**PRUNUS LONGISPINOSA (ROSACEAE): A NEW SPECIES FROM KURDISTAN-IRAQ**

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**Abstract**

*Prunus longispinosa* S.E. Shahbaz and S.S. Abdulrahman (Rosaceae), a new species from Kurdistan-Iraq, is described and illustrated. It differs from all Iraqi taxa of the subgenus *Amygdalus* by the dark reddish color of their one-year-old twigs and the very whitish thorny branches. The new species is closely related to *P. spinosissima* but can be easily separated by its green drupes vs. reddish drupes from one side and green from the other. The new species also shows close resemblance to *Prunus lycioides* but the later differs from it in having one reddish side and pale green side of their one-year-old twigs and glabrous drupes vs. dark reddish color of their one-year-old twigs and pubescent drupes for the new species.

**Key words:** *Prunus spinosissima, Prunus lycioides, Prunus carduchorum, Subgenus Amygdalus, New species, Drupe, endocarp.*

**Introduction**

While treating the woody plants of Rosaceae family, Schneider (1906) distinguished three genera, namely, *Prunus, Padus*, and *Laurocerasus*. He also recognized within *Prunus* the three subgenera: *Euprunus, Cerasus*, and *Amygdalus*. Five subgenera: *Amygdalus, Prunus, Cerasus, Padus*, and *Laurocerasus* were identified by Rehder (1940); while Okie (2003) recognized six subgenera when *Lithocerasus* was added to the 5 subgenera of Rehder. Some other workers recognized six to ten genera (De et al., 1940); while Okie (2003) recognized six subgenera when *Laurocerasus* was added to the 5 subgenera of Rehder. Some other workers recognized six to ten genera (De Tournefort, 1700; Roemer, 1847; Yu et al., 1986; Takhtajan, 1997) within the generic concept of *Prunus* s.l.

In Iraq, Townsend & Guest (1966) recognized the single genus *Prunus* within the subfamily Prunoideae Focke, and subdivided it on the basis of reproductive and vegetative morphological characters into subgenera *Prunus* L. *Amygdalus* (L) Focke, and *Cerasus* Pers.

The Plant List version 1(2010) accepts 88 out of 482 specific names for the genus *Prunus*, in addition to the 213 infra-specific taxa for the same genus, all are spreading throughout the northern temperate regions of the world.


Based on morphological characters, De Tournefort (1700) recognized *Prunus* and *Amygdalus*, as separate genera. Some botanists inclined to split *Prunus* s.l. into numerous genera (Yu et al., 1986; Takhtajan, 1997; Lu & Bartholomew, 2003), while others preferred to maintain the unity of *Prunus* s.l and only identifying sectional or subgeneric groups (Chin et al., 2010; Shi et al., 2013; Eisenman, 2015).

Recent phylogenetic analyses of molecular data have shown *Prunus* s.l. to be monophyletic (Bortiri et al., 2001). Moreover, in a recently presented monograph using morphological and molecular sequence data, Yazbek (2010) concluded that phylogenetic relationships of *Prunus* subg. *Amygdalus* is best circumscribed to include almonds and peaches.

Flora of Iraq is rich in *Prunus* taxa, 5 wild species of the subgenus *Amygdalus* are present (*P. arabica* (Oliv.) Meikle, *P. webbii* (Spach) Vierh. *P. argentea* (Lam.) Rehd, *P. kotschyi* (Boiss. et Hoh.) Meikle, and *P. carduchorum* (Bormm) Meikle) together with several other ill-defined infra-specific taxa(*P. argentea var. elaeagnifolia* (Spach) Meikle, and *P. carduchorum var. glabra* (Bormm) Meikle)) which form the bulk of food source for honey bees at the time of flowers scarcity in Winter and in very early Springtime.

Members of the subgenus *Amygdalus: Prunus persica* (L.) Batsch. and *P. dulcis* are extensively cultivated in orchards and vineyards throughout Iraq, but all other taxa are growing naturally in the mountainous region at the upper forest zone, timber-line and even in the thorn-cushion zone, usually at high altitudes up to 1800m. Two species; namely, *P. argentea* and *P. arabica* are normally found in the lower forest zone. Moreover, *P. arabica* is growing in the steppe and sub-desert regions of Iraq down to 150m above sea level.

**Material and Methods**

Field trips were conducted in Sulaymani province/ Kurdistan region with the aim of collecting *Prunus* plants. Trips started September 25/2016, continued at April to June 2017. Authors collected specimens belonging to *Prunus* subgenus *Amygdalus* from Hanaqol Mountain east of Khormal town, near Iranian border facing Mariwan city, revisited in March 20/2017 to collect flowers and then in May 25/2017 to collect fruits.

