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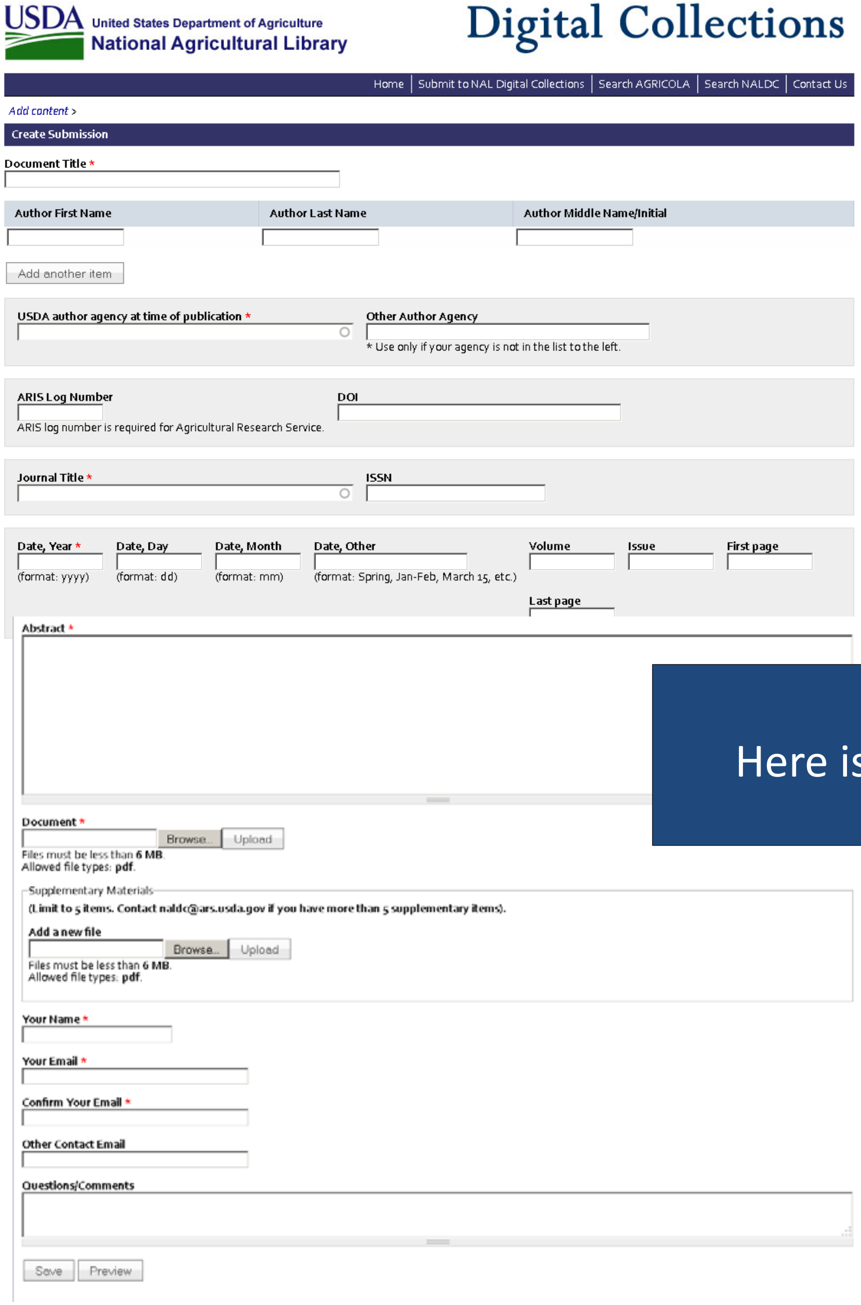

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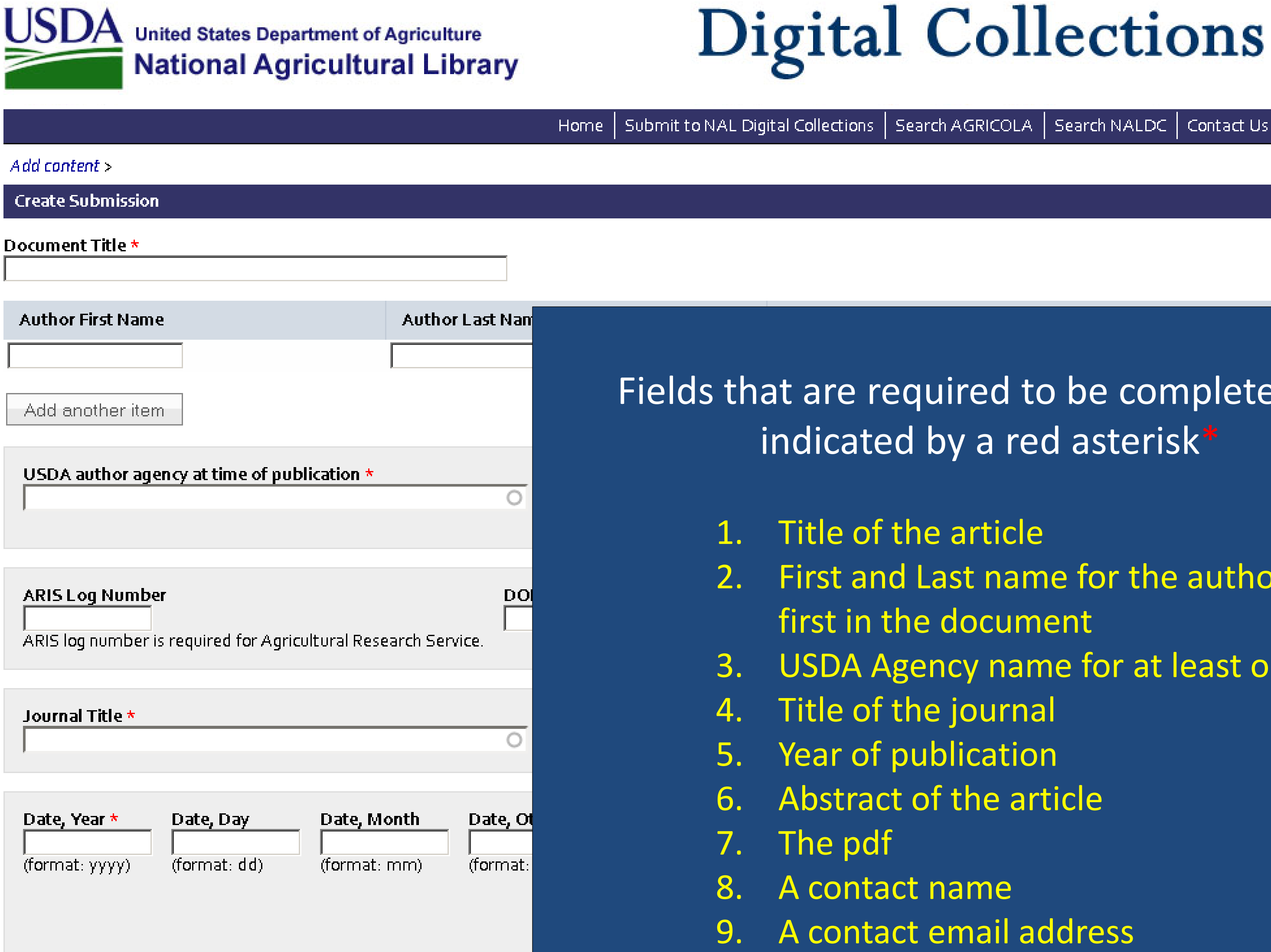

