

## RESEARCH ARTICLE

***SESUVIUM PORTULACASTRUM* L. SESUVIOIDEAE AIZOACEAE: A NEW RECORD TO FLORA OF ADEN AND ADDITION TO FLORA OF YEMEN**Amena Abdullah Ebrahim Saeed<sup>1</sup> and Abdul-Nasser Al-Gifri<sup>1,\*</sup> <sup>1</sup> Dept. of Biology, Faculty of Education - Aden, University of Aden, Yemen\*Corresponding author: Abdul-Nasser Al-Gifri; E-mail: [ngifri@gmail.com](mailto:ngifri@gmail.com)

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**Abstract**

A field study was conducted in November 2023 in Aden Governorate, Yemen, during which *Sesuvium portulacastrum* L. was collected from various locations within the governorate. This species is recorded here for the first time in Aden, and this record also represents a new and significant addition to the flora of Yemen, as it had not been previously documented in the country's vegetation. The study provides a detailed morphological description supported by illustrative photographs, contributing to the understanding of halophytic plant diversity in the region and expanding the known geographical distribution of this species.

**Keywords:** *Sesuvium portulacastrum*, Aden flora, Halophyte, New record.**1. Introduction**

The Republic of Yemen is located in the southwestern corner of the Arabian Peninsula and is characterized by significant environmental and geographical diversity, which has contributed to the emergence of unique plant ecosystems. This diversity is attributed to climatic variation and the convergence of several phytogeographical regions, including the Sudanian, Arabian Desert, and Mediterranean regions [1,2]. Aden Governorate is a prominent example of this botanical richness, having long served as a focal point for scientists and researchers who arrived via maritime routes between Europe and India. This early interest led to the documentation of several important plant species, notably *Saltia papposa*, recorded by Henry Salt in 1809, and *Sphaerocoma hookeri*, described by Anderson in 1861 [3]. These efforts culminated in the compilation of a comprehensive flora of Aden by E. Blatter between 1914 and 1916, which was later published in 1924 under the title Flora of Aden. This publication is considered the first comprehensive botanical work covering a region of the Arabian Peninsula [4]. In 1992, Al-Gifri conducted a modern revision of the flora of Aden within its administrative boundaries, comparing his findings with those of Blatter [5].

Recent field studies have revealed notable additions to the flora of Aden, including the first record of the rare species *Stipagrostis xylosa* in Yemen, collected from

north of Bir Ahmed in 2022 [6]. In this context, the present study documents another new addition to the flora of Yemen, represented by *Sesuvium portulacastrum* L. from the family Aizoaceae, collected from various locations in Aden Governorate. These coastal saline habitats remain underrepresented in national botanical references.

The significance of this study lies in addressing a clear knowledge gap regarding the distribution of this species in Yemen, by providing recent field documentation, a detailed morphological description, and a comparative taxonomic analysis with the closely related species *S. verrucosum*, which had been previously recorded in the flora of Yemen [2] Table 2. This addition contributes to a better understanding of the taxonomy and biogeography of coastal plant species in the region.

**2. Materials and Methods***Study Area and Sampling Sites*

Aden Governorate is located in the southern part of the Republic of Yemen, on the coast of the Gulf of Aden at the southern entrance of the Red Sea, extending between latitudes 12°43'–12°57' N and longitudes 44°40'–45°07' E, with a total area of approximately 741 km<sup>2</sup>. The governorate comprises eight main districts and exhibits diverse topography, including flat coastal plains bordered by prominent volcanic hills and formations, as

well as two main peninsulas, Aden and Al-Buraiqah, separated by a natural bay. The region is characterized by a hot arid tropical climate, with high temperatures, low rainfall, and the influence of seasonal monsoon winds. During a floristic survey conducted in November 2023, specimens of *Sesuvium* were collected from multiple sites across the governorate. The geographical coordinates of each site were recorded precisely using a GPS device, and voucher specimens were deposited in the Herbarium of the Department of Biology, Faculty of Education, University of Aden [3,5].

### Specimen Collection

The plant samples were collected following standard procedures commonly applied in floristic studies. Flowering and mature individuals were selected to represent the studied species. The collected materials included aerial parts such as stems and leaves, in addition to flowers and fruits whenever available. All field data, including precise GPS coordinates, were properly recorded at the time of collection.

### Morphological Analysis and Taxonomic Comparison.

Morphological analysis was carried out using hand lenses and a stereomicroscope, with a focus on key taxonomic traits critical for accurate identification. The collected specimens were compared with descriptions from the flora of Yemen and with documented records from neighboring countries, including Saudi Arabia [7] and the United Arab Emirates [8]. Additionally, reference was made to global taxonomic revisions of the genus *Sesuvium* [9], particularly the comprehensive review by [10] and the recent African study on perennial species by [11]. These sources provided essential information for distinguishing closely related taxa within the genus.