The specimens were compared with all *Prunus* specimens in Iraqi herbaria including National Herbarium of Iraq/Baghdad (BAG), Sulaymani University Agriculture Herbarium (SUAH), and Kurdistan Botanical Foundation Herbarium (KBFH) in Sulaymani. Moreover, the specimen photos were sent to Herbarium of the Hebrew University of Jerusalem (HUJ), Central Herbarium of Tehran University (TUIH). Records in the literature (Shaw, 2005; Sangtane & Jun, 2001; Yazbek, 2010) were checked. Flora of Iraq (Townsend & Guest, 1966) and the neighboring countries: Flora of Turkey (Davis, 1965-1988) and flora of Iran (Rechinger, 1963-2005) were consulted.
The unknown *Prunus* is found only in one location, an effort to find more locations in the vicinity where this novel plant may be located was unsuccessful.

Morphological measurements for the description of the taxa were obtained from observation of living material in the field and occasionally from herbaria. 12 herbarium specimens were prepared from similar number of the new species and deposited in DPUH (Duhok Province University Herbarium).

**Results and Discussion**

*Prunus longispinosa* S.E. Shahbaz, and S.S. Abdulrahman, Species Nova. Type: Iraq, Kurdistan, Sulaimani province, 2.5-3km east Khormal city, the south-east facing of Hanaqol Mountain, Hanaqol village, spreading in an area of about 2.4 x 0.6 km, in a steep rocky slope, altitude 1095m, latitude 35.31995°N, longitude 46.06223°E, Sept, May 25/2017. Saleem Esmael Shahbaz (University of Duhok), Shamiran Salih Abdulrahman (University of Zakho), 2017-3630. Holotype: DPUH, Isotype: KBFH (Kurdistan Botanical Foundation Herbarium), (Table 1; Fig. 1).

**Diagnosis:** Plants are shrubs characterized by thorny branches; thorns whitish, very sharp, 1.6-5.8cm long; one-year-old twigs deep reddish, older grey whitish. Leaves are mostly falcate or curved. Hypanthium tube is long, up to 9mm length. Drupes are very small, 8.5-16mm length x 6-10.5mm width x 5.2-7mm thickness; endocarp pits absent; furrows start from the base becoming shallower towards the apex.

**Table 1. Additional specimens studied.**

<table>
<thead>
<tr>
<th>Place</th>
<th>Date</th>
<th>Specimen number</th>
<th>Herbarium deposited</th>
<th>Altitude m, above sea level</th>
<th>Collector</th>
<th>Growth stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>Mar.17/2016</td>
<td>3046</td>
<td>DPUH</td>
<td>1095</td>
<td>Shamiran</td>
<td>Flowering</td>
</tr>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>Mar.17/2016</td>
<td>3645</td>
<td>DPUH</td>
<td>1102</td>
<td>Shamiran</td>
<td>Flowering</td>
</tr>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>May.2/2016,</td>
<td>3695</td>
<td>DPUH</td>
<td>1105</td>
<td>Shamiran &amp; Saleem</td>
<td>Fruiting</td>
</tr>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>July 19/2016</td>
<td>3056</td>
<td>DPUH</td>
<td>1097</td>
<td>Shamiran &amp; Saleem</td>
<td>Fruiting</td>
</tr>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>Sept.25/2016</td>
<td>3057</td>
<td>DPUH</td>
<td>1106</td>
<td>Shamiran</td>
<td>Fruiting</td>
</tr>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>April 4/2017</td>
<td>3677</td>
<td>DPUH</td>
<td>1109</td>
<td>Shamiran</td>
<td>Flowering</td>
</tr>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>April 4/2017</td>
<td>3678</td>
<td>DPUH</td>
<td>1384</td>
<td>Shamiran</td>
<td>Flowering</td>
</tr>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>April 4/2017</td>
<td>3679</td>
<td>DPUH</td>
<td>1137</td>
<td>Shamiran</td>
<td>Flowering</td>
</tr>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>Sep.10/2017</td>
<td>3680</td>
<td>DPUH</td>
<td>1121</td>
<td>Shamiran</td>
<td>Fruiting</td>
</tr>
<tr>
<td>Iraq/ Sulaymani/ Hanaqol</td>
<td>Sep.10/2017</td>
<td>3681</td>
<td>DPUH</td>
<td>1272</td>
<td>Shamiran</td>
<td>Fruiting</td>
</tr>
</tbody>
</table>