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Gordon W. Selling , Mila P. Hojilla-Evangelistaa, Roque L. Evangelista,
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Industrial Crops and Products

Volume 41,
Number 1,
2013
Pages 113-119

(The first page of the article appears next…)

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[a] Plant Polymer Research Unit, National Center for Agricultural Utilization Research, USDA/Agricultural Research Service, 1815N, University Street, Peoria, IL 61604, United States
[b] Bio-Oils Research Unit, National Center for Agricultural Utilization Research, USDA/Agricultural Research Service, 1815N, University Street, Pea
[c] Renewable Product Technology Research Unit, National Center for Agricultural Utilization Research, USDA/Agricultural Research Service, 1815N
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Keywords:
Pennycress
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Biodiesel
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Authors

(Since "Gordon W. Selling" is listed first, that is the name you would enter into the form)

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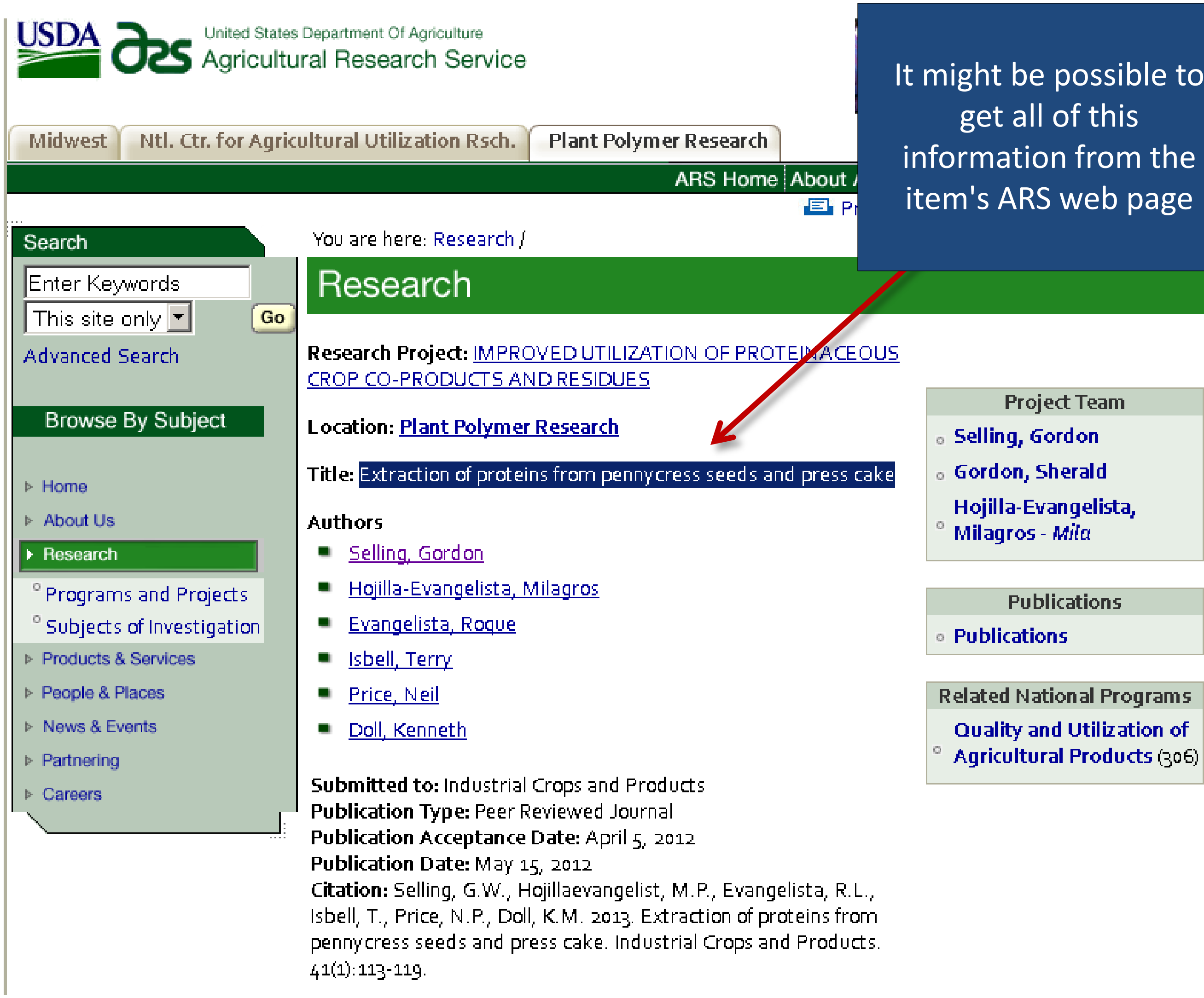

