

# Contents

|                                                                                                                                             | Page       |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------|
| <b>1.INTRODUCTION .....</b>                                                                                                                 | <b>1</b>   |
| <b>2. REVIEW OF LITERATURE .....</b>                                                                                                        | <b>3</b>   |
| 2.1. Effect of <i>Orobanche</i> parasite on faba bean performance .....                                                                     | 3          |
| 2.2.Stability of faba bean genotypes across diverse environments .....                                                                      | 18         |
| <b>3. MATERIALS AND METHODS .....</b>                                                                                                       | <b>34</b>  |
| <b>4. RESULTS AND DISCUSSION .....</b>                                                                                                      | <b>42</b>  |
| 4.1. Performance of the faba bean genotypes under <i>Orobanche</i> .....                                                                    | 42         |
| infestation .....                                                                                                                           | 42         |
| 4.1.1. Plant height (cm) .....                                                                                                              | 47         |
| 4.1.2. Number of branches/plant .....                                                                                                       | 50         |
| 4.1.3. Number of pods/plant .....                                                                                                           | 54         |
| 4.1.4. Number of seeds/pod .....                                                                                                            | 56         |
| 4.1.5. Number of seeds/plant .....                                                                                                          | 61         |
| 4.1.6. 100-seed weight (g) .....                                                                                                            | 64         |
| 4.1.7. Seed yield/plant (g) .....                                                                                                           | 68         |
| 4.1.8. Number of <i>Orobanche</i> spikes/m <sup>2</sup> .....                                                                               | 72         |
| 4.1.9. Dry weight of <i>Orobanche</i> spikes g/m <sup>2</sup> .....                                                                         | 72         |
| 4.2. Performance of the faba bean genotypes under free-<br><i>Orobanche</i> conditions in addition to <i>Orobanche</i> susceptibility ..... | 76         |
| index .....                                                                                                                                 | 76         |
| 4.2.1. Plant height (cm) .....                                                                                                              | 80         |
| 4.2.2. Number of branches/plant .....                                                                                                       | <b>83</b>  |
| 4.2.3. Number of pods/plant .....                                                                                                           | 86         |
| 4.2.4. Number of seeds/pod .....                                                                                                            | 89         |
| 4.2.5. Number of seeds/plant .....                                                                                                          | 92         |
| 4.2.6. 100-seed weight (g) .....                                                                                                            | 95         |
| 4.2.7. Seed yield/plant (g) .....                                                                                                           | 98         |
| 4.3. Stability of the faba bean genotypes .....                                                                                             | 98         |
| 4.3.1. Analysis of variance .....                                                                                                           | 100        |
| 4.3.2. Phenotypic and genotypic stability parameters .....                                                                                  | 101        |
| 4.3.2.1 Number of pods/plant .....                                                                                                          | 104        |
| 4.3.2.2 Number of seeds/pod .....                                                                                                           | 107        |
| 4.3.2.3 Number of seeds/plant .....                                                                                                         | 110        |
| 4.3.2.4 100-seed weight .....                                                                                                               | 113        |
| 4.3.2.5 Seed yield/plant .....                                                                                                              | <b>119</b> |
| <b>5. SUMMARY .....</b>                                                                                                                     | <b>125</b> |
| <b>6. REFERENCES .....</b>                                                                                                                  |            |
| <b>ARABIC SUMMARY .....</b>                                                                                                                 |            |