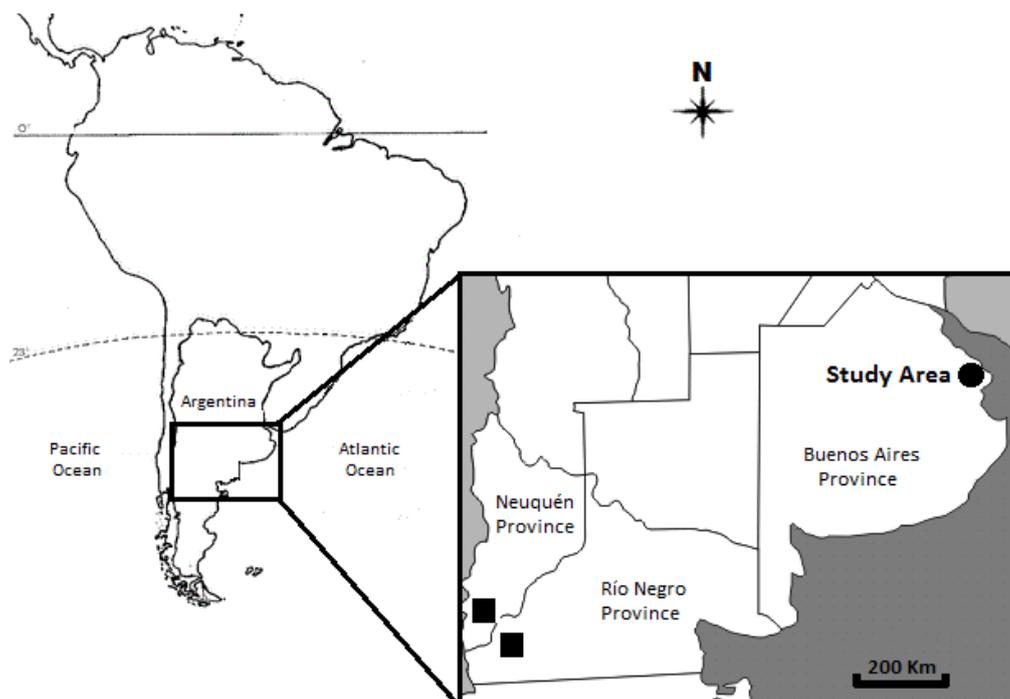
DOI: 10.15560/10.5.1167

The genus *Crataegus* (commonly known as “hawthorns”) includes more than 140 species of shrubs and trees within the family Rosaceae. Most of the species of the genus are native to temperate regions of the Northern Hemisphere in Europe, Asia and North America (Phipps *et al.* 2003; Potter *et al.* 2007). *Crataegus* spp. usually grows up to 5–9 m, has a type of bark smoothy grey, small pome fruits and thorny branches. The leaves are somewhat variable in shape, with lobed or serrate margins, grow spirally arranged on long shoots, and in clusters on spur shoots on the end of twigs (Phipps *et al.* 2003; Potter *et al.* 2007). Patterns of phenotypic variation between genus *Crataegus* are commonly associated with the occurrence of gametophytic apomixis (Camp and Gilly 1943; Harlan and De Wet 1975; Dickinson 1983; Dickinson and Phipps 1985).

*Crataegus monogyna* Jacq. (Rosales, Rosaceae) is a

species of tree native to Europe, northwest Africa and western Asia, but which has been introduced in many other parts of the world where it can be an invasive weed (Potter *et al.* 2007). It is a small tree 5–8 m tall with a dense crown, the bark is dull brown with vertical cracks (Potter *et al.* 2007). The younger stems bear sharp thorns 1–1.5 cm long. The leaves are 2–4 cm long, obovate and deeply lobed, usually with obvious spicules. The flowers are produced in late spring in corymbs of 5–25 together. Each flower is about 1 cm diameter, with five white petals and red stamens. The fruit is oval and dark red about 1 cm long, with a single seed (Potter *et al.* 2007). In Argentina, *C. monogyna* has been cited previously as an introduced species to Río Negro and Neuquén provinces (Figure 1) (Zuloaga *et al.* 2008).

*C. monogyna* is characterized by sexually diploid, highly



**FIGURE 1.** Map showing the location of the study area in Buenos Aires province and the two previous reports in Argentina.

promiscuous and can easily generate hybrids with other individuals including other taxonomic series, as many species of America (Núñez-Collin and Hernández-Martínez 2011). Although this species is apomictic in North America (Dickinson and Phipps 1986), other authors reported that apomixis is not common in Europe (Yeboah Gyan and Woodell 1987; Guitán and Fuentes 1992; Chacoff *et al.* 2008).