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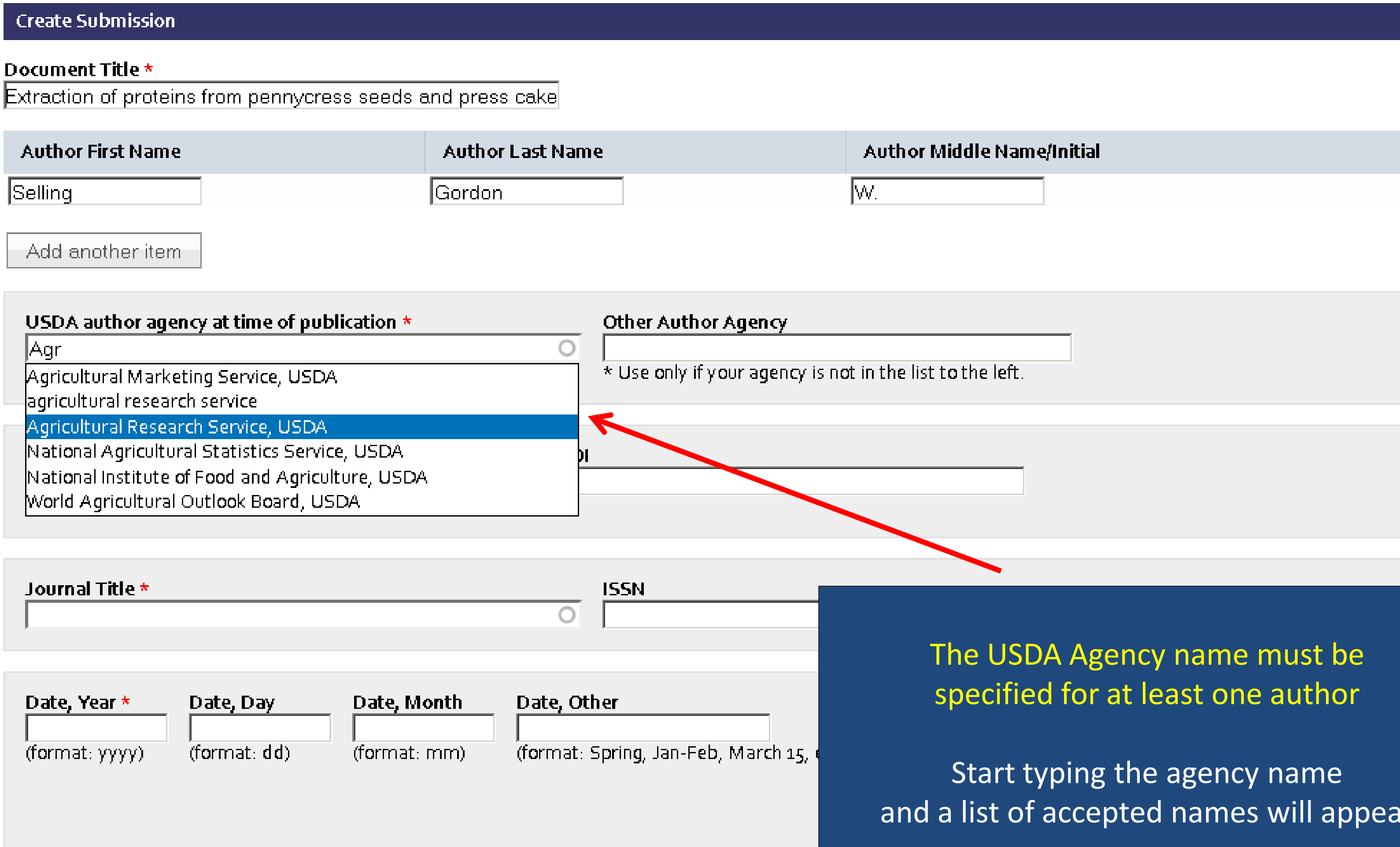