### Herbarium Processing and Specimen Documentation

The specimens were properly dried, pressed, and mounted according to established herbarium techniques. They were then deposited at the Herbarium of the Department of Biology, Faculty of Education, University of Aden, as permanent voucher material. Each specimen was assigned a specific collector's number as follows: Faculty of Nursing (211), behind the Chemistry Laboratories – Faculty of Education (108), Al-Kumsari Nursery – Dar Saad (200), Caltex – behind Al-Buraihi Hospital (220), Al-Jumhuriya Hospital – Khormaksar (210), and Faculty of Education – Khormaksar (107). All specimens are preserved under suitable conditions to ensure their long-term use as taxonomic references. Table 1.

## 3. Result and Discussion:

*Sesuvium portulacastrum* (L.) L., Syst. Nat. ed. 10. 2: 1058.1759.

*Portulaca portulacastrum* L., Sp. Pl. 1: 446. 1753

### Description

Perennial creeping herb. Stems cylindrical, 4–5 mm in diam., smooth, green, turning reddish in some individuals; prostrate and rooting at the nodes, with some ascending branches. Leaves opposite, succulent, 20–60 × 6–15 mm, 2–3 mm thick; petiole to 3 mm long; blades entire, surface without bladder cells but with minute epidermal papillae. Flowers solitary, axillary, in one of the opposite leaf axils; perianth 13 mm long, pedicel 3 mm, elongating to 7 mm at maturity; sepals triangular with green apical appendages c. 1 mm; outer surface green, inner white to pale pink; petals absent. Stamens numerous, up to 50, in 2 unequal whorls; anthers pink. Carpels 3, each with a distinct style. Fruit a broadly ovoid capsule, to 6 mm long, with several shiny black seeds, c. 1–1.2 mm. Figure (1)

Collector: Amna Abdullah.

**Table 1:** Collection Sites

| Site                                                                       | Latitude    | Longitude   |
|----------------------------------------------------------------------------|-------------|-------------|
| Khormaksar – Faculty of Nursing                                            | 12.806177°N | 45.034640°E |
| Khormaksar – behind the Chemistry Laboratories at the Faculty of Education | 12.815200°N | 45.029983°E |
| Dar Saad – Al-Kumsari Nursery                                              | 12.881764°N | 44.983243°E |
| Caltex – behind Al-Buraihi Hospital                                        | 12.851035°N | 44.991153°E |
| In front of Al-Jumhuriya Hospital in Khormaksar                            | 12.806130°N | 45.036140°E |
| Khormaksar – Faculty of Education                                          | 12.806130°N | 45.036140°E |

**Table 2:** Morphological Differences Between *Sesuvium portulacastrum* and *Sesuvium verrucosum*

| Characteristic                       | <i>Sesuvium portulacastrum</i>                       | <i>Sesuvium verrucosum</i>                             |
|--------------------------------------|------------------------------------------------------|--------------------------------------------------------|
| <b>Life form</b>                     | Creeping perennial                                   | Creeping and sprawling perennial                       |
| <b>Fruit shape</b>                   | Ovoid capsule                                        | Turbinate capsule                                      |
| <b>Seed morphology</b>               | Black, glossy, smooth, funicular aril fully adherent | Black, rougher, aril partially detached from seed coat |
| <b>Adventitious rooting at nodes</b> | Frequent and well-developed                          | Not clearly observed, may occur in mature plants       |
| <b>Stem and leaf surface</b>         | Smooth, lacking bladder cells                        | Covered with papillae and bladder cells                |
| <b>Stamen number</b>                 | Numerous (~50), in two unequal groups                | Numerous                                               |
| <b>Pedicel length</b>                | 3–7 mm, elongating in fruiting stage                 | Very short, nearly sessile                             |
| <b>Flower size</b>                   | Large (10–15 mm)                                     | Small to medium (~9 mm)                                |
| <b>Bracteoles</b>                    | Absent                                               | Present                                                |

In Yemen Aizoaceae contain only two species belong to genus *Sesuvium* *S.sesuvioides*, *S.verrucosum* .[2] Field observations and morphological-taxonomic analyses of the specimens collected from the salt marshes of Khor Maksar and Caltex along the Aden coast revealed a clear correspondence with the diagnostic characteristics of *Sesuvium portulacastrum*, thereby supporting its registration as a new addition to the flora of Yemen. The specimens displayed creeping, succulent stems that readily root at the nodes — a feature widely reported for this species [10,11,12]. The leaves were fleshy and lacked bladder cells, but fine epidermal outgrowths were observed under magnification, potentially representing an additional morphological trait useful for identification. Notably, the degree of succulence varied depending on environmental conditions, reflecting a high degree of physiological plasticity [9,12] and further highlighting the species' adaptability to saline coastal environments. One of the most distinctive floral traits is the presence of numerous stamens, which may number up to 50, as documented by [13,14]. This is a critical diagnostic feature distinguishing *S. portulacastrum* from closely related species in the region, such as *S. sesuvioides*, which has only 5–7 stamens [15] as well as smaller flowers and dull brown seeds. *S. verrucosum* also differs markedly by the presence of prominent bladder cells on vegetative surfaces, fewer stamens, and smaller flowers, facilitating its morphological separation despite some superficial similarities [16], Figure (2).