As part of a research program on the reproductive biology of a south temperate bird: the Red-crested Cardinal *Paroaria coronata* (Passeriformes: Thraupidae) in natural forests of central-eastern Argentina during 2005–2014, we detected the presence of the exotic tree *C. monogyna* distributed among other native trees. After an extensive literature review, we conclude that this is a new record for the Buenos Aires province in Argentina and that this species has few records in southern South America (Zuloaga *et al.* 2008).

The specimens were studied and collected in Estancia La Matilde (35°20'59" S, 57°11'28" W), Punta Indio, Buenos Aires, Argentina (Figure 1). The Estancia La Matilde is located *ca.* 2000 km away from the first cited record by Zuloaga *et al.* (2008) in Río Negro and Neuquén provinces, southern Argentina. The study site is a flat area of approximately 400 ha within the Biosphere Reserve "Parque Costero del Sur" (MAB-UNESCO). It is a semi-open grassland with patches of woodlands mainly dominated by native tree species such as Tala (*Celtis ehrenbergiana*), Coronillo (*Scutia buxifolia*), Molle (*Schinus longifolia*), and Ombú (*Phytolacca dioica*) (Goya *et al.* 1992).

The specimens collected (February 2014) were determined with the help of specific literature (Phipps *et al.* 2003) and subsequently deposited in the Herbarium of Museo de La Plata (LP). Individual tree measurements were obtained by a tape measure (4 m long) and values presented are means  $\pm$  standard errors.

*Specimens examined:* ARGENTINA. Buenos Aires province: Dpto. Punta Indio, Punta Piedras, 35°20'59" S, 57°11'28" E, 28-II-2014, Segura & Jauregui 1 (LP).

At the study area we found 10 specimens of *C. monogyna* distributed among native trees in the forest (Figure 2). They were  $4.5 \pm 0.3$  m in high (range = 3–6.2 m), their tree-canopy was  $4.2 \pm 0.4$  m in width (range = 2.1–6.2 m), and their trunk diameter at 20 cm above the ground was  $18.7 \pm 1.4$  cm (range = 12–26 cm). We observed *C. monogyna* flowering during the austral spring (October–November) and with fruits during the austral summer (February–March). Despite looking for young specimens, we could not detect the presence of seedlings growing in the study area.

The present study reports the first record of *C. monogyna* to Buenos Aires province in central-eastern Argentina, and extends its distribution within southern South America. From the number of specimens found, their sizes, and their specific location within the forest (Figure 2), a possible hypothesis on the origin of these trees could be natural reproduction, although we did not find any seedlings growing in the study area. However, Valek (1980) suggested that the way in which favorable conditions for seedling establishment by *Crataegus* individuals tend to be very localized both in time and space (erosion surfaces, abandoned agricultural land),

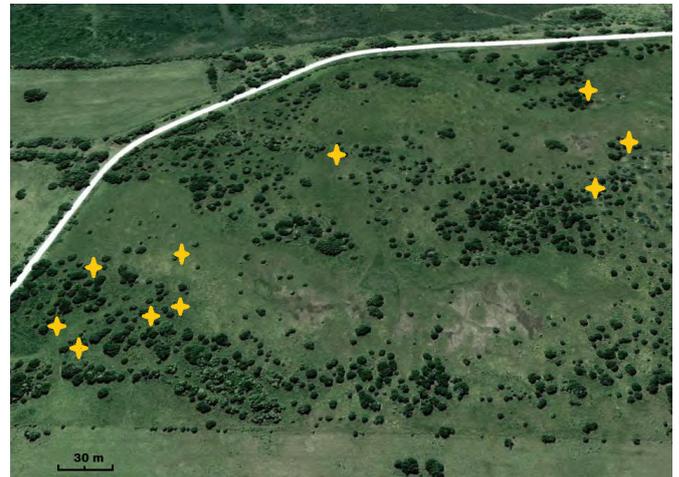


FIGURE 2. Image from Google Earth™ (28 January 2014) of the study area in the Estancia La Matilde, (Buenos Aires, Argentina) showing the location of specimens of *Crataegus monogyna*.

and this could be the reason for the localized presence of these alien trees in the study area.