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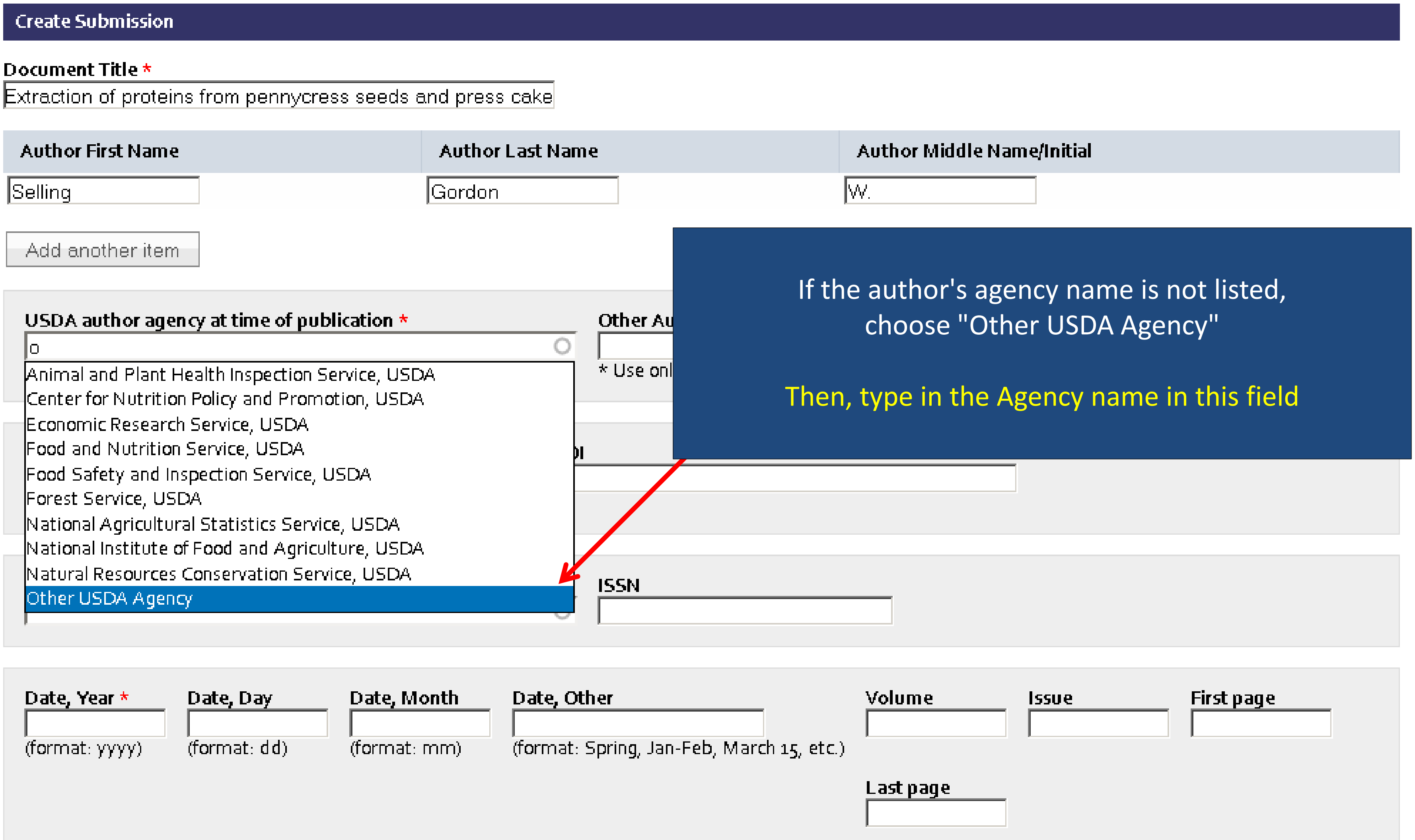
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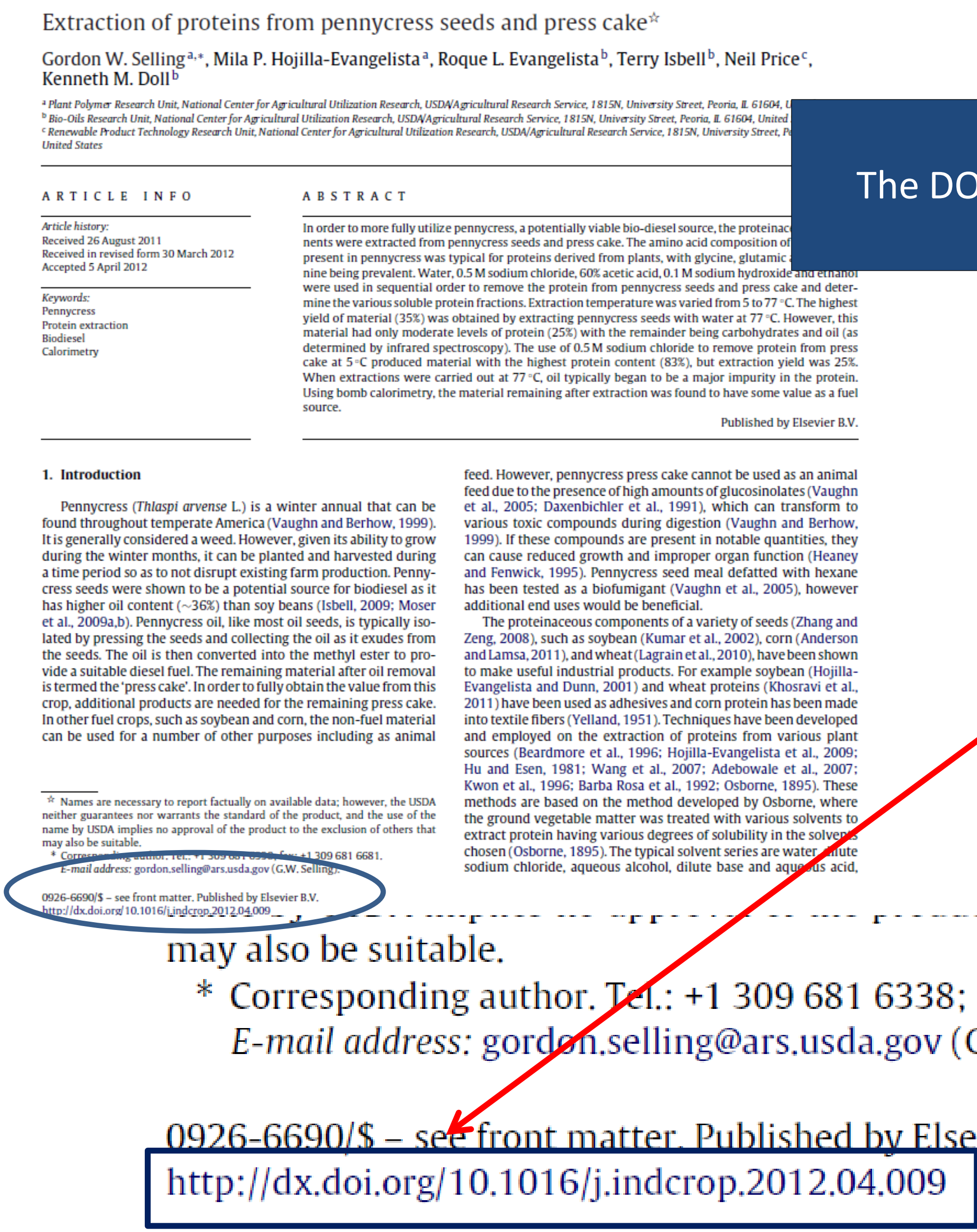

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1. Introduction

Pennycress (*Thlaspi arvense* L.) is a winter annual that can be found throughout temperate America (Vaughn and Berhow, 1999). It is generally considered a weed. However, given its ability to grow during the winter months, it can be planted and harvested during a time period so as to not disrupt existing farm production. Pennycress seeds were shown to be a potential source for biodiesel as it has higher oil content (~36%) than soy beans (Isbell, 2009; Moser et al., 2009a,b). Pennycress oil, like most oil seeds, is typically isolated by pressing the seeds and collecting the oil as it exudes from the seeds. The oil is then converted into the methyl ester to provide a suitable diesel fuel. The remaining material after oil removal is termed the 'press cake'. In order to fully obtain the value from this crop, additional products are needed for the remaining press cake. In other fuel crops, such as soybean and corn, the non-fuel material can be used for a number of other purposes including as animal feed. However, pennycress press cake cannot be used as an animal feed due to the presence of high amounts of glucosinolates (Vaughn et al., 2005; Daxenbichler et al., 1991), which can transform to various toxic compounds during digestion (Vaughn and Berhow, 1999). If these compounds are present in notable quantities, they can cause reduced growth and improper organ function (Heaney and Fenwick, 1995). Pennycress seed meal defatted with hexane has been tested as a biofumigant (Vaughn et al., 2005), however additional end uses would be beneficial.