Although flower color in *S. portulacastrum* ranges from pale pink to white and may overlap with other species, studies such as [10] confirm that floral color is not a reliable diagnostic character due to intraspecific variation.

#### 4. Conclusion:

This study confirms that *Sesuvium portulacastrum* corresponds precisely to the specimens collected from various locations within Aden Governorate, thereby supporting its documentation as a new and verified addition to the flora of Yemen. Morphological analyses revealed several diagnostic traits—such as creeping stems that root at the nodes, fleshy leaves lacking bladder cells, and a high number of stamens—that clearly distinguish this species from closely related taxa within the genus *Sesuvium*. Beyond its taxonomic significance, *S. portulacastrum* plays an important ecological role. It contributes to soil stabilization and erosion control, and its exceptional salt tolerance makes it a promising candidate for rehabilitating degraded lands and mitigating sand dune encroachment in coastal and saline habitats.

Accordingly, this study recommends prioritizing *S. portulacastrum* in national plant conservation efforts and conducting further research on its distribution, ecological variability, and potential applications in environmental restoration programs



Fig. (1): *Sesuvium portulacastrum* 1, Leaf ,2, Fruit ,3, seeds ,4, Flower ,5, Rooted nodes,6, Habitat



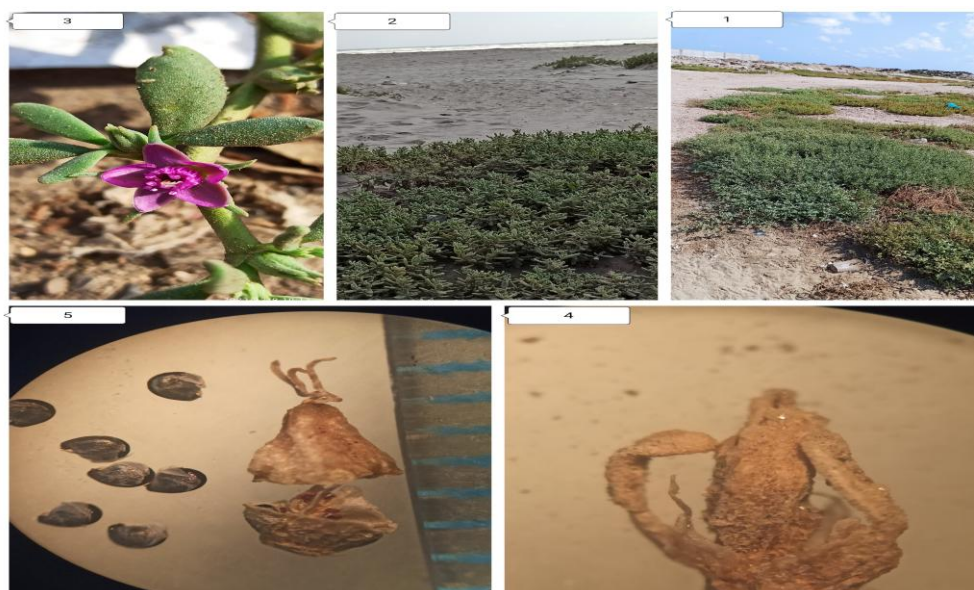


Fig. (2): *Sesuvium verrucosum*, 1, Flowering ,2,3 Habitat ,4, Flower with bracteoles and leaves ,5, Fruit and seeds

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## مقالة بحثية

# تسجيل جديد لنبات *Sesuvium portulacastrum* من تحت فصيلة Sesvoideae فصيلة Aizoeaceae في فلورا عدن وإضافة جديدة في فلورا اليمن

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## المُلخَص

أجريت دراسة حقلية في نوفمبر 2023 في محافظة عدن، اليمن، وتم خلالها جمع نبات *Sesuvium portulacastrum* L. من مواقع متعددة داخل المحافظة. ويُعدّ هذا التسجيل الأول من نوعه لهذا النبات في محافظة عدن، كما يُمثل إضافة جديدة ومهمة لفلورا اليمن، إذ لم يُوثّق وجوده سابقاً ضمن الغطاء النباتي للبلاد. قدّمت هذه الدراسة وصفاً مورفولوجياً تفصيلياً مدعوماً بصور توضيحية، مما يُسهم في تعزيز المعرفة بالتنوع النباتي للنباتات المقاومة للملوحة (الهالوفائيتية) في المنطقة، ويوسّع من النطاق الجغرافي المعروف لهذا النوع.

**الكلمات المفتاحية:** *Sesuvium portulacastrum*، فلورة عدن، النباتات المقاومة للملوحة، تسجيل جديد.

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