Most of the studied specimens reached four meters high and five meters wide, size that effectively serve as nesting-tree for birds as the Red-crested Cardinal (Segura and Arturi 2009; Segura and Reboreda 2012; Segura *et al.* 2012; Segura and Berkunsky 2012). However, during nine consecutive years monitoring the breeding performance of this bird (where more than 850 different nest-trees were identified), we never observed *C. monogyna* used as a nesting-tree (LNS, pers. obs.). By contrast, in this site Cardinals have nested exclusively on native trees (Segura and Arturi 2009).

Specimens of *C. monogyna* were dispersed intermingled between the native trees at the study area probably as a result of frequent seed dispersal by birds and small mammals (see also Courtney and Manzur 1985; Guitán 1998) combined with successful establishment (Lo *et al.* 2009). Birds have been long considered as the main seed dispersers (Van der Pijl 1982). During our observations, we recorded one bird species consuming fruits of *C. monogyna*: the Rufous-bellied Thrush (*Turdus rufiventris*). This bird species has been described as an effective seed disperser (Rodríguez 2001; Gasperin and Pizo 2009) and could be the responsible for the presence of *C. monogyna* in the area.

Some studies have documented positive effects of hybridization on invisibility, such as faster growth, greater size and increased aggression (Ellstrand and Schierenbeck 2000; Perry *et al.* 2001). In addition, the potential apomictic behavior (Dickinson and Phipps 1986) and highly promiscuity (Núñez-Collin and Hernández-Martínez 2011) of *C. monogyna* could further increase its invasive potential. Our results, other than increase the distributional range of this invasive species, highlight about the presence of an aggressive alien tree species in a natural south temperate forest of South America.

**ACKNOWLEDGMENTS:** We thank Emiliano Torres y Luis Del Sotto for allowing us to collect and enter on their property; Mariana Grossi and Gustavo Delucchi (Herbarium of Museo de La Plata) for their suggestions and invaluable help with species identification; and Angelo Manzatto and one anonymous review for helpful comments on a previous version of this manuscript. The Universidad Nacional de La Plata covered our field expenses (Proyecto de Incentivos 11/N708).