The proteinaceous components of a variety of seeds (Zhang and Zeng, 2008), such as soybean (Kumar et al., 2002), corn (Anderson and Lamsa, 2011), and wheat (Lagrain et al., 2010), have been shown to make useful industrial products. For example soybean (Hojilla-Evangelista and Dunn, 2001) and wheat proteins (Khosravi et al., 2011) have been used as adhesives and corn protein has been made into textile fibers (Yelland, 1951). Techniques have been developed and employed on the extraction of proteins from various plant sources (Beardmore et al., 1996; Hojilla-Evangelista et al., 2009; Hu and Esen, 1981; Wang et al., 2007; Adebowale et al., 2007; Kwon et al., 1996; Barba Rosa et al., 1992; Osborne, 1895). These methods are based on the method developed by Osborne, where the ground vegetable matter was treated with various solvents to extract protein having various degrees of solubility in the solvents chosen (Osborne, 1895). The typical solvent series are water, dilute sodium chloride, aqueous alcohol, dilute base and aqueous acid,

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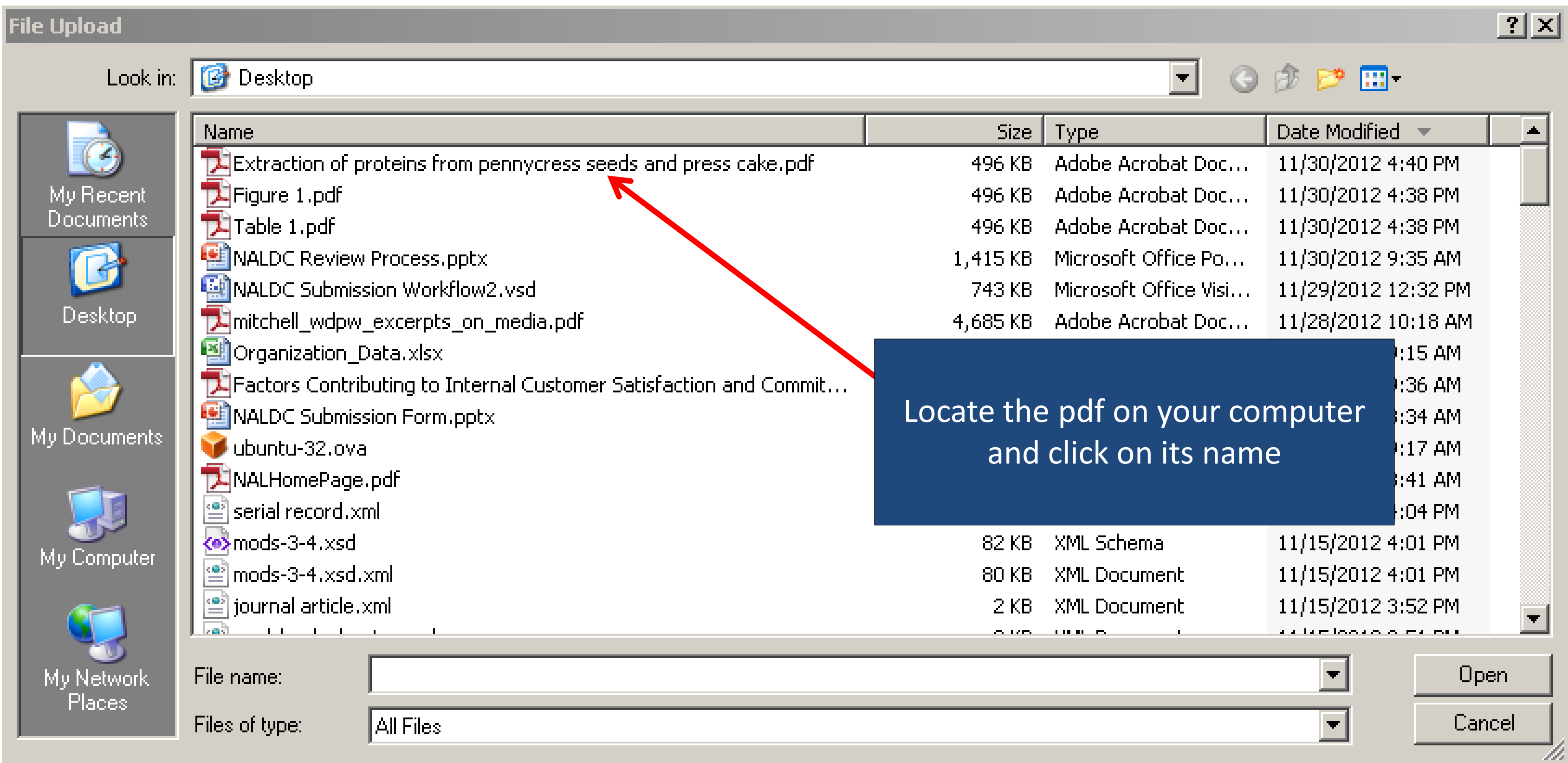
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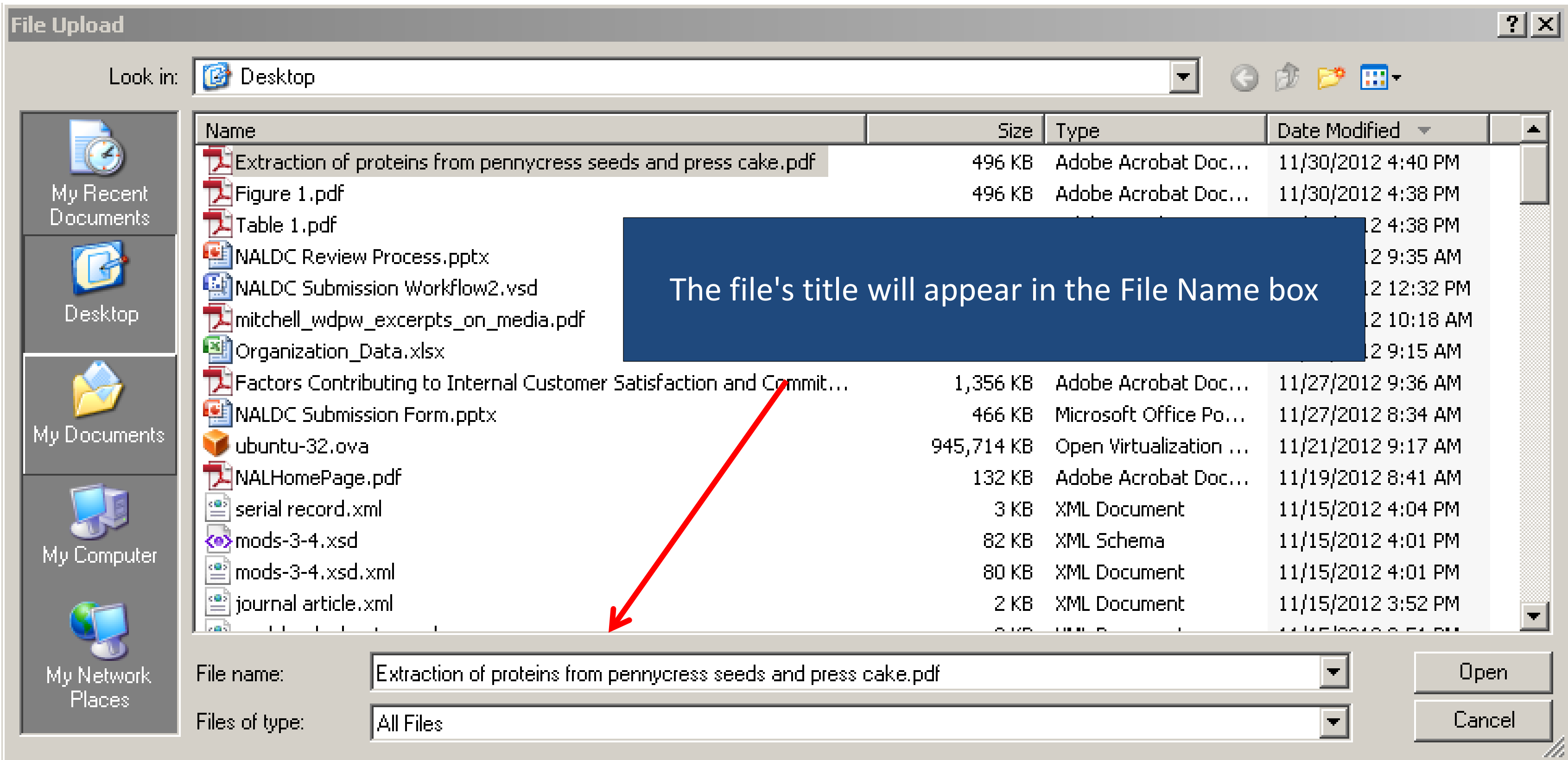
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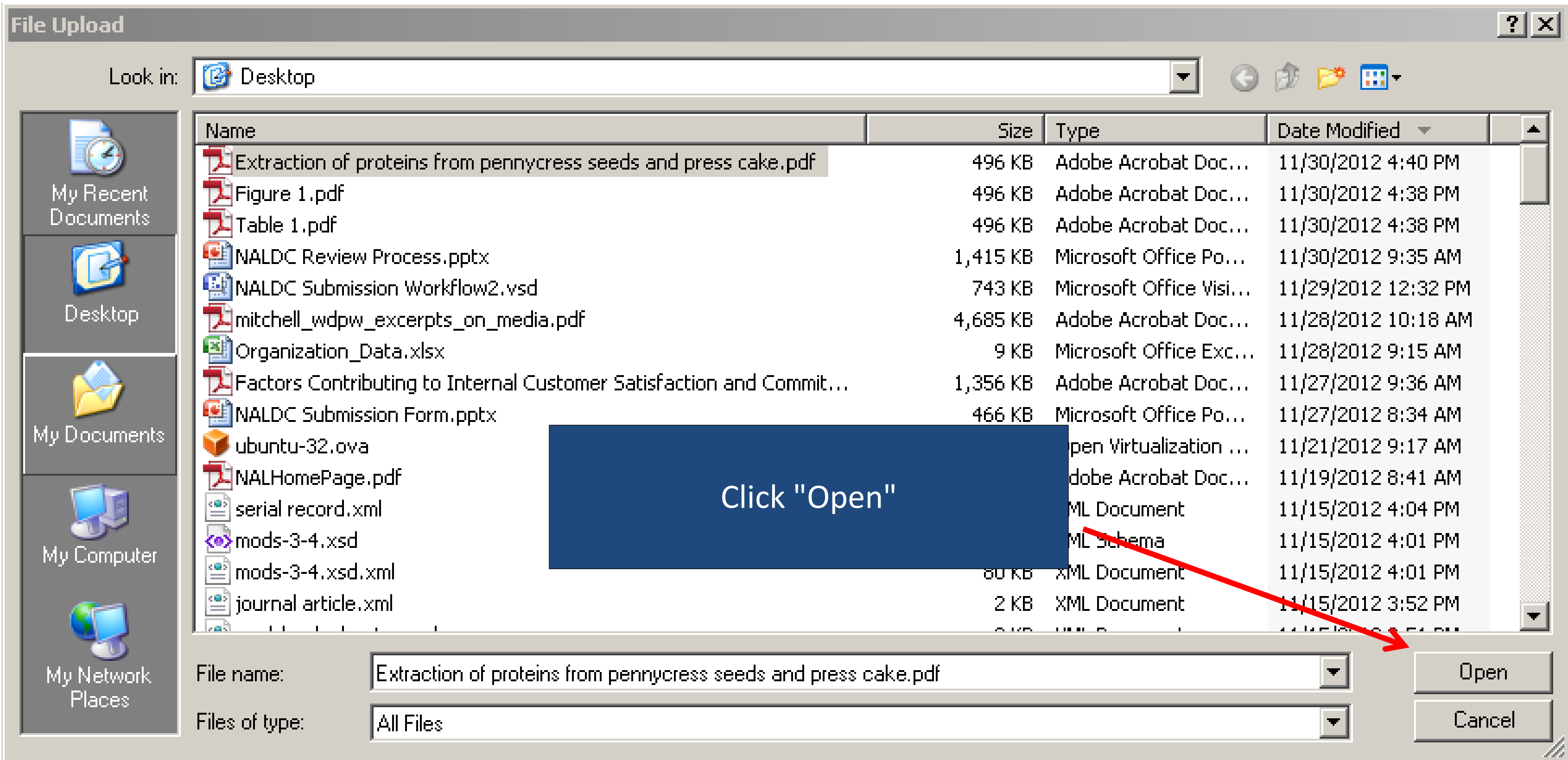