![Fig. 1. Map of northern Iraq showing the location of Prunus longispinosa.](image-url)
**Species description:** Shrubs are 0.65-1.22 m tall, with spreading crown. Bark grey, with black lenticels, upper parts grey whitish. Branches very thorny, some ascending, others trailing; thorns whitish, 1.6-5.8 cm long; one-year-old twigs deep-reddish, glabrous. Axillary buds with scale margin entire, glabrous, apex rounded, base cuneate. Leaves mainly born on new growths, few on old twigs, mostly present as short shoots of 1.7-7 mm long, fascicled, 6-25 mm long, 2-4.5 mm width; blade shape mostly falcate or curved; lanceolate to oblanceolate, narrow-elliptic; apex acute to acuminate; base cuneate to more or less rounded, glabrous; margins obscurely serrate, more towards apex, 7-9 teeth per cm, each with a single gland; petiole very short 1-2 mm; stipules caduceus. Inflorescences fascicled on short shoots; pedicel 0.1-1.5 mm long, flowers with hypanthium red-purple, cylindrical, inflated at the base. 4.5-9 mm long, 0.5-2 mm wide with 6-10 longitudinal dark colored striations, glabrous; sepals reddish from outside and inside, margins entire, ciliated, 1.6-2 mm long, 1.2-1.7 mm wide, apex acute; petals pink to pale pink, oblong, or wedge-shaped, apex emarginated to acute, base cuneate or tapering, 6.5-8 mm long, 3.5-4.5 mm width; stamens 9-18, 0.8-5 mm long; style longer than stamens. 4.5-7 mm long, densely long-hairy at the style lower part, often persistent in fruit; ovary ovate pubescent, 1.5-3.5 mm long, 1.2-2.9 mm width. Fruits with pedicel 0.7-1.2 mm long, hairy, drupe green often asymmetrical, compressed or slightly so, 8.5-16 mm long, 6-10.5 mm wide, 5.2-7 mm thick, ovate in cross-section; base round, sometimes slightly asymmetric; apex acute to round, surface pubescent; mesocarp splitting at complete or over maturity; endocarp brown to light brown, more or less asymmetric, ovate in cross-section, compressed, 8.5-13 mm long, 5.5-9.6 mm wide, 4.2-6.2 mm thick, base round, sometimes slightly asymmetric, apex acute to round, surface pits absent, ventral suture with obtuse keel, furrow start from the base becoming shallower towards apex, sometimes reticulate furrows in patches or all over, could be deep or shallow. Seeds are with whitish pulp, 5-10 mm long, and 3-4 mm wide, and 1.4-3 mm deep, ovate to oblong-ovate, base round asymmetric, apex acute or acute-mucronate; testa slightly sulcate, light brown (Figs. 2, 3, 4 and Table 3).

![Fig. 2: Prunus longispinosa](image-url)
**Distribution and conservation status:** Distribution is known only in Hanaqol Mountain/Sulaimani province, a restricted area near the Iranian border (Fig. 1). The new species is found to form a population of low density, above 1095m altitude. The area is denuded from the normal arborescent cover of *Quercus* and *Pistacia* (*Pistacia eurycarpa* Yal. and *P. khinuk* Stocks) which are normal in lower elevations. Very few perennials could be observed in the region, like *Rhus coriaria* L., *P. cardochorum*, number of Compositae as *Onopordon* sp., *Silybum marianum* (L.) Gaertn., *Echinops ritro* L., *Centaurea* sp., and *Lactuca serriola* L. A great number of annuals from Poaceae like *Hordeum* spp., *Avena* spp., and *Bromus* spp. are to be found covering the site. Some members of Apiaceae like *Tordylium cordatum* (Jacq.) Poir. are also common in the region.

*Prunus longispinosa* seems to face some degradation in its habitat due to intensive grazing and gathering of firewood by the local villagers, in addition to fires that break out from time to time in the region during the long dry summer season. The spread of groups of individuals at the very high altitude of the limited area of distribution and the very steep rocky slope of some sites may cause reduction of threats to this species. Since necessary information regarding population size, number of mature individuals, reproduction status, and exact quality of habitats are not known, the IUCN Red List category (Anon., 2001) for this species remains uncertain and could currently be assessed as Data Deficient (DD).

**Related Taxa:** Only *P. longispinosa* and *P. cardochorum* coexist at the same habitat and overlap at their area of distribution. Both show similar habit and possess mesocarp that is splitting at complete maturity and endocarp surface with no pits, but *P. cardochorum* branches are thorn-less and the one-year-old twigs are greenish-brown (Fig. 5). All available taxa in Iraq are thorn-less except *P. argentea* and the one-year-old twigs of them are not red in color at all with the exception of the new species (Table 2; Fig. 5).
PRUNUS LONGISPINOSA (ROSACEAE): A NEW SPECIES


Table 2. Characteristics used to differentiate Prunus longispinosa from the two closely related species P. spinosissima (Bunge) Franch and Prunus lycioides (Spach) C.K. Schneid (Yazbek, 2010) (Fig. 5).