## LITERATURE CITED

- Camp, W.H. and C.L. Gill. 1943. The structure and origin of species. *Brittonia* 4(3): 323–385.
- Chacoff, N.P., D. García and J.R. Obeso. 2008. Effects of pollen quality and quantity on pollen limitation in *Crataegus monogyna* (Rosaceae) in NW Spain. *Flora* 203(6): 499–507 (doi: 10.1016/j.flora.2007.08.005)
- Courtney, S.P., M.I. Manzur. 1985. Fruiting and fitness in *Crataegus monogyna*: the effect of frugivores and seed predators. *Oikos* 44(3): 398–406.
- Dickinson, T.A. 1983. *Crataegus crus-galli* L. sensu lato in southern Ontario: phenotypic variation and variability in relation reproductive behavior. PhD Thesis. University of Western Ontario, Canada.
- Dickinson, T.A. and J.B. Phipps. 1985. Studies in *Crataegus* L. (Rosaceae: Maloideae). XIII. Degree and pattern of phenotypic variation in *Crataegus* sect. *Crus-galli* in Ontario. *Systematic Botany* 10(3): 322–337 (<http://labs.eeb.utoronto.ca/dickinson/TADandJBPSystBot1985>.)
- Dickinson, T.A. and J.B. Phipps. 1986. Studies in *Crataegus* (Rosaceae: Maloideae) XIV. The breeding system of *Crataegus crus-galli* sensu lato in Ontario. *American Journal of Botany* 73(1): 116–130 (doi: 10.2307/2444284)
- Ellstrand, N.C. and K.A. Schierenbeck. 2000. Hybridization as a stimulus for the evolution of invasiveness in plants? *Proceedings of the National Academy of Sciences* 97(13): 7043–7050 (doi: 10.1073/pnas.97.13.7043).
- Gasperin, G. and M.A. Pizo. 2009. Frugivory and habitat use by thrushes (*Turdus* spp.) in a suburban area in south Brazil. *Urban Ecosyst* 12(4): 425–436 (doi: 10.1007/s11252-009-0090-2).
- Goya, J., G. Placci, M.F. Arturi and A. Brown. 1992. Distribución y características estructurales de los Talaes de la Reserva de Biosfera Parque Costero Sur. *Revista de la Facultad de Agronomía* 68(1): 53–64.
- Gutián, J. and M. Fuentes. 1992. Reproductive biology of *Crataegus monogyna* in northwestern Spain. *Acta Oecologica* 13(1): 3–11.
- Gutián, P. 1998. Latitudinal variation in the fruiting phenology of a bird-dispersed plant (shape *Crataegus monogyna*) in Western Europe. *Plant Ecology* 137(2): 139–142 (doi: 10.1023/A:1009712000104).
- Harlan, J.R. and J.M.J de Wet. 1975. On Ö Winge and a prayer: the origins of polyploids. *Botanical Review* 41(2): 361–390.
- Lo, E.Y.Y., S. Stefanovic and T.A. Dickinson. 2009. Population genetic structure of diploid sexual and polyploid apomictic hawthorns (*Crataegus*; Rosaceae) in the Pacific Northwest. *Molecular Ecology* 18(6): 1145–1160 (doi: 10.1111/j.1365-294X.2009.04091.x).
- Núñez-Collin, C.A. and M.A. Hernández-Martínez. 2011. The problems in the taxonomy of the genetic resources of Tejocote (*Crataegus* spp.) in Mexico. *Revista Mexicana de Ciencias Agrícolas* 2(1): 141–153 ([http://www.scielo.org.mx/scielo.php?script=sci\\_arttext&pid=S2007-09342011000100011&lng=es&nrm=iso](http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2007-09342011000100011&lng=es&nrm=iso)).
- Perry, W.L., J.L. Feder, G. Dwyer and D.M. Lodge. 2001. Hybrid zone dynamics and species replacement between *Orconectes* crayfishes in a northern Wisconsin lake. *Evolution* 55(6): 1153–1166 (doi: 10.1111/j.0014-3820.2001.tb00635.x).
- Phipps, J.B., R.J. O'Kennon and R.W. Lance. 2003. *Hawthorns and Medlars. Royal Horticultural Society. Plant Collector Guide*. Portland: Timber Press. 139 pp.
- Potter, D., T. Eriksson, R.C. Evans, S. Oh, J.E.E. Smedmark, D.R. Morgan, M. Kerr, K.R. Robertson, M. Arsenault, T.A. Dickinson and C.S. Campbell. 2007. Phylogeny and classification of Rosaceae. *Plant Systematics and Evolution* 266(1): 5–43 (doi: 10.1007/s00606-007-0539-9)
- Rodríguez, F. 2001. Potential of germination of *Ficus microcarpa* seeds with Rufous-billed Thrush, *Turdus rufiventris*, as a dispersor. *Tangara* 1(1): 30–33.
- Segura, L.N. and M.F. Arturi. 2009. Selección de sitios de nidificación del Cardenal Común (*Paroaria coronata*) en bosques naturales de Argentina. *Ornitología Neotropical* 20(2): 203–213.
- Segura, L.N. and I. Berkunsky. 2012. Supervivencia de nidos del Cardenal Común (*Paroaria coronata*) en un hábitat modificado en Argentina. *Ornitología Neotropical* 23(4): 489–498.
- Segura, L.N. and J.C. Rebores. 2012. Nest survival of Red-crested Cardinals increases with nest age in south temperate forests of Argentina. *Journal of Field Ornithology* 83(4): 343–350 (doi: 10.1111/j.1557-9263.2012.00384.x).
- Segura, L.N., D.A. Masson and M.G. Gantchoff. 2012. Microhabitat nest cover effect on nest survival of the Red-crested Cardinal. *Wilson Journal of Ornithology* 124(3): 506–512 (doi: 10.1676/11-181.1).
- Valek, D. 1980. Hawthorn type; pp. 38–56, in: F.H. Eyre (ed.). *Forest cover types of the United States and Canada*. Washington, D.C.: Society of American Foresters.
- Van der Pijl, L. 1982. *Principles of Dispersal in Higher Plants*. Berlin: Springer-Verlag. 154 pp.
- Yeboah-Gyan, K. and S. Woodell. 1987. Flowering phenology, flower colour and mode of reproduction of *Prunus spinosa* L. (Blackthorn); *Crataegus monogyna* Jacq. (Hawthorn); *Rosa canina* L. (Dog Rose); and *Rubus fruticosus* L. (Bramble) in Oxfordshire, England. *Functional Ecology* 1(3): 261–268.
- Zuloaga, F.O., M.O. Morrone and M.J. Belgrano. 2008. *Catálogo de las Plantas Vasculares del Cono Sur*. Saint Louis: Missouri Botanical Garden Press. 3348 pp.

RECEIVED: March 2014

ACCEPTED: August 2014

PUBLISHED ONLINE: October 2014

EDITORIAL RESPONSIBILITY: Angelo Gilberto Manzatto