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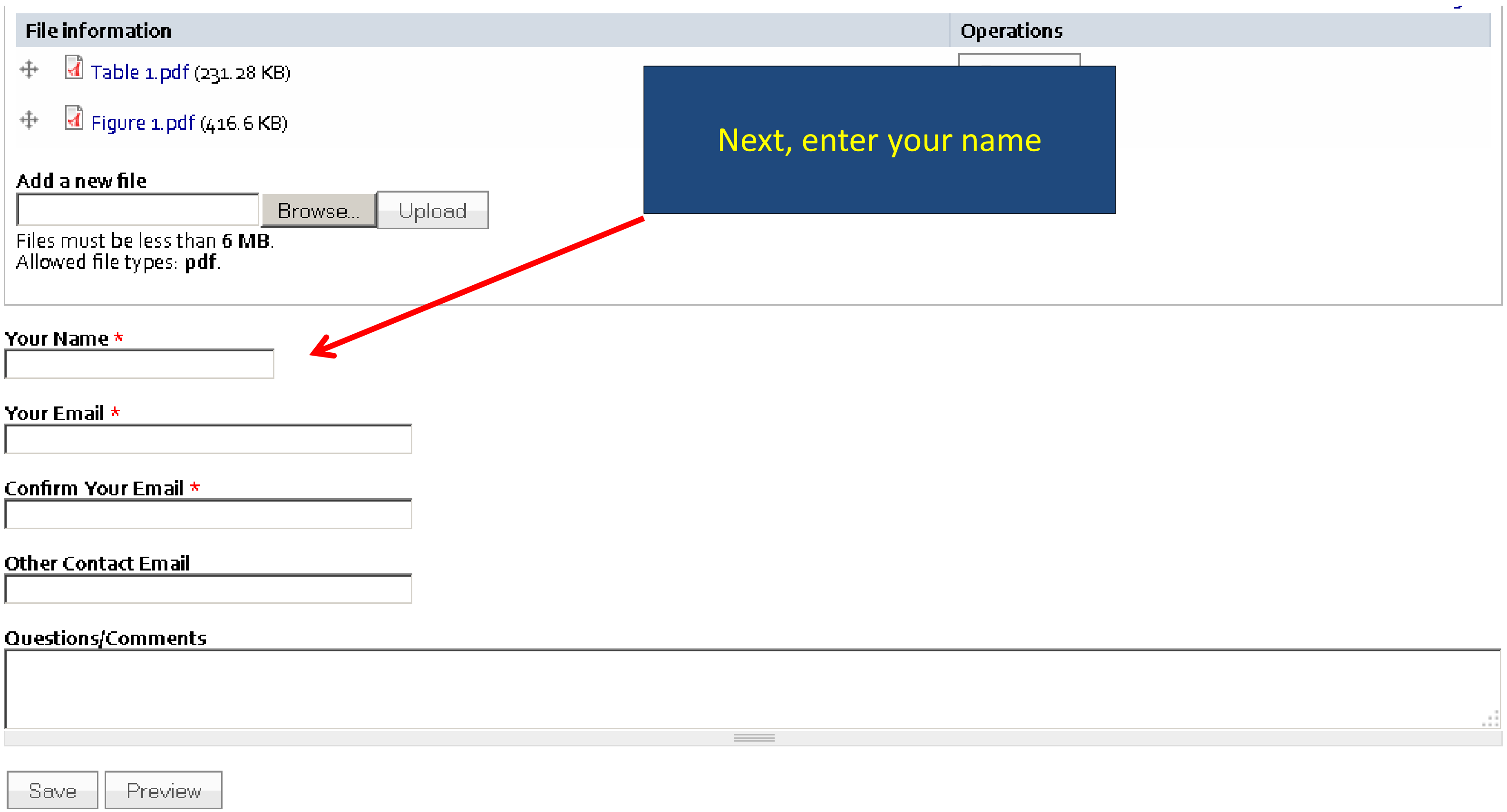
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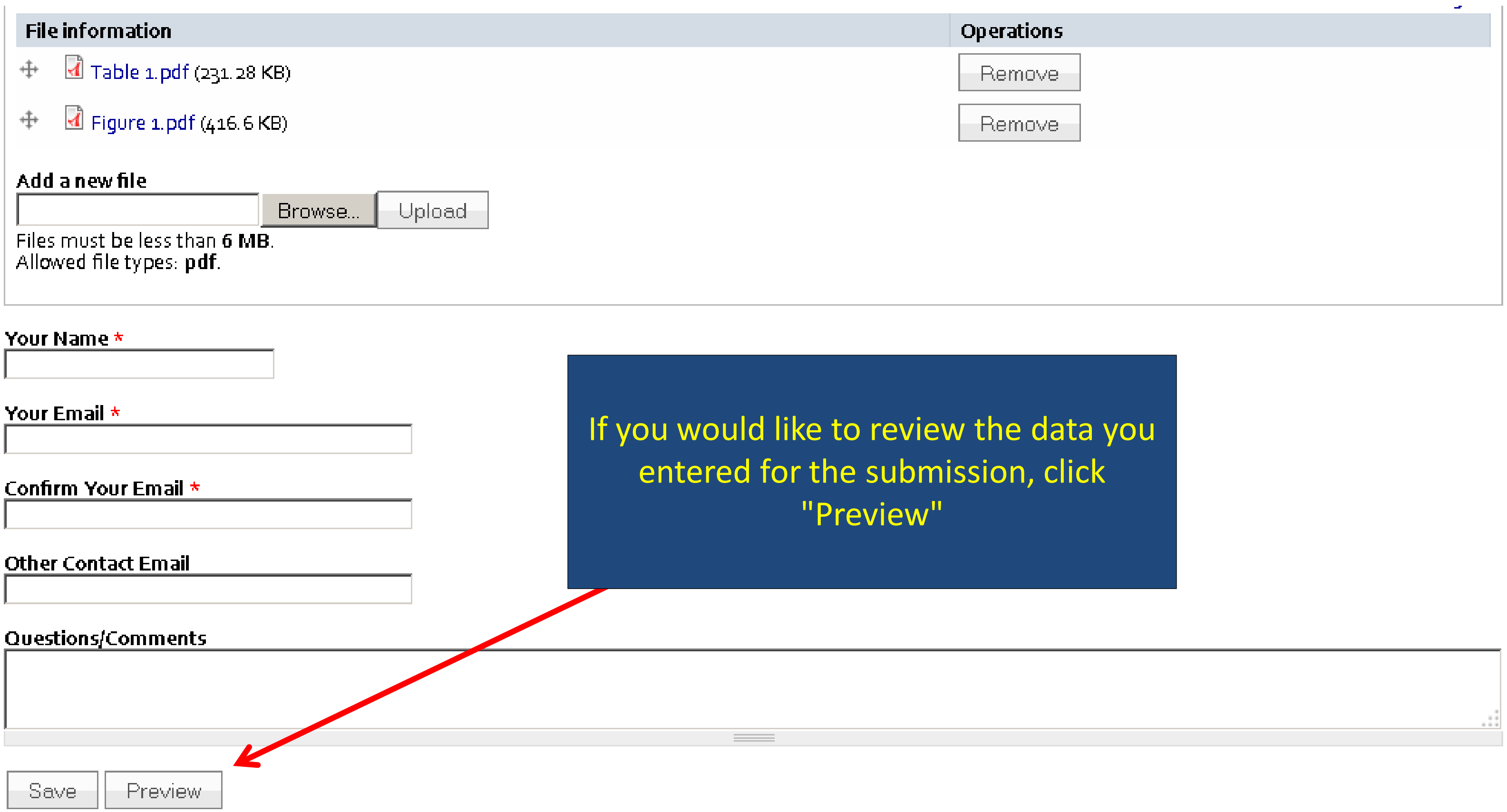