<table>
<thead>
<tr>
<th>Characters</th>
<th>P. longispinosa</th>
<th>P. spinosissima</th>
<th>P. lycioides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoot</td>
<td>One-year-old twigs deep reddish, older One-year-old twigs deep reddish, older One-year-old twigs reddish side and pale twigs grey-whitish, with black lenticels. twigs brown-grey to white-grey, glabrous green side, older twigs grey, glabrous glabrous</td>
<td>Not recorded</td>
<td>Not recorded</td>
</tr>
<tr>
<td>Leaves</td>
<td>Falcate or curved, lanceolate to Spathulate, obovate, elliptic or Linear, linear- lanceolate, or linear-ob lanceolate, narrowly elliptic, 6-25 x 2- lanceolate, (11)18-28(30) x 3-9mm oblanceolate, 9-32 x 1-4(7) mm 4.5mm</td>
<td>Hypanthium red-purple, cylindrical, Hypanthium reddish, cylindrical, inflated Hypanthium deep-red to purple, inflated at the base, 4.5-9 mm long, 0.5- at base, 3-8 mm long, 1-3 mm wide, cylindrical, inflated at base, 3-7 mm long, 2mm wide with 6-10 longitudinal dark glabrous colored striations, glabrous</td>
<td>Hypanthium deep-red to purple, cylindrical, inflated at base, 3-7 mm long, 1-3 mm wide, glabrous</td>
</tr>
<tr>
<td>Hypanthium</td>
<td>Hypanthium red-purple, cylindrical, Hypanthium reddish, cylindrical, inflated Hypanthium deep-red to purple, inflated at the base, 4.5-9 mm long, 0.5- at base, 3-8 mm long, 1-3 mm wide, cylindrical, inflated at base, 3-7 mm long, 2mm wide with 6-10 longitudinal dark glabrous colored striations, glabrous</td>
<td>Not recorded</td>
<td>Not recorded</td>
</tr>
<tr>
<td>Style</td>
<td>Densely long-hairy at its lower part</td>
<td>Not recorded</td>
<td>Not recorded</td>
</tr>
<tr>
<td>Drupe</td>
<td>5.2-7mm thick, surface pubescent</td>
<td>8.5-13mm x 5.5- Ovate, strongly compressed, 13-14mm x ovate or broadly ovate, strongly compressed, 10-16 mm x 8-13 mm x 6-furrow start from the base becoming surface pits absent, shallow furrows start 10 mm, surface pits absent, furrows start shallow towards the apex, sometimes from base becoming shallower and from the base becoming reticulate reticulate furrows in patches or allower disappear towards the apex, or reticulate towards the apex, could be deep or shallow shallow</td>
<td>9.6mm x 4.2-6.2mm, surface pits absent, 9-17mm x 7-9mm, compressed, 10-16 mm x 8-13 mm x 6-furrow start from the base becoming surface pits absent, shallow furrows start 10 mm, surface pits absent, furrows start shallow towards the apex, sometimes from base becoming shallower and from the base becoming reticulate reticulate furrows in patches or allower disappear towards the apex, or reticulate towards the apex, could be deep or shallow shallow</td>
</tr>
<tr>
<td>Endocarp</td>
<td>Ovate, compressed, 8.5-13mm x 5.5- Ovate, strongly compressed, 13-14mm x ovate or broadly ovate, strongly compressed, 10-16 mm x 8-13 mm x 6-furrow start from the base becoming surface pits absent, shallow furrows start 10 mm, surface pits absent, furrows start shallow towards the apex, sometimes from base becoming shallower and from the base becoming reticulate reticulate furrows in patches or allower disappear towards the apex, or reticulate towards the apex, could be deep or shallow shallow</td>
<td>Not recorded</td>
<td>Not recorded</td>
</tr>
<tr>
<td>Phenology</td>
<td>Flowering: Early May to Late June</td>
<td>Flowering: Early May to Late June</td>
<td>Flowering: Early May to Late June</td>
</tr>
<tr>
<td>Habitat</td>
<td>steep rocky mountain slope, elevation slopes; elevations between 700 – 1900 m. and hillsides. Sometimes near rivers, above 1095m</td>
<td>In dry and semiarid regions, rocky slopes</td>
<td>elevation 450-2200m</td>
</tr>
</tbody>
</table>
Fig. 5. Closely related species. *P. spinosissima*: a. Fruiting branch, b. leaves (Yazbek, 2010); *Prunus lycioides*: c. and d. fruiting branches, e. Foliage branches with red one-year-old twigs (Yazbek, 2010); *P. carduchorum*: f. Fruiting branches, g. Foliage branches with green one-year-old twigs.

References


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