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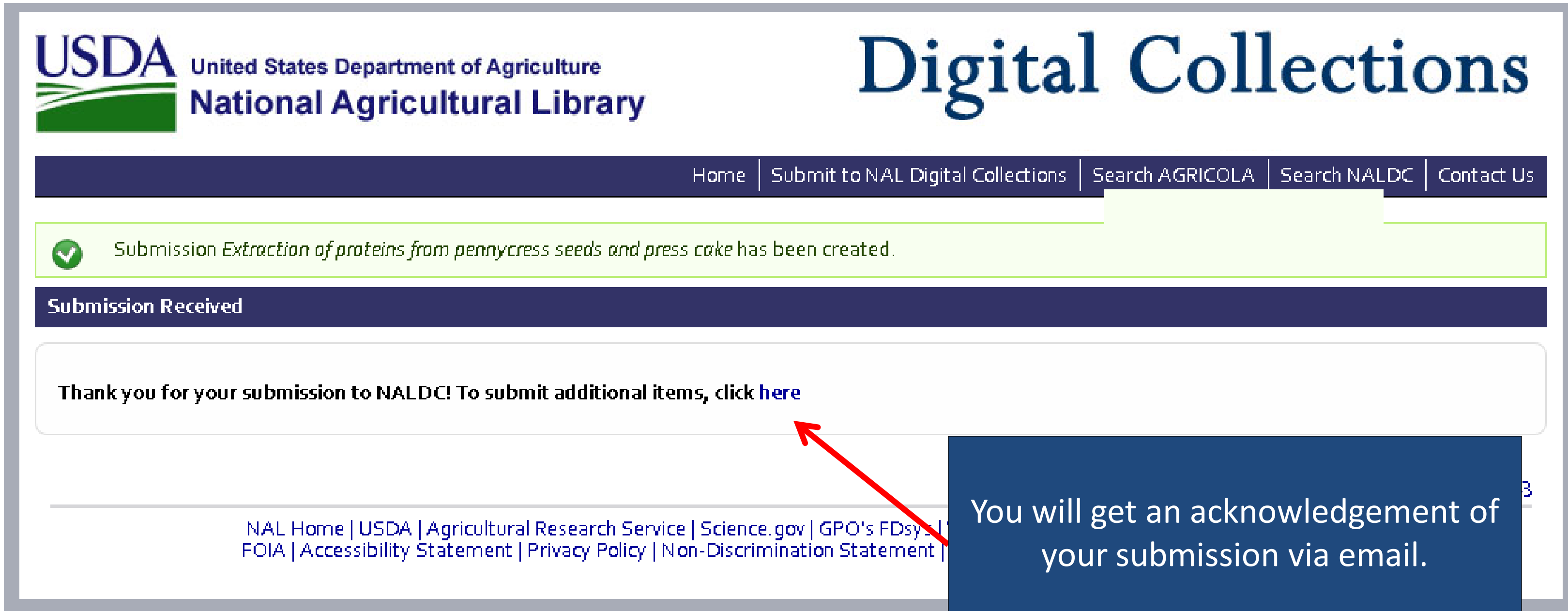

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